RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

Sustainable Drainage Approval Body

Ysgol Gyfun Cwm Rhondda

Pre-Application Enhanced Detailed Review Report

March 2026

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DOCUMENT VERIFICATION

Applicant	Stantec on behalf of Mr Pedro Vecina Galian of RCTCBC
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1 INTRODUCTION

1.1 PURPOSE OF THE REPORT

The purpose of the report is to undertake an appraisal of the site and assess the applications compliance with the National Standards. The report will also inform the applicant, where required, what additional information is required for the full application in order for the application to constitute as a validly made application.

1.2 SITE PROPOSAL

The proposed development includes the provision of a replacement Secondary School for the current Ysgol Gyfun Cwm Rhondda; redeveloped to accommodate 900 pupils. The new school building is proposed to be located within the existing school site boundary in the area of the site currently accommodating the existing Sports Hall and redgra sports area. On completion of construction of the new building, the existing school building will be demolished to allow for the construction of additional parking areas and sports provisions. Due to the requirement to keep the school operational during the construction phase, a phased construction is being proposed.

1.3 SUSTAINABLE DRAINAGE PROPOSAL

The proposed development is to be split into two phases. The first phase will consist of the demolition of the existing sports hall at the west of the site and two existing buildings to the west of the site

Network 1 - Sports pitch area:

The new permeable sports pitch is to consist of 4/20mm subbase and will drain via a series of perforated pipes which will drain to a flow control chamber (FC01) downstream. Attenuation is to be provided via geo-cellular crates beneath the pitch. Accessible parking area will also drain to the attenuated system and will consist of permeable surfacing with an underdrain outlet.

The Flow control is to restrict runoff to the greenfield runoff rate (8l/s) with discharge to an existing SWS at MH121 which runs along the western boundary of the site. This existing network conveys from north to south across the site before it discharges off site at the main site entrance.

Network 2 - New school building (Northern section of building)

The main building is to consist of a green roof which will drain traditionally into a surface water system which runs along the perimeter of the building. The hardstanding areas surrounding the building are to consist of permeable surfacing with an underdrain. Flows from these areas are to convey downstream towards a flow control chamber (FC02), which will restrict discharge to 20l/s. Attenuation is to be provided via a cellular storage tank. The flow control is to discharge to the same existing SWS network that the sports pitch is to discharge into, which runs from north to south along the western boundary of the site before discharging off site by the site entrance.

Network 3 - New school building (southern section and existing car park)

The southern section of the building is also to consist of a green roof which will drain traditionally into a surface water system which runs along the perimeter of the building. The hardstanding areas surrounding the building are to consist of permeable surfacing with an underdrain.

A proposed courtyard is to drain to two raingardens via lateral inflow and is to then drain downstream to the traditional network.

The applicant is proposing the existing car park to the south of the site will drain to the new proposed network here, despite the car park only having minor alterations to the kerb lines and re-surfacing works. The car park will be collected by beanie kerb drainage and discharged downstream to the same proposed network as above, which is to convey from west to east along the southern perimeter of the building.

Some hardstanding areas to the east of the building are to consist of impermeable surfacing and will drain to gullies prior to discharging to a proposed raingarden.

Flows from these areas are to convey downstream towards a flow control chamber (FC03), which will restrict discharge to 30l/s. Attenuation is to be provided via a cellular storage tank. The flow control is to discharge to the existing network which runs from south to north along the eastern boundary of the site at existing MH25. This network currently serves a portion of the existing buildings in the central catchment.

Network 4 - New access road & car parking/MUGA:

The new access road, some footways, and car parking will consist of permeable surfacing with underdrains. The MUGA areas are also to consist of porous surfacing with an underdrain. Some hardstanding areas (footpaths & access track) are proposed

to drain to the permeable surfaced areas, and will convey to the features as lateral inflow. Some areas are also to consist of impermeable surfacing and will drain to gullies/linear drainage prior to discharging to proposed raingardens. A filter trench is also proposed to collect some greenfield runoff in this catchment to stop runoff discharging onto the car park.

All runoff will convey downstream to a proposed SWS which runs from south to north along the western boundary. These areas are then to convey to FC04 which will discharge runoff to an existing SW situated at the very northeast of the site at a restricted rate of 20l/s. Again, attenuation is to be provided via cellular storage.

Therefore, in total, runoff is to discharge off site at a total rate of 78l/s to the various surface water sewers which serve the site currently.

Network 5:

To note, the applicant is proposing to install land drainage in the middle section of site along the sloping embankments between the sports pitch and proposed buildings. This is to drain the embankment and footpath linking the sports pitch to the school and discharge at an unrestricted to an existing surface water sewer which across the site from the existing sports hall to the northern boundary of the site.

Note: Portions of the existing access roads will also remain unaltered with slight kerb alterations at the eastern boundary of the site. These will remain as existing and will discharge at an unrestricted rate.

1.4 Site Location

The land to be developed is situated on the existing Ysgol Gyfun Cwm Rhondda secondary school site, located at Graigwen Road, Cymmer, Porth, CF39 9HA.

E- 302154, N- 190536

1.5 Submitted Documentation

As part of the application, the following documents were submitted:

- Pre-App Application Form
- 01 - Existing Site - Southern Car Park (Network 2) 2025

- 02 - Existing Site - Original Site (Network 3) 2025
- 03 - Existing Site - Original Site (Network 4) 2025
- 04 - Existing Site - Original Site (FW) 2025
- British Water Performance Declaration-en-gb-Downstream Defender Select
- CCTV Survey
- DDC12-100-C-300_Technical_Detail
- Design Datasheet-en-gb-Downstream Defender Select
- Downstream Defender Select 1200CV G.A..dwg
- Network 1 - North Muga (2025)
- Network 2 - Main Building (Western Outfall) (2025)
- Network 3 - Main Building (Eastern Outfall) (2025) P01
- Network 4 - East Muga (2025) P02
- Landscape General Arrangement Plan
- SHE-0130-8000-1100-8000_Design_Drawing
- SHE-0130-8000-1100-8000_Hydraulic_Characteristics
- SHE-0179-2000-2300-2000_Design_Drawing
- SHE-0179-2000-2300-2000_Hydraulic_Characteristics
- SHE-0188-2000-1715-2000_Design_Drawing
- SHE-0188-2000-1715-2000_Hydraulic_Characteristics
- SHE-0224-3000-1890-3000_Design_Drawing
- SHE-0224-3000-1890-3000_Hydraulic_Characteristics
- WRc Performance Declaration Certificate-en-gb-Downstream Defender Select
- YGCR-KCX-XX-XX-T-X-002001_Construction Environmental Management Plan_P02
- YGCR-STN-00-XX-D-C-000100 - Site Location - S2_P01
- YGCR-STN-00-XX-D-C-000400_Existing Drainage Plan_S3-P02
- YGCR-STN-00-XX-D-C-000500_Site Constraints Plan_S3-P02
- YGCR-STN-00-XX-D-C-001100 - Proposed Levels Plan_S3_P02
- YGCR-STN-00-XX-D-C-001400_Finishes Plan_S3-P02
- YGCR-STN-00-XX-D-C-001601 - Site Sections - Sheet 1_S3_P02
- YGCR-STN-00-XX-D-C-001602 - Site Sections - Sheet 2_S3_P02
- YGCR-STN-00-XX-D-C-001651 Typical Sections - Sheet 1_S3_P01
- YGCR-STN-00-XX-D-C-001652 Typical Sections - Sheet 2_S3_P01
- YGCR-STN-00-XX-D-C-003000 Proposed Drainage Whole Site_S3_P03
- YGCR-STN-00-XX-D-C-003001 Phase 1 Proposed Drainage Sheet 1_S3_P03
- YGCR-STN-00-XX-D-C-003002 Phase 1 Proposed Drainage Sheet 2_S3_P02
- YGCR-STN-00-XX-D-C-003003 Phase 1 Proposed Drainage Sheet 3_S3_P03
- YGCR-STN-00-XX-D-C-003011 Phase 2 Proposed Drainage Sheet 1_S3_P03
- YGCR-STN-00-XX-D-C-003012 Phase 2 Proposed Drainage Sheet 2_S3_P03

- YGCR-STN-00-XX-D-C-004100_Interception Plan_S3-P01
- YGCR-STN-00-XX-D-C-004200_Catchment Plan_S3-P02
- YGCR-STN-00-XX-D-C-004400_Exceedance Plan_S3-P02
- YGCR-STN-00-XX-D-C-004600_Maintenance Plan_S3-P01
- YGCR-STN-00-XX-D-C-004700_Water Quality Plan_S3-P01
- YGCR-STN-00-XX-D-C-005001_Kerbs and Paving Details Sheet 1_S3_P02
- YGCR-STN-00-XX-D-C-005002_Kerbs and Paving Details Sheet 2_S3-P02
- YGCR-STN-00-XX-D-C-005101_Drainage Details Sheet 1_S3-P02
- YGCR-STN-00-XX-D-C-005102_Drainage Details Sheet 2_S3-P02
- YGCR-STN-00-XX-D-C-005103_Drainage Details Sheet 3_S3-P02
- YGCR-STN-00-XX-D-C-005104_Drainage Details Sheet 4_S3-P02
- YGCR-STN-00-XX-IR-C-000001 - Cwm Rhondda Issue Register
- YGCR-STN-00-XX-L-C-000001 Foul Water Manhole Schedule_S3_P02
- YGCR-STN-00-XX-L-C-000002 Surface Water Manhole Schedule Phase 1_S3_P02
- YGCR-STN-00-XX-L-C-000003 Surface Water Manhole Schedule Phase 2_S3_P02
- YGCR-STN-00-XX-T-C-000002_Drainage Maintenance Report_S3-P01
- YGCR-STN-00-XX-T-C-000003_Water Quality Report_S3-P01
- YGCR-STN-00-XX-T-C-000005 Drainage Strategy Report_S3_P03
- YGCR-STN-00-XX-T-G-100000_Ground Conditions Desk Study_P03_S2 – Suitabl
- YGCR-STN-00-XX-T-G-100001_Phase 2 Ground Investigation Report_P02_S2 – Suitabl
- YGCR-STN-00-XX-T-W-000001-P03

2 Site Appraisal

2.1 Sustainable Drainage Application History

No sustainable drainage application has previously been submitted within the boundary of the development.

2.2 Existing Site Use

The land is currently occupied by the existing school buildings, paved access roads and paths, car parking and bus drop off areas, a sports pitch, and a redgra sports area.

2.3 Existing Site Drainage

The has provided a CCTV plan of the existing drainage which serves the site. The SAB have reviewed the submitted information and note the following:

Existing network 1: Sports pitch

The grassed sports pitch which serves the northeast of the site is drained via a series of perforated pipes which direct flows to the south-west corner of the pitch. From here, flows are directed towards a 225mm SWS which runs from North to South along the western boundary of the site ultimately conveying off site by the main site entrance.

This network also has connections from the northern part of the site from Bryn Crydd Road and from the redgra pitch area. This redgra is deemed to be an area of porous surfacing and runoff from this area is directed to the southwest boundary where it then conveys to the 225mm network.

Existing network 2: Car park/bus drop off:

This area currently consists of the existing parking area and is situated to the south of the main buildings. Runoff from this area currently falls to a drainage channel along the southern boundary, which collects runoff and conveys to the same outfall at the southwest corner of the site as noted above at MH72, which is the final outfall from site for this western network.

Existing network 3 & 4: Original school site:

The main school site utilises a combination of SWS and combined networks to discharge runoff off site, with 4 different outfalls noted in the existing drainage drawing. To note this contradicts the existing drainage layout drawings in the strategy which outlines 5 outfalls with the conveyance network being different, so clarification required here. Some of the buildings discharge into the foul/combined system before discharging off site, whilst others discharge into SWS outfalls.

Existing network 3: Some of the western building areas and the northern building in the central/lower section of catchment discharge into a SWS which discharges into a combined network before discharging off site at MH129.

The remainder of the building areas in the catchment appear to discharge into a 150mm SWS which discharges off site at MH130.

Existing network 4: The most northern buildings discharges into either a combined network outfall or a SWS outfall located at the northern boundary of the site, with two outfalls noted.

The northern section of the northern building discharges into the combined network which runs from west to east and discharges off site at the northern boundary via MH114.

The lower area of the northern building and building to the south discharges into a 150mm diameter SWS network which runs from west to northeast and discharges offsite via MH140 at the northeast corner of the site.

The end destinations of these networks beyond the site are unclear. However, in summary, there appear to be 2 primary SWS outfalls on site. One serving the central/southern building catchment area (existing 3), and another serving the lower section of the northern building catchment area (existing 4)

Existing network 5: Sports hall and land drainage between sports pitch and school site

In 2004, a new sports hall was constructed on the red gravel sports area. A new isolated surface water system was installed to serve this area, along with new land drainage to alleviate problems from runoff flow from the steep embankments.

The SWS system serving the hall directed runoff in a north easterly direction, out-falling to an existing SWS which runs from west to East along the northern boundary

of the site. This network varies from a 150mm network by the school pitch, up to a 675mm diameter section, and then back into a 225mm network downstream of the flow control (MH90 CP). It then remains a 225mm pipe up until the point of connection. It's noted the land drainage (150mm filter pipe) installed at the base of the embankment also discharges into this system upstream of the flow control chamber.

The flow control chamber is stated to have a 190mm orifice, with the 675mm pipe upstream acting as attenuation. It's stated historic drainage plans show the network at the northern boundary of the site serves a spring.

For clarity, the proposed destinations are proposed:

- (Network 1) Sports pitch is to discharge into western network (EX1) at greenfield QBAR
- (Network 2) Northern section of roof is to discharge into the network the southern parking area used to previously (EX2). Existing rate from car parking area to inform discharge of northern roof section. Red gra area removed from this analysis as how area drains unclear but it is assumed does contribute to this system.
- The existing car park and southern roof section of the new proposed building (network 3) is to discharge into the existing network (EX3) which currently serves the central/southern building catchment of the original school site.
- The new parking areas, and access tracks are to discharge into the existing system (EX4) which currently serves the northern building areas.
- (network 5) Land drainage serving embankments and paths are to discharge into the existing system (EX5) which currently serves the sports hall and existing land drainage

2.4 Flood Risk Review

Following a review of the Flood Map for planning, it was found that the site is situated predominantly within a zone 1 flood risk extent, however zone 2 & 3 flood risk is noted on site, which can be attributed to runoff becoming stuck behind the buildings in the model and is likely not representative of the true surface water flood risk.

Figure 1. Flood risk zones as per NRW flood map for planning

2.5 Environmental Impact Assessment

The applicant has stated that the proposed development does not require an environmental impact assessment, and therefore the determination period for the full application will be 7 weeks once the application is determined as validly made.

2.6 Ordinary Watercourse Consents

Since the Lead Local Flood Authority became responsible for authorising ordinary watercourse consents (OWC) in 2012, no OWC have been authorised within the boundary of the site.

2.7 Dwr Cymru Welsh Water Apparatus

Following a review of the Dwr Cymru Welsh Water (DCWW) GeoWeb, no DCWW apparatus was identified within the site boundary. However, it is recommended that Dwr Cymru Welsh Water be contacted regarding any abandoned apparatus, as this is a brownfield site.

2.8 Ordinary Watercourses

No known ordinary watercourses lie within the boundary of the site. The nearest open watercourses are situated some 130m to the south of the development.

2.9 Main River

No main river lies within the boundary of the site. The nearest main river is the Afon Rhondda situated some 0.7km to the northeast of the site.

2.10 Assets

There are no known land drainage assets situated within the boundary of the site, however a SWS has been identified to the northwest of the site, whilst a culverted watercourse is noted to the south.

Figure 2. Assets near the site.

3 VALIDITY OF APPLICATION

3.1 REQUIREMENTS FOR A FULL APPLICATION

Paragraph 9 (2) of schedule 3 states that an application must be in any form required by the Approving Body. Within Regulations 'The Sustainable Drainage (Approval and Adoption Procedure) (Wales) Regulations 2018', regulation 3 states that an approving body may refuse to determine an application for approval which is not made in accordance with Paragraph 9(2) of Schedule 3.

The table below summarises the general documentation determined to be the minimum required to constitute a valid application, based on the development proposed. Table A and Table B found within the "Guidance on completing the full application form" has been utilised to determine the required documentation for a validly made application.

It is recommended that the applicant considers Table A and Table B prior to submitting a full application to the SuDS Approval Body (SAB). Supporting documentation required for each of the standards is stated and discussed in chapter 5 "compliance with National Standards" of this report.

Please note that where insufficient detail has been found on a drawing, that documentation has been determined to not be provided.

The SAB application form must be completed in full.

Table 1. General documentation required for the Full Application

Supporting Documentation			
Criteria	**Information/ Documentation**	**Provided**	**Required**
General	Drawing Issue Sheet	**Yes ☒ No ☐**	**Yes ☒ No ☐**
Site Plan	Construction Area Extent	**Yes ☒ No ☐**	**Yes ☒ No ☐**
	Location Plan	**Yes ☒ No ☐**	**Yes ☒ No ☐**
EIA	Statement	**Yes ☐ No ☒**	**Yes ☐ No ☒**
Non-Performance Bond	Cost of entirety of drainage system	**Yes ☐ No ☒**	**Yes ☒ No ☐**

3.1 Construction Area and Associated Fee

An applicant must pay the correct fee in order for the application to constitute as a valid application. Each full application will be charged by the SAB in accordance with the regulations i.e. the application fee is related to the construction area of the proposed development. A review has been undertaken regarding the construction area and an estimate can be found in the table below.

Table 2. Required Fee based on an estimation of the Construction Area

Criteria	Estimated construction area (ha)	Required Fee (£)	Comments
Application fee	4.6	£1,670.00	Applicant needs to define construction area.

It is of note that the Application fee does not need to be provided to the SAB until the SAB has confirmed the validity of the application. Please visit the below webpage address which states the process of submission and validation for a full application.

Web Link - www.rctcbc.gov.uk/sustainabledrainage

4 ADOPTION

4.1 REQUIREMENT FOR ADOPTION

The SuDS proposed is designed to provide drainage for a single property as defined by Regulation 9 of The Sustainable Drainage (Approval and Adoption Procedure) (Wales) Regulations 2018 and therefore **the SAB does not have a mandatory duty to adopt** as per the exemption detailed in paragraph 18 (1) and (2) of Schedule 3 of the Flood and Water Management Act 2010.

Table 3. information required to determine adoption requirements

Supporting Documentation			
Criteria	**Information/ Documentation**	**Provided**	**Required**
Quantities	List of the SAB adoptable drainage items (and associated units/quantities)	**Yes ☐ No ☒**	**Yes ☐ No ☒**
Plan	Adoption Plan	**Yes ☐ No ☒**	**Yes ☐ No ☒**
Statement	Landowner Statement (intention of ownership)	**Yes ☐ No ☒**	**Yes ☐ No ☒**

5 MEETING

A virtual meeting was held on 6thMarch 2026. The meeting was attended by the following:

- DM – Daniel Mathias
- BM – Bethany Morgan
- ML – Mark Lewis
- AS – Andrew Stone
- NH – Nick Hamersley
- SB – Scott Bowler
- JK – Jessica Knight
- AA – Ahsen Aslan

Meeting started at 09:00

5.1 SUMMARY OF DISCUSSION

Meeting Overview

DM opened the meeting and invited attendees to introduce themselves. Following introductions, DM outlined the proposed structure of the meeting. It was agreed that DM would present his review of the drainage strategy against the relevant SAB standards, with discussion and clarification provided by the project team where required.

S1: Drainage Hierarchy, Rainwater Harvesting and Discharge Destinations

DM noted that, from an S1 perspective, the strategy proposes the use of rainwater harvesting. Although this is not yet shown on the layout, DM advised that this would be expected to come forward at a detailed design stage.

DM also noted that rainwater harvesting would not be capable of managing all runoff from the site, but confirmed that, given the nature of the site, its inclusion is still expected. DM advised that the Full Application should include construction details, tank sizing and a yield-demand calculation to demonstrate that the system has been sufficiently sized.

ML clarified that the rainwater harvesting system will not serve the whole roof or the whole building, as a large proportion of the roof will be occupied by PV panels, green roof and bio solar, accounting for approximately 70–80% of the roof area. ML explained that rainwater harvesting will therefore apply only to a smaller proportion of the roof and will contribute towards demand rather than meeting the whole demand.

DM confirmed that he had no issue with this approach and reiterated that the finer design details would be expected at Full Application stage. DM again acknowledged that it would not be viable for rainwater harvesting to manage all runoff from the site.

Priority Level 2: Infiltration and Ground Conditions

DM noted that, based on the ground conditions and the GI information provided, infiltration is not a viable method to manage runoff and confirmed that he was satisfied with this position. DM advised that it would therefore be acceptable to move to a lower priority destination level.

DM noted that the strategy proposes permeably lined features, which from RCT's perspective is beneficial as this would allow greater losses to ground and support compliance with the interception criteria. However, DM advised that the Full Application should include an assessment to demonstrate that allowing infiltration in these areas would not result in non-compliance with the standards.

In particular, DM stated that where infiltration is proposed near infrastructure, buildings or retaining walls, the applicant should demonstrate that it would not pose any risk of instability and, given the extent of made ground on site, would not increase the risk of groundwater contamination. DM confirmed that if there are locations where impermeably lined features are required due to these risks, he would have no issue with that and would not object to such an approach from an interception basis.

ML confirmed that the main building is acceptable in this regard because it will be piled, but further checks will be undertaken in relation to the retaining walls. DM highlighted one potential instance around the MUGA area where a relatively deep structure appears to be located adjacent to a retaining wall and suggested that an assessment may be needed there to demonstrate that no risk would arise.

ML confirmed that the MUGA retaining wall will be designed to resist the water pressure associated with retaining water at a higher level behind it and will therefore be designed accordingly to accommodate those conditions.

Priority Level 3:

DM then noted, in relation to Priority Level 3, that there are no nearby surface water bodies and that any such connection would require extensive conveyance infrastructure or access arrangements. DM confirmed that this was not considered a viable option. In summary, DM confirmed that he was satisfied with the proposal to proceed to Priority Level 4 and use the existing connections on site and raised no objection from an S1 perspective.

S2: Interception Criteria

DM noted that, with regard to S2 and the interception criteria, the strategy has maximised permeable surface across the site. DM advised that areas which are permanently surfaced would be compliant, whether or not some of those areas ultimately need to be lined.

DM also noted that rain gardens are proposed to drain the courtyard areas and, although they are not technically sufficiently sized as per the standards, he would not raise an objection to them. DM considered that interception has been maximised where possible and noted that the proposed rainwater harvesting would provide additional benefit and reuse.

DM acknowledged that there are a few areas which are technically non-compliant, such as the footpaths, but confirmed that, when looking at the site overall, he had no real objections from an interception perspective. DM advised that, provided the Full Application demonstrates that the features are appropriately designed, he could not see any red flags.

Proposed Discharge Rates and Network Strategy

DM reviewed the proposed discharge rates for the various drainage networks.

For Network 1, relating to the sports pitch, DM noted that the proposal is to discharge at Greenfield/ Greenfield Q2, understood to be approximately 8 l/s. DM advised that the greenfield runoff estimation had not been submitted, but that his own calculations indicated that the proposed rate appeared to be about right. DM requested that a runoff estimation be included at Full Application stage to demonstrate that the proposed rate has been appropriately calculated. Subject to that, DM raised no objection.

For Networks 2 and 3, DM advised that he had no real objection to the methodology, namely to discharge at Q2 30% betterment rate on the existing connection in which discharge is proposed and confirmed that this was the correct procedure. DM noted that the existing calculations had been based on the original survey, but that later survey works had since been undertaken, particularly in relation to Network 3.

ML clarified that Network 3 is the southeastern outlet and advised that the outlet rate is now proposed to be reduced from approximately 20 or 30 l/s down to 10 l/s. ML explained that, following further analysis of the existing on-site drainage and the existing pipes through the site, it had been identified that the current system floods in approximately a 1 in 18 year storm, that after Phase 1 it would flood in approximately a 1 in 22 year storm, and that after Phase 2 it would not flood. ML explained that the capacity of the on-site pipes is restricting the allowable discharge rate even further than previously anticipated and that reducing the outlet to 10 l/s would therefore achieve even greater betterment.

DM confirmed that this was positive and reiterated that, in principle, the requirement is for each network to discharge at Q2 30% betterment or better.

DM noted that the main issue appeared to be with Network 4, where it looked as though combined foul and surface water flows had been used to derive the discharge rate.

ML confirmed that those numbers would be reviewed and that only the flows which actually enter the storm system would be used. ML also advised that further analysis had identified additional cross-connections and that the revised reporting would emphasise the benefit to Welsh Water of removing more surface water from their system.

DM advised that, at Full Application stage, he would require the existing drainage route to be clearly shown, along with the existing contributing areas to each network, the exact areas being drained, and the collection mechanisms, including downpipes and gullies, to demonstrate that those areas are actually being collected and routed into the system. DM requested a revised model showing the Q2 rate. The proposed rate should then be a 30% betterment on this, and the basis for the proposed discharge. ML acknowledged that this meant further work would be needed on Network 4.

DM also noted that the footpaths would be freely draining into the system, but confirmed that he had no objection to this, as the additional impermeable area is nominal and the network already has its own restriction.

ML explained that there is an orifice on the downstream end of a 600 mm diameter attenuation pipe, and that calculations had been included to show that the path area is less than the roof area of the existing sports hall.

ML also noted that the bank already drains to the filter drain, meaning that while the path increases runoff off the bank, it does not materially increase the overall flow.

DM confirmed that this was sufficient, provided the submission clearly shows the existing and proposed contributing areas.

Hydraulic Modelling, Sports Pitch Network and Software Discrepancies

DM advised that, when he ran the sports pitch network model, he obtained approximately 40 m³ of flooded volume, which was not shown in the submitted printout. DM noted that all other calculations broadly aligned with the submitted printout and suggested that the discrepancy may be related to differences in the software version used.

ML asked which version of InfoDrainage was being used.

DM advised that he was using 2026.4.

BM confirmed that the submitted model had been run in 2025, as the 2026 version had not worked properly in relation to CAD imports.

BM advised that the issue would be revisited and that the model would be rerun to confirm that the sports pitch does not flood.

DM also noted some small discrepancies between the manhole schedule and the hydraulic models but advised that these were likely to be resolved at detailed design stage. DM stated that there was only one FC invert level which appeared to be out.

In relation to the sports pitch, DM advised that, based on the current proposal, he would prefer the pitch not to be split into two sections in the model unless a clear separation is provided, as the slope means that the upper section would attenuate more runoff. BM confirmed that the design team would need to speak to the pitch designer to resolve this.

ML advised that the pitch drainage will be reviewed because the pitch area will be used as a temporary construction compound. ML stated that there is a desire to

get the tank in early to accommodate flows, and that this may result in the tank being located more towards the southeastern corner.

Sports Pitch Drainage, Cellular Storage and SDS Detail

DM queried the cellular storage design and noted that the underdrains appear to run adjacent to the tanks, with the inlet and outlet mechanism effectively occurring via filtration through the surrounding material.

ML advised that the design intention is to use an SDS system and that there is no physical connection into the tank. ML explained that this arrangement is intended to minimise the chance of silt entering the tank, with water passing from the filter pipe into the stone, through the membrane and then into the tank, and being washed back out as the tank empties.

DM queried whether the SDS detail included a filter trench through the feature. ML clarified that the filter trench either runs through or alongside the feature but is not physically connected to the tank. DM noted that, provided the trench is within the tank or immediately adjacent to it, and suitable access points are provided, he would have no issue with that arrangement. DM explained that his original concern was that it had appeared to be a simple joined sub-base arrangement, in which case access through the feature would not have been available

ML confirmed that the intention is to progress the detail further with Kier and the sports pitch manufacturer, particularly because the relevant components will need to be brought in early.

ML advised that the current intention is to use larger filter pipes, likely approximately 225 mm to 300 mm diameter, and for the underdrains from the pitch drainage to connect into those pipes. ML also noted that the filter pipes have been extended sufficiently far into the pitch to allow rodding access, but that the arrangement will now need to be refined further to accommodate the construction phase runoff.

Flow Controls and Overflows

DM noted that the submitted flow control details include overflow pipes and advised that RCT would generally expect overflows to be incorporated. However, DM requested confirmation at Full Application stage that the overflow levels are located above the maximum water level in the system but also below exceedance

DM also emphasised that overflow levels must be buildable in practice, noting that on some sites overflow levels have been proposed too close to cover levels to be practically constructed. DM further advised that, particularly in cases where the low point in the system is remote from the flow control, the overflow level should be set below the relevant exceedance point so that the overflow takes effect before water escapes elsewhere within the system.

ML confirmed that actual hydraulic details would be prepared rather than relying solely on generic typical details.

ML noted that this is an issue they have picked up on other jobs and that, where space is tight, options such as an internal backdrop using a vertical pipe or an adjacent gully could be considered. ML confirmed that all overflow arrangements would be checked to ensure that they are buildable.

DM confirmed that, if there are difficulties, and the consequences of failure are acceptable because the water would be captured by a downstream system, he would not object to the use of a bypass.

ML advised that the only location where he could not yet confidently say the overflow arrangement would work is the pitch, whereas the other locations have sufficient depth and are not expected to present a problem.

Cellular Storage Porosity, Typical Details and Paving Depths

DM noted that, when modelling cellular storage, the porosity needs to reflect the SDS design. DM explained that where a substantial filter trench or pipe passes through the feature, the tank cannot simply be modelled using a standard very high void ratio, and the model should reflect the actual arrangement.

ML confirmed that, in their approach, the tank size in InfoDrainage is taken as the actual tank size and the filter drain is excluded from that volume. DM confirmed that this was appropriate.

DM then referred to the typical detail and heavy-duty detail and advised that he would like clarity on where each detail is proposed, for example around the playground and car park areas. DM also requested that the InfoDrainage model make clear that the paving depths relate only to the sub-base depth. DM noted that a provisional depth of 150 mm appears to have been used, which may be conservative in some locations, and that the proposed levels plan otherwise appeared acceptable, with the permeable paving apparently modelled to the exceedance levels.

S3: Treatment, Filter Drains, Rain Gardens and Underdrains

DM advised that, from an S3 perspective, the green roof will provide interception and treatment of runoff and that there are sufficient permeable surfaces on site to provide treatment for their own areas.

DM noted that the access road and two parking areas will drain a small amount of impermeable area and provide treatment for bilateral inflow but confirmed that this remains within the 2:1 threshold and is therefore acceptable.

DM also noted that the resurfaced parking area is proposed to drain to a downstream defender, which represents a betterment, even though technically it would not be necessary to include it as part of resurfacing. DM advised that, ideally, an advanced vortex unit would be preferred, as that would provide the necessary mitigation indices, although he acknowledged that this could not be required because the area is not strictly subject to the standards in the same way as new SAB construction.

In relation to the filter drains, DM noted that topsoil is currently proposed above them, whereas RCT would normally prefer clean stone aggregate, or enhanced filter medium. However, DM acknowledged that on a school site clean stone at the surface may not be acceptable, and therefore requested that engineered filter medium be used in place of topsoil.

ML clarified that the path does not drain directly into the adjacent filter drain but instead drains overland to the downstream bank, and that a small filter trench is proposed to encourage water into the topsoil layer rather than over it. DM noted that there is presently a stone trench at the bottom taking the footpath runoff while the filter drain serves the greenfield land, and that on other school sites exposed stone has often not been acceptable.

ML confirmed that, on previous school schemes, stone on the surface had indeed not been accepted and explained that baffles would be introduced at intervals along the trench due to the longitudinal fall, so that water would be directed perpendicular to the path rather than flowing along the trench. DM confirmed that this approach was appropriate, and ML agreed to add more detail.

In relation to the rain gardens, DM confirmed that he had no issue with them in principle but requested a standard detail at Full Application stage, and then bespoke where differs from the standard. DM noted that the current design shows 500 mm filter medium, 150 mm depression depth, and grated inspection chamber covers, all of which appeared acceptable. DM requested confirmation

that the chamber covers would sit below the exceedance level of the rain garden. BM advised that the manhole schedule already shows them 25 mm below the top of the rain garden, however exceedance of all RG isn't fully clear/. ML also noted that the water level at the grated weir level could be shown in the 3D model. DM confirmed that, if this is the case, then he had no issue.

DM then referred to the underdrains and noted that they appear to be shown within a Type S bed. DM advised that RCT would normally prefer the drainage layer to be formed using 420 mm aggregate, with the perforated pipe located approximately 50 mm above the base, and that they do not typically see the Type S bedding detail used beneath the pipe anymore.

ML explained that the finer stone had been used to accommodate the pipe because 420 aggregate is more difficult to compact but confirmed that the detail could be changed back to all 420 aggregate if preferred.

DM also requested that the geotextile shown on top of the sub-base in the heavy-duty porous asphalt detail be removed. ML confirmed that this was already being removed because the laying machine would rip it up. ML explained that the current proposal is to blind the surface very lightly with bedding material to create a more stable laying surface for the tarmac.

DM understood this as a 2–6 mm grit blinding layer over the sub-base. ML clarified that it would only be a very thin blinding layer, enough to fill the upper voids and create a slightly denser, more stable surface, in accordance with Interpave guidance. ML also noted that the permeable paving designs are already slightly conservative on storage depth, so the blinding layer would not affect the overall void ratio significantly.

DM requested that the Full Application include a formation level drawing to clarify the formation level of each permeable paving area, in addition to the surface levels. ML confirmed that this could be provided and noted that some paving formations will vary in depth, for example increasing from 300 mm to 400 mm, because the bases have to be formed to fall back towards the filter drain.

DM concluded that, overall, he had no real red flags from an S3 perspective.

S4 and S5: Amenity and Biodiversity

DM advised that the scheme includes some rain gardens but not an extensive use of green SuDS. However, given the nature of the site, and particularly the fact that it is a school, DM confirmed that he had no objection from an S4 or S5

perspective. DM noted that rain gardens around buildings are not always ideal on school sites.

DM also noted that many of the permeable surfaces on site will have a dual function and will provide amenity benefit, including the pitches and MUGA areas. DM confirmed that he had no issues from an S4 or S5 perspective.

S6: Construction Phasing, Temporary Runoff Management and CMP

DM advised that the key discussion point under S6 would be the phasing of the works, the Construction Management Plan, and how runoff would be managed during the interim period before completion.

DM noted that it appeared the scheme would use crates during the construction phase and queried whether these would be the same as the proposed crates. DM advised that the key issue was ensuring that, if these features are used during construction, they are properly remediated prior to completion so that they are not handed over full of silt from the construction runoff.

ML explained that the intention is for the area around the school to be surfaced in tarmac during the construction phase so that it acts as an impermeable working surface. ML further explained that a metre or so around the edge would be left without tarmac, where sacrificial stone and an extra wrap of geotextile would be provided. The purpose of this is to capture any silt runoff from the tarmac in the filter drain zone and prevent it from reaching the tanks.

ML also advised that Kier intended to use a siltbuster from the outset to manage runoff. Once the building is piled and the area around it can be surfaced in tarmac, the site will become more stable and cleaner for plant movement, thereby reducing silt runoff because construction traffic will no longer be moving through mud.

DM clarified his understanding that, around the permeable paving areas, the formation and sub-base would be built, then the asphalt concrete layer would be placed so that the area acts as a fully impermeable temporary traffic surface, before being cored later and brought up to final completion in Phase 2. ML confirmed that this was correct.

DM requested that all of this be clearly reflected in the Construction Management Plan, including exactly how the system will be built, how the SuDS elements will be protected, and how runoff and sediment will be managed.

ML advised that further sections are already being developed to illustrate the phased nature of the construction and reiterated that the intention is to get a hard surface down as early as possible so that scaffolding and plant can operate on a stable surface rather than driving through mud and contaminating the sub-base.

DM then asked about the time lag between Phase 1 and Phase 2. NH explained that enabling works will commence in Summer 2026, including demolition of a couple of buildings and installation of the attenuation tank at an early stage. NH confirmed that Phase 1 of the school building is expected to be handed over in Summer 2029, and that Phase 2, including demolition of the existing site and the pitch works, is expected to continue for approximately one further year, concluding around October half term 2030. ML clarified that the process will be continuous, with the children decanting into Phase 1 and the existing buildings then being demolished.

DM queried whether the proposed discharge arrangement during Phase 1 would mean that the car park continues to drain as existing. ML explained that, following demolition of the existing buildings, attenuation will be installed to the southeast of the school and runoff from the car park will be rerouted into the eastern system at a very low rate, around 1.5 l/s, so as not to flood that system. ML explained that this in turn relieves the southwestern system and allows the building runoff to be added.

DM then sought confirmation that this would not increase flood risk between Phase 1 and Phase 2. ML and BM confirmed that the existing Network 3 currently floods in approximately a 1 in 18-year storm, that with 1.5 l/s from the hydrobrake the Phase 1 arrangement is acceptable up to approximately a 1 in 22-year storm, and that once the existing buildings are demolished the final arrangement performs to a much higher standard. ML confirmed that this is why the Network 3 discharge has been reduced from 30 l/s to 10 l/s to manage the construction phase, acknowledging that while it may be non-compliant against a full final design standard during construction, it is still better than the current situation.

DM confirmed that this made sense and requested that this be explained in the Full Application, ideally by means of a short technical note within the drainage strategy.

Maintenance, Chambers and Beany Kerb Drainage

DM advised that the submitted maintenance plan was of a very good standard and was one of the better maintenance plans he had seen. The only item he considered to be missing was the schedule for the downstream defender, which

he expected would simply need to be added in accordance with the manufacturer's guidance.

DM confirmed that, overall, he had no real issues with the maintenance proposals. He noted that the manhole design and schedule were mostly acceptable and appeared to be based on Sewers for Adoption 7th Edition, but that there were a few instances where chamber sizes might need to be increased.

ML confirmed that the chambers along the side of the school would need to be increased in size and explained that this had arisen because a late pipe size upgrade had been made without updating the manuals.

DM advised that, given the traffic loading, he would probably want those chambers to be precast Type 2 chambers rather than inspection chambers. DM also raised potential concern in relation to beany kerb drainage, noting that Highway colleagues often raise concerns about this type of drainage in urban areas because maintenance by jetting can spray silt and sediment around. DM suggested that the team may need to discuss this with Highways, who might prefer traditional gullies or linear drainage channels.

ML responded that he had used combined kerb drainage extensively on highway schemes and considered that the issue related more to maintenance procedure than to the drainage type itself. ML also noted that such systems are often preferred around schools because of their robustness and capacity. DM reiterated that Highways often do raise concerns and that this should therefore be discussed with them.

ML advised that the maintenance plan may be expanded further to provide more practical guidance for the school, such as what can be addressed by litter picking, when a jetter may be needed, and when confined space training may be necessary. DM welcomed this and commented positively on the fact that the maintenance submission already contained far more narrative than is normally provided.

DM concluded that, other than the issue with Network 4, he had no real red flags from an S6 or overall application perspective.

Construction Runoff Permissions, Surface Water Consents and Flocculant Query

ML raised a further query, not strictly relating to the SAB elements, concerning whether any additional permissions or permits would be required for the

construction phase runoff. ML explained that further downstream CCTV investigation had now been undertaken beyond the site boundary, confirming that the relevant surface water outlets discharge into a surface water pipe running parallel to a foul pipe.

ML asked whether any permits or permissions would be needed for discharging construction waste, for example through RCT Drainage.

DM advised that, in terms of managing interim surface water runoff, the key requirement is a Construction Management Plan setting out how surface water runoff, pollution, silt and sediment will be managed without increasing runoff or pollution off site. DM noted that this can either be submitted at Full Application stage or conditioned later. DM emphasised that RCT's interest is limited to the surface water element and that the CMP should clearly explain how the SuDS features will be constructed, protected, used during construction if relevant, and remediated prior to completion.

NH then referred to the CMP already submitted and asked whether RCT had received it. DM confirmed that he had received it, but that more detail was needed, particularly in relation to the phasing around the outside of the site, which ML had already discussed.

NH then explained that the intention is to demolish two buildings, install the attenuation tank and hydrobrake, and route construction runoff through a siltbuster before it enters the attenuation system, so that the discharge enters the permanent system clean and at the same slow rate as the permanent scheme. NH confirmed that further wording would be added to explain the use of temporary stone, tarmac, removal of the sacrificial material and replacement with final construction.

NH then asked whether, once the runoff enters the system and ultimately discharges to the highway storm drain, any permission would be required from the highway authority, NRW or Welsh Water.

DM advised that, because the proposal is using an existing connection on site, no additional permission would be required from the highway authority, NRW or Welsh Water in relation to the surface water element. DM clarified that such permissions would be needed only if a new connection into the highway network were proposed. DM also noted that any foul water connection would need to be dealt with separately through Welsh Water, and that SAB approval does not itself confer any right to connect. NH confirmed that the proposal would not make the

existing situation worse and that only clean water would be entering that surface water system.

SB then raised a further query regarding the potential use of a flocculant with the siltbuster to improve treatment of clay-laden water and reduce turbidity. SB asked whether RCT would have any concern or preference in relation to such an approach.

DM advised that RCT would not generally become involved in that aspect and that, if flocculants were to be used, this would be a matter to discuss with Natural Resources Wales, given that the highway system would ultimately discharge downstream to a main river. DM reiterated that RCT's concern is that the construction runoff itself is appropriately managed on site, and that they would not have the relevant expertise to comment on the acceptability of treatment additives.

SB confirmed that, if flocculant appears to be the sensible way forward, further consultation through NRW's pre-application service could be undertaken. NH added that it would also be sensible to have a further discussion with siltbuster in light of the environmental implications.

Meeting Close and Next Steps

DM confirmed that his report was essentially complete and only required minor amendments. DM advised that the meeting minutes would be written up, included within the report, and issued to the project team before the end of the following week.

DM invited attendees to raise any further queries by email once they had reviewed the report.

The meeting was then closed, with thanks exchanged by those present.

Meeting ended at 9:50

6 COMPLIANCE WITH NATIONAL STANDARDS

6.1 STANDARD S1 - SURFACE WATER RUNOFF DESTINATION

Priority level 1 -

As per the strategy, the applicant is proposing that RwH is to be utilised as a method for managing some runoff on site. The applicant states the school building will have some use for grey water and that there is demand. The tank will be sized based on the drained area and demand, which will be developed at detail design.

At this stage, the layout does not include the provision of any RwH however it is anticipated this will be proposed at full application. The SAB would request at full application the applicant ensures there is sufficient yield for the demand and that the tank is appropriately sized based on this to ensure the demand can be met.

It is not anticipated to be used as a method for managing runoff during storm events and is expected to be a passive system, only utilised for supply with runoff overflowing to the SW system. The SAB have no objections to this and acknowledge RwH is a method for managing runoff from the whole site for all events isn't feasible, as such a lower priority destination level will still need to be considered in conjunction with RwH.

Should RwH not be proposed, the applicant would need to evidence the exemption criteria applies, however this is not anticipated to be the case and the SAB are expecting RwH is proposed at full application, given the nature of the development.

Priority level 2 –

The applicant is not proposing to discharge runoff to ground as a primary method for managing runoff. The applicant states within the strategy that infiltration have not been deemed viable based on a lack of infiltration capacity on site.

As the applicant is not proposing to discharge runoff to ground as a method for managing runoff, for a lower priority destination level to be considered the SAB will require the applicant suitably evidences at least one of the exemption criteria outlined in section G1.8 of the SuDS national standards and section 25.2 of the Ciria SuDS manual, which highlights the potential constraints for infiltration systems with respect to infiltration capacity, depth to groundwater, ground stability, groundwater flood risk, and protection of groundwater from contamination.

Infiltration capacity and infiltration testing

If the lack of infiltration capacity is stated to be one of the justifications as to why a lower priority destination level needs to be considered, the SAB will require evidence at full application that soakaway testing in accordance with BRE365 has been conducted on site. The SAB require trial pit locations and logs are provided, demonstrating testing was undertaken with a suitable methodology.

The applicant has provided evidence of both a phase 1 (desktop study) and phase 2 GI report. The phase 1 desktop study report outlines that the site consists of variable made ground, with a risk of shallow mining works and potential risk of instability to slopes.

The desktop study recommended a follow up GI is undertaken to:

- Establish the risk of shallow mining works in relation to the proposed development via BH's
- Undertaken soakaway testing
- Conduct groundwater and gas monitoring
- Conduct geo-technical and geo-environmental testing of the soils

The GI was undertaken between the 11th and 29th of August 2025. The GI consisted of 3 rotary cored boreholes, 6 windowless sampler boreholes, and 4 machine excavated pits, with soakaway testing conducted in two of the pits (TP03 & TP04), with a falling head test conducted in WS04. A locality of the trial pits is shown in the figure below, with TP04 in the vicinity of the existing car park, and TP03 in the vicinity of the sports pitch.

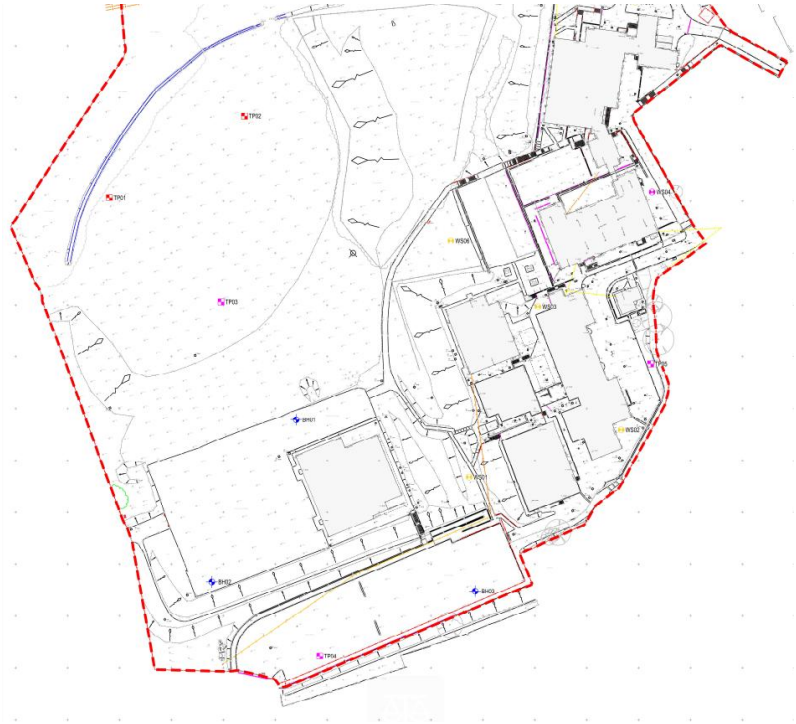

Figure 3. exploratory hole locations

The ground conditions encountered were as follows:

Made ground: below the surface covering made ground was encountered across the site. There are three types of made ground on site

- Topsoil Made Ground: Typically, 0.10–0.20m thick (locally up to 0.60m), comprising dark brown sandy silt with roots, gravel of mudstone and occasional grass fragments.

- 'General' Made Ground: Present to depths of approximately 0.25–1.20m (average thickness c.0.50m), comprising variable clay, sand and gravel with brick and concrete fragments.

- Reworked (Fill): Encountered between approximately 0.25m and 2.00m depth (average thickness c.0.80m), comprising locally gravelly slightly sandy clay or sandy gravel of sandstone and limestone with occasional anthropogenic inclusions.

Made Ground was noted to be heterogeneous, with greater concentrations of anthropogenic material beneath areas of hardstanding but also beneath the topsoil in the western area of site.

Glacial Till: Where made ground was penetrated, glacial Till was encountered underlying the Made Ground/reworked deposits across the site. The thickness ranges between approximately 1.30m and 4.90m (average c.3.50m). The Till generally comprises variably gravelly sandy clay, with gravel consisting of rounded mudstone, sandstone and limestone. Occasional clayey gravel and sand horizons were recorded.

Underlying the glacial till, weathered Rhondda Member was encountered in three of the BH at depths between 3.3 and 6.7mbgl. The depth was not proven.

As noted above, infiltration testing was undertaken at TP03 & TP04. Testing was undertaken in accordance with BRE 365. TP03 was tested down to a depth of 1.4mbgl, whilst TP04 was tested at a depth of 2.35mbgl. Both tests were conducted within the glacial till which underlay the made ground/reworked deposits on site.

The strategy states testing returned no positive rate after the first fill and was therefore terminated. However, it is noted the results aren't included within the appendix as noted previously. On submission of the full application these are required.

A falling head test was undertaken on the Weathered Rhondda Member at WS04 (3.70m bgl). Testing similarly recorded insufficient drainage to determine an infiltration rate.

Typically for a site of this nature, the SAB would expect the testing is conducted with sufficient coverage of the site, with testing conducted at different depths, to demonstrate the findings are reflective of the site as a whole and not just at that specific point. 3 tests wouldn't typically be deemed sufficient coverage based on a site of this size.

However, it is noted the ground conditions have been established across site, with the superficial deposits consisting of glacial till which was clay dominated

It is noted glacial till is typically poor infiltration media due to its variable composition but typically higher silt and clay content (high fines), with poorly connected pore spaces. Due to its nature (deposited beneath or within ice/glacier) it is also subject to very high loadings which results in a very compact and consolidated material.

As such, whilst testing isn't sufficient the SAB do acknowledge the applicant has evidenced the ground conditions are consistent across site. Given the glacial till has been evidenced to underlay the entirety of the site, the SAB are satisfied infiltration is unlikely to be a viable method of managing runoff. The GI also states that soakaways

are considered unsuitable for the site, as such the SAB are satisfied a lower priority destination level can be considered.

Partial infiltration (leaky system):

Where infiltration has been deemed to be unviable as a primary method for managing runoff, typically the SAB request that all SuDS features are permeably lined, as it allows for greater losses for compliance with the interception which also provides beneficial volumetric control.

It's noted the constrcution details provided by the applicant do suggest the applicant intends to permeably line the SuDS and allow for losses to ground.

However, the SAB note the proposal for 'leaky' systems should never compromise compliance with the standards or constraints detailed in section 25.2 of the Ciria SuDS manual, complying with all relevant requirements for infiltration systems with respect to depth to groundwater, ground stability, groundwater flood risk, and protection of groundwater from contamination.

At full application the applicant would need to provide an assessment to evidence that a leaky system would not result in non-compliance with the standards as noted above. Should a leaky system not be proposed, with features impermeably lined, the applicant would need to evidence that there is justification as to why, given it would likely mean the applicant is non-compliant with the interception criteria.

Details regarding this have been provided below.

Groundwater flood risk and depth to groundwater:

As per section 25.2.2 of the Cira SuDS manual, 1m of unsaturated ground is required beneath the base of an any permeably lined/unlined SuDS feature to ensure the performance of the feature and protecting the system from underlying groundwater. Should this not able to be provided the SAB would request that all SuDS are impermeably lined.

Its noted groundwater was only encountered in three boreholes across site at depths between 5mbgl and 21.5mbgl. The groundwater encountered at 5mbgl was deemed to be perched groundwater within the till, whilst actual groundwater level is deemed to be around 20mbgl within the Rhondda Member.

Based on this, the SAB are satisfied there is sufficient depth of unsaturated ground beneath the SuDS for the features to be permeably lined and that there is no to little risk of groundwater flooding or ingress into SuDS as a result of the features being permeably lined.

Groundwater contamination:

As per section 25.2.4 of the Ciria SuDS manual, the SAB require that the proposal for permeably lining the features won't increase the risk of mobilisation of existing contaminants to ground.

It's noted contaminants testing was conducted on site and identified exceedances of iron, manganese, and aluminium. These were deemed to be due to local background concentrations of these metals which is a characteristic of mining areas in South Wales. As such it is considered these exceedances do not pose a risk to groundwater.

However, exceedances of ammonia and ammonium were noted at TP04. The GI states given there is expected to be an increase in hard cover which will reduce infiltration, there is no significant risk to controlled waters when also considering the impermeability of the glacial till.

However, the SAB do query that by lining all SuDS, there is likely to be an increase in the natural levels of infiltration on site compared to the baseline which contradicts the GI. Whilst the SAB acknowledge that the poor permeability on site will inhibit leachate transport to groundwater, and that the systems will be undertrained so there is to be little infiltration regardless, the SAB would request further clarification is provided that partial infiltration via the proposed design would not increase the risk of groundwater contamination on site, especially when considering the made ground extent which is likely within the extent of the proposed SuDS. This could potentially result in leaching from the anthropogenic materials and pose a local issue on site rather than to groundwater itself.

It is not anticipated that groundwater contamination is to be a reason for the features to be lined, however should it be deemed the proposal would pose a risk of contamination, the SAB would not object to the applicant proposing to line the features where required, despite this resulting in these features not contributing to interception of runoff.

Ground stability:

The SAB's biggest concern based on the GI is that given the extent of made ground, should natural infiltration process be enhanced within close proximity to structures then there could be an increased risk of instability.

Infiltration into made ground could increase the risk of differential settlement, softening of soils and pose a risk to structures.

The SAB note as per section 25.2.4 of the Ciria SuDS manual and section G1.20 of the SuDS standards, where infiltration is proposed **or where natural infiltration process is significantly enhanced** within 5m of any existing or proposed structures, the risk of instability should be assessed by a geotechnical engineer.

For diffuse plan infiltration systems near the surface such as permeable paving or basins with a low impermeable: base permeable area, infiltration is less likely to cause adverse effects. There will be very literal lateral movement from these features and an assessment is only required when natural infiltration is significantly enhanced within 3m of structures as per section G1.21 of the SuDS national standards.

As such, should the applicant propose any partial infiltration that enhances natural infiltration processes within the above proximities to existing or proposed structures, then the SAB would request a geotechnical assessment is provided indicated that partial infiltration will pose no risk to structures. Should there be a risk of instability the SAB would request this is evidenced and then that the features are impermeably lined.

The SAB do have some concerns that the cellular storage is to attenuate runoff and is to allow infiltration within close proximity to structures. For example, cellular storage within the MUGA will allow infiltration in close proximity to a retaining wall.

In summary, the SAB's biggest concern is that by permeably lining the features in close proximity to structures, there may be an increased risk of instability given the extent of made ground and nature of the soils. As such, the SAB would expect the assessment as to the risk of instability is provided where within close proximity to structures. Should it be deemed that by lining SuDS there is an increased risk of instability to structures, then the SAB would have no objection to the applicant impermeably lining the SuDS. However, it may be the case that some SuDS will be lined, and others will allow for infiltration based on their nature (design, proximity to structures and drained area). Should this be the case it must be clear as to where features are lined/unlined.

Priority level 3 –

The applicant is not proposing for any runoff to be discharged at this Priority level (PL). The applicant states the nearest watercourse is the existing River Rhondda that is located 600m away to the east of the site.

The SAB are satisfied there is no surface waterbody within a reasonable distance of the development. Any discharge to this PL would require extensive conveyance infrastructure and third party land access agreements which would not be viable. As such, the SAB are satisfied a lower priority destination level can be considered given the exemption criteria have been evidenced.

Priority level 4 –

The applicant is proposing to discharge all runoff on site to the existing SWS networks that currently serve the existing development. A description of each catchments discharge destination is noted in section 1.5, however in summary the proposal will not require the use of pumping and connections can be facilitated. Given the above priority destination levels have been ruled out (except PL1 which will be used as a passive system to supply demand), the SAB have no objection to discharge at this PL. It's noted the proposal will re-utilise existing connections which is sustainable and will not result in any extensive conveyance infrastructure.

Priority level 5 –

Table 4. Primary and secondary destination of surface water runoff

Priority Level	Primary destination	Secondary destination	Comments
Priority Level 1	N	Y	
Priority Level 2	N	N	
Priority Level 3	N	N	
Priority Level 4	Y	N	
Priority Level 5	N	N	

Advisory:

It is noted that the applicant intends to utilise existing connections from the site. However, should a new outfall/connection be required and subsequently proposed, then the applicant should be advised of the following.

**Please note that SAB approval does not provide the right to connect into a culverted watercourse. As per Paragraph G2.3 and G2.4 of the National Standards, the right to connect must be secured from the Landowner who is responsible for the receiving drainage system in*

which the connection is proposed. In this case the XXXXX is the landowner XXXXX (delete where not applicable).

Furthermore, the SAB approval process does not provide consent under Section 23 of the Land Drainage Act 1991 to undertake connection/ outfall works to the ordinary watercourse. This type of consent (Ordinary Watercourse Consent) is regulated by the Lead Local Flood Authority (LLFA). Under this process, the LLFA will review the connection and as to whether the additional flow of water will present an increase in flood risk by reviewing the capacity of the culvert. For more information the applicant is advised to visit RCT's Ordinary Watercourse Consent Webpage which provides Application Guidance, Culverting Policy and contact details to make an application (Section 7).*

Please note that SAB approval does not provide the right to connect into a drainage system such as a highway drainage system. As per Paragraph G2.3 and G2.4 of the National Standards, the right to connect must be secured from the Landowner who is responsible for the receiving drainage system in which the connection is proposed. It is recommended that the Highways Development Control department are contacted regarding the proposal for runoff to connect into the existing system. Please note the HDC department will be consulted as part of the SAB full application.

Typically, HDC state the following regarding proposed discharge of runoff to highway drainage –

"Should developers wish to connect to the highway drainage system they will need to locate and confirm that the drain is a highway drain and provide a CCTV survey form point of connection to outfall to verify capacity and structural condition. Calculations/modelling must be provided to assess the existing flow and anticipated flow to demonstrate no adverse impact in terms of flood risk and operation of the highway drainage system following connection. If a connection is considered acceptable Commuted Sums will be charged as a contribution towards future maintenance as set out within the Councils Design Guide Section D. It is the developer's responsibility to carry out this investigation work, which we recommend be undertaken prior to commencing with the development. However, if RCTCBC hold any information on a particular location it will be shared to assist in the developer's investigation"

10. Section D application to Development Control to include:

c) Hydrological assessments and hydraulic calculations of the catchment area for the existing highway drainage to confirm its hydraulic capacity to accept additional discharges.
d) A CCTV survey of the existing highway drainage to confirm it's structural and service condition from destination to outfall

There will be a one-off fee currently £2,000 (2014) for review of the submitted information relating to the capacity and suitability of the existing highway drainage system in order to provide consent for connecting to an existing highway drainage system. The fee is to be paid in advance of any approval and is not refundable. It should be noted that payment of this fee

does not guarantee that consent will be granted as set out within Section D – 2, 2.3 of this Councils Design Guide.

The applicant should seek permission from this Councils streetcare principal drainage engineer to connect to highway drainage immediately.

It should be noted that SAB approval does not provide the right to connect into Dwr Cymru Welsh Water apparatus. The right to connect must be secured from DCWW via a section 106 agreement. It is recommended that the applicant contacts DCWW prior to the submission of the full application to establish as to whether DCWW would raise any objection to the proposed connection and associated discharge into the DCWW apparatus. Please note the DCWW will be consulted as part of the SAB full application.

Summary:

In summary, the proposed design **does not include sufficient information to ascertain compliance** with Standard S1. A summary of compliance with S1 is noted below.

- Applicant is to propose RwH at full application as per strategy. Applicant needs to evidence sufficient yield for demand. Locality of feature, design, and drained area needs to be clear.
- Exemption criteria for PL2 evidenced, lower PL can be considered. Applicant needs to supply soakaway logs however to support report.
- Further assessment required as to whether a leaky system (permeably lined) can be proposed. Risk associated to instability to structures from permeably lining should be considered.
- Exemption criteria for PL3 evidenced.
- No objection to discharge at PL4.

Please see Table 5 which summarises the documentation required to satisfy standard S1.

Table 5. Documentation required to satisfy Standard S1 for the Full Application

Supporting Documentation

Criteria	Information/ Documentation	Provided	Required
Detailed whole Site SuDS Drainage Design Proposals	Drainage Strategy	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
Statement	RWH statement	**Yes** ☐ **No** ☒	**Yes** ☒ **No** ☐
Ground Investigation	Geotechnical Interpretive report	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	Geo-environmental (Contaminated Land) interpretive Report	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	Geological Logs	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	Trial Pit Location Plan	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	Photographic Evidence of investigation	**Yes** ☐ **No** ☒	**Yes** ☒ **No** ☐
	Permeability testing and calculations (inc graph)	**Yes** ☐ **No** ☒	**Yes** ☒ **No** ☐
	Groundwater monitoring	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	Groundwater assessment	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	Ground Conditions Plan View	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	*Ground stability assessment	**Yes** ☐ **No** ☒	**Yes** ☒ **No** ☐

*Associated to risk of instability from partial infiltration.

6.2 STANDARD S2 – SURFACE WATER RUNOFF HYDRAULIC CONTROL

Interception of runoff

As per section 24.8 of the Ciria SuDS manual, compliance with the interception criteria should differentiate between winter and summer, with the first 5mm of rainfall expected to be intercepted during 80% of summer events and 50% of winter events.

The drainage proposal includes SuDS such as permeable surfacing, filter drains, and raingardens which provide some level of interception regardless of whether the features will allow for infiltration or not. The applicant is currently proposing that all features will be permeably lined, however it may be that some features will need to be lined as per S1.

The applicant has provided an interception plan as part of the submission. The interception plan outlines that all areas of new constrcution are to be complaint with the interception criteria, with the exception of the yard compound area, the terraced seating area, and the new footpath. It's noted the existing car park and sections of existing access road which will be re-surfaced with minor kerb alternations are also noted as non-compliant. However, these areas are not subject to the SuDS standards given they won't consist of new constrcution.

To determine the level of interception offered the SAB have analysed the interception mechanisms for each catchment/land use area and the required design parameters. As per the drainage strategy and catchment plan the catchments will drain as follows.

<u>Analysis – areas draining to permeable paving:</u>

The applicant is proposing that the MUGA areas, some external yard areas, sports pitch, playground areas, and new parking areas/access road are to consist of permeable surfacing. These will all drain their own area with exception of the car parking areas which will drain an additional small area of impermeable surface via lateral inflow, and the permeable paving adjacent to the MUGA which will drain some external hardstanding area via lateral inflow.

For the catchment areas draining to permeable surfacing, as per table 24.6 of the Ciria SuDS manual, all permeable surfaces whether lined or not can be assumed to comply provided there is no extra area drained to the permeable surface. As per Drake et al 2012, on average the first 7mm of rainfall is intercepted, while for permeable blockwork the average ranges from 7.3mm to 5mm according to various studies. Therefore, should the permeable surfacing areas only drain their own areas, providing they are suitably designed they will offer sufficient levels of interception regardless of whether

they are lined or not. Where draining an additional impermeable area the total additional area must not exceed the permeable area and the feature must allow for infiltration to be compliant.

As such, for all the permeable surfaced areas which drain their own area, these are to be complaint with the interception criteria regardless of whether they are lined (subject to suitable design). Whilst the permeable parking areas and section of PP adjacent to MUGA will also drain an additional section of impermeable area. They are to be within the 2:1 threshold and as such will also be complaint should the PP allow for infiltration. However, should the applicant need to line the features here due to a risk of non-compliance with S1, the SAB would not object to the applicant's proposal regardless, despite being non-complaint with the interception criteria.

Analysis – roof areas

The applicant is proposing that the entirety of the building area is to consist of a green roof. As such, this is expected to provide interception of runoff at source. Therefore, the roof areas are to be complaint with the interception criteria. The SAB simply request a constrcution detail is provided at full application which evidences the proposal will function as a green roof.

It is also acknowledged the applicant is to propose RwH at full application which will presumably drain some of the roof catchment. This is to provide an additional level of interception and the re-use will provide a significant betterment with regard to volumetric control on site.

Analysis - areas draining to raingardens:

The applicant is proposing that some external hardstanding areas such as the courtyard, and some footpath areas are to drain to raingardens. For these areas, the SAB will seek that the features are appropriately designed to offer interception of runoff.

The SAB will deem interception of runoff has been maximised as far as practically possible for the areas draining to bioretention areas, providing the following conditions are met:

- A key requirement for interception to be offered by the features is that runoff from impermeable areas enters at surface level as the majority losses occur as runoff soaks into the surface vegetation and is lost to transpiration.

Appears this is to be proposed with point inflow noted for some areas and other areas draining via lateral inflow. However, this should be clarified in the constrcution detail as noted at S6.

- It's noted as per ciria guidance at least 250mm of filter medium depth is required for runoff to be lost through evapotranspiration. SAB will require this is provided (minimum 400mm required for treatment). This is to be provided via design.

- SAB request minimum depth of depression is to be 150mm, with overflow set 50mm below, which is of sufficient depth to provide temporary shallow ponding where losses to evapotranspiration can occur. This appears to be provided however further comment noted as per S6.

- As per section 18.4.1 of the Ciria SuDS manual, the desirable gradient of a bioretention system is either horizontal or as close to horizontal as possible (doesn't exceed 1:100), to ensure flow is evenly distributed across the surface of the feature and for interception to be maximised. Should any substantial gradients be proposed (exceed 1:33) then the SAB will require appropriate interception mechanisms, such as check-dams are proposed to ensure flow is evenly distributed across the surface and to maximise interception of runoff.

  Should gradients exceed 1:17 then interception cannot be deemed to be provided regardless of whether check-dams are provided.

  The applicant has provided a levels plan which shows the majority of the features are flat, with the exception of the feature to the west of the access road. This is to have a fall from south to north. The SAB require clarification here regarding the gradient and as to whether a check-dam would be required. Further comment in S6.

- The applicant has evidenced the areas of the feature and the drained area. The majority of which are suitably sized with exception of the courtyard area and the access road entrance.

  Whilst non-complaint, the SAB are satisfied the raingardens serving the courtyard area are reasonably sized and will provide sufficient interception of runoff. Therefore, the SAB have no objection to this.

  For the access road area, it's noted this simply consists of re-surfacing and the applicant's proposal to drain the area to a raingarden is a betterment. As such the SAB have no objection.

Analysis – areas non-complaint

The proposed footpath connecting the sports pitch to the main building is to be of impermeable construction and is to drain via a series of filter drains (Stone trenches). These will provide some level of interception but will not ensure compliance with section G2.1 of the standards, whilst being non-compliant, given the proposal overall the SAB don't raise any objection to this.

A portion of hardstanding area near the main building will be collected traditionally and conveyed via gullies to network 2. This area is minimal and as such the SAB raise no objection.

The proposed terraced area that is to drain to greenfield land prior to being captured by a filter drain is also to be non-compliant. However again, given the proposal overall the SAB will raise no objection to the applicant's proposal.

In summary, from an interception perspective the SAB are satisfied with the proposal, subject to the applicant ensuring features are appropriately designed. Should the applicant evidence this at full application (noted in S6), then the SAB will not object to the applicant's proposal from an interception perspective.

Morphological protection and flood risk mitigation for receiving surface water bodies

As noted in section 2 of the report, the site currently consists of the existing school buildings, access roads, parking areas, and associated infrastructure. As per the existing drainage survey provided by the applicant, there are currently 5 SWS networks which discharge runoff off site, with the applicant proposing to discharge runoff to each of these networks. Given the brownfield nature of the site, it will need to be ensured the proposed discharge to each network is suitable in accordance with the standards.

Summary of rationale:

As per section G2.23 of the standards, the proposed development should aim to replicate the existing greenfield runoff rates, to ensure downstream flood risk is not exacerbated. As per section G2.26, the volume of runoff from the site should not exceed the volume in it's greenfield/natural state.

For brownfield areas, as per section G2.24 of the SuDS national standards, for runoff should be aimed to reduced to replicate greenfield runoff rates where possible. By allowing previously developed runoff rates to occur (for a longer duration than was

used to size the system) then it's likely that morphological damage and downstream flood risk could be made significantly worse. As such a betterment of at least 30% should be considered a minimum requirement, and strong consideration should also be given to control volumes to greenfield equivalents.

As per section G2.31 of the SuDS national standards. For previously developed sites the volume of runoff discharged during the 360 minute storm should be kept as close as possible to the greenfield volume for the equivalent storm. The runoff volume in the for the existing developed site may be contributing to downstream flood risk and as such the only way to offset this is by ensuring the site allows for losses such as infiltration or re-use of runoff, which in turn reduces the volume of runoff leaving site. As such infiltration and rainwater harvesting are important mechanisms for delivering volume control and helping mimic greenfield runoff volume. However as noted in S1 this cannot be achieved to an extent which will mimic greenfield runoff volumes.

Where controlling runoff to greenfield runoff is unachievable, then the runoff volume should be reduced as much as possible, with any additional volume stored and released at a low rate which does not increase downstream flood risk.

As such, for brownfield areas in which greenfield volumes can't be mimicked, the SAB typically request the applicant ensures that all runoff is restricted to a 30% betterment on the existing Q1/Q2 rate for the brownfield areas to be drained, and restricts for all storms up to the Q100+40% CC event. However, it must be noted this betterment only applies where the proposed discharge destination is the same as existing.

Additional flow for brownfield:

To note where new flow is being proposed (runoff being discharged to a new destination), then runoff should be restricted to both greenfield rates and volumes, given brownfield rates and volumes do not apply given they are entirely additional flow and no betterment to the receiving network is being provided. In this instance, runoff rates should mimic greenfield conditions, and volume should be reduced as much as possible, with any additional volume stored and released at a low rate which does not increase downstream flood risk. Should volumes not be able to be mimicked the SAB require that all runoff is restricted to the greenfield QBAR, given this will be entirely additional volume to the watercourse that was not received previously.

Should the proposed discharge from each brownfield catchment be in the accordance with the above, then the SAB would deem compliance in offering sufficient morphological and flood risk protection for the receiving waterbodies.

Brownfield runoff estimation:

Typically, for brownfield sites the SAB request an existing runoff calculation is provided as per section 24.5 of the Ciria SuDS manual, with a hydraulic model provided detailing the existing discharge rate for each network on site draining the existing impermeable area that is to be developed and is to drain to the proposed system.

As per section 24.5 of the Ciria SuDS manual, peak flows for an existing drainage system should be demonstrated producing an accurate representation of the drainage system and site contributions. However, to model an existing drainage system, it must be ensured the extent of existing drainage is appropriately evidenced.

Where an existing drainage system has been modelled, this must be supported by an existing drainage layout plan depicting the existing regime, with levels, pipe diameters and chamber diameters noted. A CCTV survey should also be provided. The SAB would request that to support the catchment plan, the locality of gullies and collection mechanisms are clear on plan.

To note, only areas that would be captured and collected by the existing network can be considered. Areas which will remain as hardstanding and not be drained by the proposed also cannot be considered.

An alternate method for identifying existing flows should only be utilised when the extent of the existing drainage system is unknown, or is not in reasonably working order. This alternative method of modelling should consist of modelling the total proposed impermeable area as greenfield area response from impermeable soils. The SAB would also accept a greenfield runoff calculation with an urbanisation factor, which accounts for the total urban extent within the catchment. Methods such as ReFH2 are accepted.

At full application, the SAB require the applicant ensures that the pre-development runoff estimation for the brownfield areas is calculated in accordance with the above.

To determine whether this is to be provided for these networks as part of the proposal, the SAB have reviewed each network in isolation.

Network 1 - Sports pitch area (greenfield):

This area of site currently consists of a grassed sports pitch and is drained via a series of perforated pipes which direct flows to the south-west corner of the pitch. From here, flows are directed towards a 225mm SWS at MH121. The network (EX1) runs from

North to South along the western boundary of the site ultimately conveying off site by the main site entrance.

This network also has connections from the northern part of the site from Bryn Crydd Road and from the redgra pitch area. This redgra is deemed to be an area of porous surfacing and runoff from this area is directed to the southwest boundary where it then conveys to the 225mm network.

The applicant is proposing to restrict discharge from the new artificial sports pitch catchment area to the Q2 greenfield runoff of 8l/s, with discharge to an existing SWS at MH121 which runs along the western boundary of the site.

For the proposed discharge rate from the area, the applicant is proposing to restrict discharge to the greenfield Q2 rate of the drained area, and has excluded the red gra area from the analysis given how the area drains are unclear, however it is anticipated this would have drained to the network downstream of MH121 at Node MH88. However, the SAB are satisfied with the applicant excluding this area given the conveyance from the network isn't clear. The SAB are also satisfied with the intention to discharge at the greenfield Q2 rate.

With regard to the proposed discharge from this area, the applicant has outlined within the strategy that the proposed works have a footprint of 5,330m². The section outlines a Q2 greenfield rate of 8l/s. It's noted no runoff estimation has been provided to support this and at full application this would be required, however it is anticipated that 8l/s is likely reflective of the greenfield Q2 rate for this area.

To note, for greenfield areas, "As per section 24.2.2 of the Ciria SuDS manual the applicant should ensure only the drained area is utilised in the greenfield runoff calculations. However, the equivalent area also needs to be included in the hydraulic model"

It's noted the applicant has inputted an area of 0.533ha in the hydraulic calculations which aligns with the area detailed in the strategy. As such, should the Q2 rate be evidenced to be 8l/s for the drained area via an appropriate runoff estimation at full application, the SAB would have no objection to the applicant proposing to discharge runoff at 8l/s based on a drained area of 0.533ha. The applicant will also need to evidenced the drained area is in fact 0.533ha as part of the submission and the contributing area plan should include the total area in the catchment annotated on plan.

Network 2 - New school building (Northern section of building)

The applicant is proposing the northern and western section of the new main building and external areas surrounding are to convey downstream towards a flow control chamber (FC02), which will restrict discharge to 20l/s. The flow control is to discharge to the same existing SWS network that the sports pitch is to discharge into, but further downstream at node MH88, which runs from north to south along the western boundary of the site before discharging off site by the site entrance at MH72.

Node MH88 currently drains the existing red gra area and downstream of this is node MH72 (EX 2), which drains the existing parking area which situated to the south of the main buildings. The applicant has provided an existing drainage plan which shows runoff from this area currently falls to a drainage channel along the southern boundary, which collects runoff and conveys to the same outfall at the southwest corner of the site as noted above at MH72 via MH71.

As part of the proposed works, the existing car park is to be re-surfaced with minor kerb alternations, however it is intended for the entirety of this area now to discharge to a different network to the east (network 3).

The applicant's intention is for the northern and western section of the new proposed building to discharge to this network instead, however at the Q2 betterment rate of the existing flows from the car park area.

As noted in the rationale section above, the applicant is required to provide an accurate depiction of the existing arrangement via CCTV survey, and then a hydraulic model based on this.

The applicant has provided a model of the existing arrangement, with the applicant modelling an area of 0.33ha into node MH71. The SAB have reviewed the model and submitted information for this catchment and make the following observations regarding suitability of the proposed discharge rate:

- The SAB are satisfied the existing drainage for this network has been sufficiently evidenced and that an accurate model of the existing can be provided to determine the Q2 betterment rate for the car park. It is clear this area would be collected and would convey to MH72. However, drainage channels should be shown more clearly on existing plan as is the case on the CCTV/utility survey.

- Unclear if area of 0.33ha inputted is representative of existing parking area. Whilst likely appropriate, existing catchment plan needs to clarify area currently draining to node.
- Applicant has inputted entirety of area to MH71 with a TOC of 5 minutes inputted. Given area would convey to drainage channel prior, the SAB would query whether a higher TOC would be more appropriate and conservative.
- CV value of 0.750 and 0.84 utilised which is appropriate.
- PIMP of 100% which is suitable.
- The applicant has modelled node MH71 appropriately with invert and cover level reflecting the survey.
- The applicant has then modelled the downstream pipe with an appropriate diameter
- Invert of MH72 is unknown, so applicant has modelled conservatively with the pipe having a 1:150 fall which is suitable and acceptable to the SAB.
- Appropriate rainfall methodology (FEH) with appropriate location inputs.
- Appropriate return period (Q2) with appropriate storm durations modelled.

The results return an existing flow of 44.8l/s for the Q2 critical event. The applicant has then proposed a discharge of 20l/s which is a 55% betterment on the existing rate from this network. It is also acknowledged this excludes the further betterment likely provided by excluding the red gra area from the analysis to this network (area being removed as part of works)

Therefore, the SAB have no objections to the proposed discharge principles for the proposed network 2 and are satisfied should the proposed hydraulic model evidence discharge is to be restricted to 20l/s (55%) betterment for all return periods to the network from FC02, then sufficient flood risk mitigation is to be provided for the receiving network at MH72. However, this is subject to the applicant ensuring the existing area plan aligns with the area used in the existing model.

To note, the SAB would also have no objection to the applicant discharging to this destination at this rate during phase 1, given the existing car park (which betterment is based upon) which currently drains to this network is to discharge to existing network 3 as part of the proposal. However, should this alter, the applicant should be aware that discharge at this rate may not be appropriate during phase 1, and the principle is only suitable during this phase providing the car park no longer drains to network during phase 1.

Network 3 - New school building (southern section and existing car park)

The southern section of the proposed new building, the proposed courtyard, the new external areas to the east of the building, and the existing car park to the south of the site are proposed to convey downstream towards a flow control chamber (FC03), which will restrict discharge to 30l/s. The flow control is to discharge to the existing network which runs from south to north along the eastern boundary of the site at existing MH25 (EX3). This network currently serves a portion of the existing buildings in the central catchment and discharges off site at MH130.

Existing network 3 currently drains some of the southern buildings and hardstanding or the original school in the catchment, which either drain to a SWS and then a combined before discharge off site at MH129, or the remainder of the building areas in the catchment appear to discharge into a 150mm SWS which discharges off site at MH130 (EX 3).

Within the strategy, the applicant outlines that the proposed discharge rate will only be based off the existing rate for the same destination. Given the applicant is intending to discharge to MH130, the proposed rate must be at least a 30% betterment on the existing. The areas draining to a separate SWS before draining to the combined have been excluded from the analysis given these are a different destination which is suitable.

To note, the hydraulic model of the existing and drainage strategy is based off a previous revision of the existing drainage regime. The previous revisions outlined that runoff from the southern catchment of the original buildings and hardstanding all previously drained to either MH8 or MH130 prior to discharge off site, as such the applicants proposed discharge rate is a betterment on the total outflow from these networks.

At full application, the SAB would expect a new calculation is provided based on the latest survey and that it is reflective. Regardless, the SAB have reviewed the principles of the strategy and model and make the following observations:

- The SAB are satisfied the existing drainage here has been sufficiently evidenced that an accurate model of the existing can be provided to determine the Q2 betterment rate for this area.
- The SAB request the extent of the collection mechanisms such as gullies and downpipes are shown on plan to ensure/evidence the areas would actually be collected as stated. Areas with no clear collection and conveyance can’t contribute.

- The applicant has modelled a total contributing area of 0.379ha for the network. Contributing area in model isn't reflective of latest drainage layout as noted above, likely to decrease in size given some of CA11 conveys to the combined network as opposed to SWS, however principles of continuing area appear appropriate based off previous revision of existing drainage layout.
- At full application, contributing area plan required for the existing area to each node. Plan should include areas annotated (m²) and there must be alignment between this and the hydraulic model of the existing.
- TOC of 5 minutes which is suitable.
- CV value of 0.750 and 0.84 utilised which is appropriate.
- PIMP of 100% which is suitable.
- The applicant has modelled nodes appropriately with invert and cover level reflecting the previous existing survey. At full application will need to reflect the latest survey which has a different layout.
- The applicant has then modelled the links with an appropriate diameter.
- Applicant has modelled two outfalls at MH130 and MH8, it is clear now that MH8 discharges into the combined system and as such these flows should be discounted from the analysis.
- Appropriate rainfall methodology (FEH) with appropriate location inputs
- Appropriate return period (Q2) with appropriate storm durations modelled.

The results of the model show a combined SW Q2 flow rate of 48.8l/s, with 39.20ls emanating from MH130 and 9.1l/s from MH8. However, the table within the strategy details a combined rate of 45.90l/s, with 37.20l/s emanating from MH130 and 8.7l/s from MH8. The applicant has then proposed a 35% betterment on this rate detailed in the strategy table, with a proposed discharge of 30l/s. Firstly as noted above it is likely the flows from MH8 are to be discounted (drains to combined), with slight amendments to the area inputted to MH130.

As such, the existing and proposed discharge rate is likely to change at full application, however the principles of the applicants methodology are mostly suitable with the applicant discounting areas where conveyance isn't clear or where IMP areas drain to the combined/foul, and only basing the proposed betterment for the flows to the network in which connection is proposed.

*To note, should MH8 have been a SWS the applicant would have needed to evidence MH8 drains to the same network as MH130 for the flows from this chamber to contribute to the Q2 betterment rate, given the applicant is proposing network 3 is to drain to MH130 network. However, this no longer applies given the flows to MH8 are to be discounted.

In summary, at full application the applicant must provide a detailed existing drainage layout and existing contributing area plan to support, for the areas draining to MH130. The proposed discharge rate will then need to be 30% betterment on the existing Q2 rate to MH130 evidenced by the hydraulic model which is reflective of the design. Should this be the case, the SAB would have no objections from a flood risk mitigation perspective for proposed network 3 and it's receiving network on completion of the site.

To note, the applicant is proposing that in phase 1, network 3 (consisting of the southern building area and existing car park) is to drain the same system that currently accommodates runoff from existing buildings. The proposed discharge from network 3 has currently been based off the Q2 30% betterment rate of this existing network which drains the existing building. During phase 1 this building is to remain and therefore the applicant would not be providing a betterment during this phase and the proposal would result in increased flows.

The applicant must ensure that flood risk is mitigated during this period and only during the time phase 2 is completed can this network discharge at the Q2 30% betterment rate of the outfall at MH130. Clarification required regarding this and how the applicant intends for network 3 to discharge in the interim between phase 1 & 2. The SAB would expect network 3 discharges at the greenfield QBAR for the drained area in the interim until phase 2 is completed.

Network 4 - New access road & car parking/MUGA:

The new access road, footways, new car parking and MUGA areas are to convey to FC04 which will discharge runoff to an existing SW (EX4) at MH137 which is situated upstream of MH140 at the very northeast of the site at a restricted rate of 20l/s.

This existing catchment here currently has two separate outfalls. The most northern buildings discharges into either a combined network outfall or a SWS outfall located at the northern boundary of the site, with two outfalls noted.

The northern section of the northern building discharging into the combined network which runs from west to east and discharges off site at the northern boundary via MH114.

The lower area of the northern building and building to the south discharges into a 150mm diameter SWS network which runs from west to northeast and discharges offsite via MH140 (EX4) at the northeast corner of the site.

Within the strategy, the applicant states the proposed discharge rate from this network will be a betterment on the existing peak flow from both networks. For this to apply, the applicant would need to evidence that both networks converge immediately downstream. Based on the current information provided, the SAB note that the applicant's methodology here would not be accepted, and the proposed discharge to network 4 must be a 30% betterment on the existing discharge at MH140. The flows from MH114 (combined) must be discounted.

At full application, the SAB would expect a new calculation is provided based on the latest survey and that it is reflective of the above. Regardless, the SAB have reviewed the principles of the strategy and provided model and make the following observations:

- The SAB are satisfied the existing drainage here has been sufficiently evidenced that an accurate model of the existing can be provided to determine the Q2 betterment rate for this area.
- The SAB request the extent of the collection mechanisms such as gullies and downpipes are shown on plan to ensure/evidence the areas would actually be collected as stated. Isn't currently clear and needs to be evidenced. Areas with no clear collection and conveyance can't contribute.
- The applicant has modelled a total contributing area of 0.217ha for the network. Contributing area in model must only reflect inputs to MH140 (destination) unless it is evidenced MH114 discharges into the system immediately downstream.
- At full application, contributing area plan required for the existing area to each node. Plan should include areas annotated (m^2) and there must be alignment between this and the hydraulic model of the existing.
- TOC of 5 minutes which is suitable,
- CV value of 0.750 and 0.84 utilised which is appropriate.
- PIMP of 100% which is suitable.
- The applicant has modelled nodes appropriately with invert and cover level reflecting the existing drainage layout in strategy. at full application must reflective latest survey
- The applicant has then modelled the links with an appropriate diameter.
- Applicant has modelled two outfalls at MH139 and MH114. MH114 system shouldn't be modelled as noted above, whilst downstream node MH140 should be modelled based on latest survey,
- Appropriate rainfall methodology (FEH) with appropriate location inputs
- Appropriate return period (Q2) with appropriate storm durations modelled.

The results of the model show a combined SW Q2 flow rate of 30.1l/s, with 18.80ls emanating from MH139 and 11.3l/s from MH114. The applicant has then proposed a 33% betterment on this rate with a proposed discharge of 20l/s. Firstly as noted above the flows from MH114 are to be discounted (drains to combined) unless evidenced it goes to same system as MH140 immediately downstream

Therefore, the principles of the applicant's methodology for this catchment are not currently suitable and the existing and proposed discharge rate for this network is likely to change at full application.

In summary, at full application the applicant must provide a detailed existing drainage layout and existing contributing area plan to support, for the areas draining to MH140. The proposed discharge rate will then need to be 30% betterment on the existing Q2 rate to MH140 evidenced by the hydraulic model which is reflective of the design. Should this be the case, the SAB would have no objections from a flood risk mitigation perspective for proposed network 3 and it's receiving network.

<u>Existing areas freely draining but included in runoff estimation:</u>

To note, the SAB have concerns some of the access road sections in this catchment have been included in the existing discharge calculation but will remain as hardstanding and won't be drained as part of the works. As noted in the summary of rationale section, for these areas to be included in the existing runoff estimation, they must be positively drained by the proposed SuDS as part of the works. Alternatively, these areas should be discounted as part of the runoff estimation. Clarification required regarding this.

Figure 4. areas that may be included in existing discharge calculation but are to remain freely draining.

In summary, the applicant is proposing to discharge runoff from each of these networks (2-4) at a restricted rate of 70l/s. It is noted these catchments are currently draining offsite at a rate of 141.90l/s during the Q2 return period. To note this includes modelling of the runoff from the buildings in the southern catchment of the original school site which freely drain MH129. The applicant therefore claims there is a betterment of 51% overall. Whilst the SAB acknowledge this and the fact that several hardstanding areas haven't been modelled, simply put the proposed discharge to each destination must be a 30% betterment on the existing Q2 to each network. The existing calculation must be supported by an existing catchment plan and drainage layout which evidence the inputs are reflective of the existing arrangement.

Network 5:

To note, the applicant is proposing to install land drainage in the middle section of site along the sloping embankments between the sports pitch and proposed buildings. This is to drain the embankment and footpath linking the sports pitch to the school and discharge at an unrestricted to an existing surface water sewer which across the site from the existing sports hall to the northern boundary of the site.

In 2004, a new sports hall was constructed on the red gravel sports area. A new isolated surface water system was installed to serve this area, along with new land drainage to alleviate problems from runoff flow from the steep embankments.

The SWS system serving the hall directed runoff in a north easterly direction, out-falling to an existing SWS which runs from west to East along the northern boundary of the site. This network varies from a 150mm network by the school pitch, up to a 675mm diameter section, and then back into a 225mm network downstream of the flow control (MH90 CP). It then remains a 225mm pipe up until the point of connection. It's noted the land drainage (150mm filter pipe) installed at the base of the embankment also discharges into this system upstream of the flow control chamber.

The flow control chamber is stated to have a 190mm orifice, with the 675mm pipe upstream acting as attenuation. It's stated historic drainage plans show the network at the northern boundary of the site serves a spring.

It's noted the footpath is to be of impermeable construction and as such will result in an increase in runoff rate and volume compared to greenfield. The applicant is proposing this footpath will be freely draining and will be collected by a filter drain and discharged to network 5. The applicant has stated the existing sports hall has not been used in any peak runoff calculation and that by removing this, this will suitably offset any increase in runoff from the footpath. The applicant states a conservative

comparison of the areas indicates the extent of proposed IMP being discharged to this network is significantly less than the existing IMP whilst it is noted flows are already restricted by a 190mm FC.

To note, should the applicant evidence the reduction in area as part of the submission, the SAB would not object to the above, however the applicant will need to provide supporting documents to reflect the statement in the strategy. Currently it is unclear as to the previous IMP draining to the network vs the proposed. Whilst the applicant should typically evidence a 30% betterment on the existing rates are provided for this catchment, should the reduction in area be significant the SAB would not object to the applicants proposal based on the nature of the area being drained and given the system is already attenuated.

To note, the sports hall is to be removed as part of phase 1 and the footpath is also to be built during phase 1. Therefore, the SAB have no objections to the problem withstanding the above during phase 1.

A summary of compliance regarding the proposed discharge rates for each network/catchment is noted below:

- Proposed drained area plans should include the areas (m²) annotated either on plan or within a table on the drawing. The total contributing area of each catchment should also be clear within the plan.
- The applicant should provide an existing contributing area plan for the existing networks on site, with the areas included on plan or table within the drawing. The total contributing area to each network should also be clear.
- Should any areas remain as existing and not be drained, they must be made clear that they are being discounted and drawings should reflect proposal for these areas.
- All collection mechanisms, such as downpipes and gullies should be shown on the existing drawings to make it clear these areas would in fact have been collected in the existing.
- Greenfield runoff estimation required to evidence greenfield flows for network 1. Should this be the case discharge of 8l/s is suitable based on the information provided.
- Proposed discharge rate from network 2 is suitable, subject to the applicant evidenced the existing area aligns with that utilised in the existing model.
- Discharge rate for networks 1 & 2 also suitable during phase 1 period, providing car park drains to network 3.
- Discharge rate principle for network 3 is suitable for completion of site, however proposed rate isn’t reflective of existing layout and revised calculations needed.

- To note, discharge rate from network 3 for phase 1 needs to be clarified, given applicant cannot provide a Q2 30% betterment on flows during this phase given the existing buildings are to remain during this phase, which would mean additional flow to network during the interim.

- Discharge rate principle for network 4 isn't suitable. SAB have issues with methodology.
- Also appears applicant has included some areas in phase 4 runoff estimation that will remain as existing and not be drained within the brownfield runoff estimation. This isn't suitable.
- Footpath and land drain freely draining likely to existing network 5 to be accepted should applicant evidence reduction in IMP area, however currently unclear.

Flood Protection for the site

The applicant has provided 4 infodrainage hydraulic models as part of the proposal, which covers each of the proposed networks.

To note, the applicant has provided both the printout of the model, and the model itself. The printouts were lacking in detail (missing results sections for networks 2-4, missing storage/FC inputs, etc) as such the SAB requested the models were provided. At full application the SAB would expect both are issued.

The SAB have reviewed each model and make the following observations:

Network 1 – sports pitch:

Simulation criteria:

- Appropriate rainfall methodology (FEH) with appropriate location inputs
- Appropriate storm return period (Q100) with an appropriate allowance of CC (40%). SAB also request Q2 and Q30 are modelled at full application.
- Appropriate storm durations
- Appropriate TOC of 5 minutes
- Appropriate CV of 1 and PIMP of 100%. Area analysed also appropriate.
- Applicant has inputted a total contributing area of 0.533ha, with what appears to be appropriate inputs at appropriate nodes. At full application, contributing area plan should include areas annotated in m², and make total catchment area clear to ensure alignment with hydraulic model.

Chamber and pipework inputs

- Appropriate pipe diameters modelled which align with layout
- Chamber invert and cover levels don't align to that within manhole schedule, there needs to be alignment here at full application.
- Diameters are appropriate as per design.

Cellular storage:

- As per submitted information to be SDS tank which is to be 36m L x 10m W, X 0.8m D at invert of 179.450.
- Applicant has modelled feature with appropriate dimensions but invert level modelled 200mm lower which isn't reflective.
- Porosity also modelled at 95% which potentially doesn't take into account of the reduced porosity of the SDS crates given they contain a clean stone trench. The inputted porosity should take into account of this.
- Applicant has modelled two outlet pipes from the cellular storage, with 2x 225mm pipes 'out-falling' to the adjacent underdrains. This doesn't reflect the design given it appears the cellular storage features will outlet via filtration between the clean stone.

Artificial pitch:

- Current makeup of surface layers is unclear at this stage, however at full application the paving layer depth inputted will need to align with the depth of surface layers.
- Applicant has modelled a depth of 0.415m currently with 65mm paving depth which gives depth of subbase of 0.350mm, which exceeds 320mm subbase detailed on construction details and layout.
- Applicant has inputted an exceedance level of 180.400 for one section of Pitch and exceedance of 118.800 for upper section, which aligns with lowest exceedance level of features as per proposed levels plan which is suitable.
- However, the applicant has modelled the feature as two separate features. However, this isn't suitable unless the applicant is proposing to isolate the feature with two separate areas with impermeable membrane separation between.
- The detail provided by the applicant depicts that the sports pitch will have a 1:100 slope at formation (flat) and a surface slope of 1:60. However the detailed subbase depth is simply 320mm. This doesn't make sense as the subbase depth would need to state minimum of xxmm, to represent the depth of subbase

at the exceedance level. If formation is to be flat subbase, depth of subbase then increases with the rise in gradient from exceedance.
- Underdrains have been modelled as 225mm which is suitable. Release height also suitable.
- Applicant has inputted an appropriate porosity and conductivity values for features.

Permeable paving:

- Unclear as to whether heavy duty detail or typical PP detail applies and clarification required. However, SAB assume typical detail applies. Typical detail has 130mm paving layer depth whilst heavy duty has 220mm paving layer depth.
- Applicant has modelled 150mm paver depth which aligns with neither so clarification required.
- Depth has been modelled as 300mm, which is less than minimum depth of 320mm. If paving layer depth was correct then subbase depth would align with the minimum depth as per detail. Conservative so SAB don't raise as issue.
- Applicant has modelled slope of 1:40, which should be 1:37 based on levels.
- Applicant has inputted an exceedance level of 180.700 which aligns with lowest exceedance level of features as per proposed levels plan which is suitable.
- Underdrain has been modelled as 150mm which is suitable. Release height also suitable.
- Applicant has inputted an appropriate porosity and conductivity values for features.

Flow control:

- FC01: as per submitted information- To have cover of 180.705, invert of chamber to be 178.775, and invert of outlet/hydrobrake to be 179.150. To be 1.2m in diameter with D400 cover and 600x600mm opening. Sump to be 375mm. Hydrobrake reference to be SHE-0130-8000-1100-8000 as per layout and hydro international drawing.
- Modelled invert level doesn't align to manhole schedule, neither does chamber diameter.
- Hydrobrake reference and cover level is appropriate and aligns with layout.

Results:

SAB note discharge of 8.7l/s during the Q100+40% CC event, which exceeds rate of 8l/s required. It is also noted there is 42m³ of flooding at PP (1). This has been validated by another officer within the SAB who ran the model. SAB acknowledge printout shows no flooding of the system whilst restricting discharge to 8l/s however unclear as to why the discrepancy given between printout and model given all of the existing calculations provided align to the printouts provided. Clarification required.

Network 2 – Main building western network

Simulation criteria:

- Appropriate rainfall methodology (FEH) with appropriate location inputs
- Appropriate storm return period (Q100) with an appropriate allowance of CC (40%). SAB also request Q2 and Q30 are modelled at full application.
- Appropriate storm durations
- Appropriate TOC of 5 minutes
- Appropriate CV of 1 and PIMP of 100% for hardstanding areas.
- Green roof has CV of 0.75 which is suitable with appropriate inputs for green roof areas (no storage modelled).
- Applicant has inputted a total contributing area of 0.559ha, however it is unclear if appropriate. Model doesn't align with drained area plan provided for network 2. At full application, contributing area plan should be provided and include areas annotated in m², and make total catchment & individual contributing area clear to ensure alignment with hydraulic model.
- Section of roof areas appears to have been excluded. Clarification as to why? If this is RwH area then still needs to be included unless evidenced system can provide active management of surface water runoff.

Chamber and pipework inputs

- Appropriate pipe diameters modelled which align with layout
- Chamber invert and cover levels don't all align to that within manhole schedule, there needs to be alignment here at full application.
- Diameters are appropriate as per design.

Cellular storage:

- As per submitted information to be SDS tank which is to be 42m L x 5m W, X 1.2m D at invert of 166.875.
- Applicant has modelled feature with appropriate dimensions and invert level as per above.
- Porosity also modelled at 95% which potentially doesn't take into account of the reduced porosity of the SDS crates given they contain a clean stone trench. The inputted porosity should take into account of this.
- Applicant has modelled outlet pipe from the cellular storage to downstream chamber which doesn't reflect outlet proposal as feature will outlet via filtration between the clean stone.

Permeable paving:

- Based on detail assumes heavy duty detail applies here, which has a 220mm paving layer depth. Heavy duty has 220mm paving layer depth.
- Applicant has modelled 150mm paver depth which doesn't align so clarification required.
- Depth has been modelled as 300mm, which is less than minimum depth of 320mm and therefore conservative. Applicant needs to ensure paving layer depth and depth is appropriate based on design.
- Applicant has modelled slope of 1:60 which is appropriate based on the levels drawing.
- Applicant has segregated the features as per where features receive runoff. Should the features have been attenuating substantial volumes of runoff (not just for the high intensity events), the SAB would typically raise issue with this given subbases are connected. Given the features don't attenuate much runoff other than during high intensity storm, the SAB don't raise issue with this.
- Applicant has inputted exceedance levels which aligns with lowest exceedance level of features as per proposed levels plan which is suitable.
- Underdrain has been modelled as 150mm which is suitable. Release height also suitable.
- Applicant has inputted an appropriate porosity and conductivity values for features.
- SAB have no issues with how PP has been modelled here other than issues with depths

Flow control:

- FC02: To have cover of 168.519, invert of chamber to be 165.880, and invert of outlet/hydrobrake to be 166.360. To be 1.8m in diameter with D400 cover and 600x600mm opening. Sump to be 480mm. Hydrobrake reference to be SHE-0188-2000-1715-2000 as per layout and hydro international drawing.
- Hydrobrake reference, chamber diameter, and invert level is appropriate and aligns with layout.
- However, cover level has been modelled at 168.998, when level of 168.529 noted on schedule. Therefore, model isn't reflective or conservative here.

Results:

- Results show no flooding of system during Q100+40% CC event. however it is noted discharge reaches 21.8l/s which exceeds the proposed rate as noted in section above. The max water level also reaches level of 168.629 in FC (hydraulic grade line), which is above cover level as per schedule. Clarification required. Noted the printout doesn't include results so the SAB can't corroborate.

Network 3 – Main building western network

Simulation criteria:

- Appropriate rainfall methodology (FEH) with appropriate location inputs
- Appropriate storm return period (Q100) with an appropriate allowance of CC (40%). SAB also request Q2 and Q30 are modelled at full application.
- Appropriate storm durations
- Appropriate TOC of 5 minutes for most areas, but existing car park has TOC of 10 minutes. SAB would request 5 minutes is utilised.
- Appropriate CV of 1 and PIMP of 100% for hardstanding areas.
- Green roof has CV of 0.75 which is suitable with appropriate inputs for green roof areas (no storage modelled).
- Applicant has inputted a total contributing area of 0.708ha, however it is unclear if appropriate. Appears It likely is based off new layout but model doesn't align with drained area plan provided for network 3. At full application, contributing area plan should be provided and include areas annotated in m², and make total catchment & individual contributing area clear to ensure alignment with hydraulic model.

Chamber and pipework inputs

- Mostly, appropriate pipe diameters modelled, with exception of outlet from PP.
- Chamber diameters, invert and cover levels don't all align to that within manhole schedule, there needs to be alignment here at full application.

Raingardens:

- Unclear if exceedance levels are appropriate.
- Depth of depression suitable.
- Underdrain diameter suitable.
- Filter medium depth and drainage layer depth suitable as per typical detail.
- Porosities for filter medium and drainage layer should both be inputted at 0.3
- Conductivity values suitable.
- SAB have no real issues with how features are modelled but clarification required on levels and confirmation of areas and dimensions required on plan

Cellular storage:

- As per submitted information to be SDS tank which is to be 20m L x 15m W, X 1.2m D at invert of 158.00
- Applicant has modelled feature with appropriate dimensions and invert level as per above.
- Porosity also modelled at 100% which isn't suitable given maximum porosity for crates is 0.95 and this doesn't consider the reduced porosity of the SDS crates given they contain a clean stone trench. The inputted porosity should consider this.
- Applicant has modelled outlet pipe from the cellular storage to downstream chamber which doesn't reflect outlet proposal as feature will outlet via filtration between the clean stone.

Permeable paving:

- Unclear as to whether heavy duty detail or typical PP detail applies and clarification required. Typical detail has 130mm paving layer depth whilst heavy duty has 220mm paving layer depth.
- Applicant has modelled 150mm paver depth which aligns with neither so clarification required.

- Depth has been modelled as 300mm, which is less than minimum depth of 320mm and therefore conservative. Applicant needs to ensure paving layer depth and depth is appropriate based on design.
- Applicant has modelled slope of 1:80 which doesn't align as should be 1:60
- Applicant has segregated PP from PP(2). Unclear as to why given subbase is connected, however to have minimal impact given slope so SAB don't raise.
- Applicant has inputted an exceedance level which aligns with lowest exceedance level of features as per proposed levels plan which is suitable.
- Underdrain has been modelled as 150mm which is suitable. Release height also suitable.
- Applicant has inputted an appropriate porosity and conductivity values for features.
- SAB have no issues with how PP has been modelled here other than issues with depths

Flow control:

- FC03: To have cover of 161.594 invert of chamber to be 157.180, and invert of outlet/hydrobrake to be 157.710. To be 2.1m in diameter with D400 cover and 1000x600mm opening. Sump to be 530mm. Hydrobrake reference to be SHE-0224-3000-1890-3000 as per layout and hydro international drawing.

- Hydrobrake reference, chamber diameter, and invert level is appropriate and aligns with layout. Cover slightly out but minimal impact.

Results:

- Results show no flooding of system during Q100+40% CC event. however it is noted discharge reaches 32.7l/s which exceeds the proposed rate as noted in section above. The max water level reaches level of 160.413 in FC (hydraulic grade line).

  Whilst not modelled, the applicant should be aware that the exceedance in the system is either the raingarden to the north of the art and sculpture courtyard, or PP (1) based on the proposed levels. Therefore, despite the flow control having a lot of freeboard, there isn't a lot of freeboard in the system.

  As noted in section above, given this network is likely to require a different discharge rate in phase compared to 2, the applicant will likely need to provide a proposed model for both phase 1 and 2, to ensure sufficient flood risk

protection for site whilst restricting runoff to the required discharge from each phase.

Network 4 – Main building western network

Simulation criteria:

- Appropriate rainfall methodology (FEH) with appropriate location inputs
- Appropriate storm return period (Q100) with an appropriate allowance of CC (40%). SAB also request Q2 and Q30 are modelled at full application.
- Appropriate storm durations.
- Appropriate TOC of 5 minutes.
- Appropriate CV of 1 and PIMP of 100% for most catchments, with exception of greenfield areas drained by filter drain which have a CV of 0.3 which is suitable.
- Applicant has inputted a total contributing area of 0.489ha, however it is unclear if appropriate. Appears It likely is based off new layout but model doesn't align with drained area plan provided for network 3. At full application, contributing area plan should be provided and include areas annotated in m², and make total catchment & individual contributing area clear to ensure alignment with hydraulic model.

Chamber and pipework inputs

- Appropriate pipe diameters modelled
- Appropriate chamber diameters modelled.
- Chamber Invert and cover levels don't all align to that within manhole schedule, there needs to be alignment here at full application.

Raingardens:

- Exceedance level doesn't align with levels plan
- Depth of depression detailed at 175mm but unclear if appropriate
- Slope isn't appropriate unless detail clarifies flat formation with minimum depths.
- Filter medium depth and drainage layer depth suitable as per typical detail but clarification it applies.
- Porosities for filter medium and drainage layer should both be inputted at 0.3.
- Conductivity values suitable.
- Underdrain modelled suitably.
- Area and dimensions needs to be confirmed on plan.

Cellular storage:

- As per submitted information to be SDS tank which is to be 150m² X 1.2m D at invert of 155.900.
- Applicant has modelled feature with appropriate dimensions and invert level as per above.
- Porosity also modelled at 95% which isn't suitable and doesn't consider the reduced porosity of the SDS crates given they contain a clean stone trench. The inputted porosity should consider this.
- Applicant has modelled outlet pipe from the cellular storage to downstream chamber which doesn't reflect outlet proposal as feature will outlet via filtration between the clean stone.

Permeable paving:

- Unclear as to whether heavy duty detail or typical PP detail applies and clarification required. Typical detail has 130mm paving layer depth whilst heavy duty has 220mm paving layer depth. Assumed heavy duty applies.
- For car parking areas applicant has modelled 130mm paver depth so clarification required
- Depth has been modelled as 320mm, which is as per minimum depth of 320mm Applicant needs to ensure paving layer depth and depth is appropriate based on design at full application.
- Applicant has modelled slope values which reflect layout plan which is suitable.
- Applicant has inputted an exceedance level which aligns with lowest exceedance level of features as per proposed levels plan which is suitable.
- Underdrain has been modelled with diameter which reflects design
- Applicant has inputted an appropriate porosity and conductivity values for features.
- SAB have no issues with how PP has been modelled here other than issues with depths.

MUGA/adjacent permeable paving:

To consist of a 30mm thick 6mm ultiporous surface course layer set on a 50mm thick 20mm ultiporous binder layer. This is then to be underlain by Terram T1000 which is to encapsulate the 370mm thick 4/20mm aggregate subbase.

- Exceedance level modelled appropriately which reflects levels drawing

- Slope modelled at 1:100 which reflects drawing.
- Depth modelled as 450mm with 100mm paving layer depth. This is suitable.
- Applicant has inputted an appropriate porosity and conductivity values for features.
- SAB have no issues with how MUGA has been modelled here.

Flow control:

- FC04: To have cover of 157.953 invert of chamber to be 153.880, and invert of outlet/hydrorbake to be 154.410. To be 2.1m in diameter with D400 cover and 1000x600mm opening. Sump to be 530mm. Hydrobrake reference to be SHE-0179-2000-2300-2000 as per layout and hydro international drawing.

- Hydrobrake reference, chamber diameter, and invert level is appropriate and aligns with layout. Cover slightly out but minimal impact.

Results:

- Results show minimal flooding of system during Q100+40% CC event (8m³) in PP (3).
- Discharge is restricted to 20l/s as per proposed rate, with max water level reaching depth of 156.510, which leaves plenty of freeboard within the system.

Therefore, for network 4 the SAB are satisfied sufficient flood risk protection is to be provided. However, it is noted the discharge rate will likely need to be altered as per the section above.

In summary, when reviewing the models there are some discrepancies which mean the results for each network cannot be validated. The applicant should be aware of the following:

Contributing area

- An appropriate contributing area should be inputted at appropriate nodes. The applicant should provide a contributing area plan as part of the submitted information with the collection mechanisms and proposed levels and contours shown to justify the contributing areas modelled are appropriate.

Chamber Node and link inputs:

- SAB request manhole schedule provided at full application, which shows invert levels, cover levels, chamber diameter, chamber type, cover and frame type, and hydrobrake details. Incoming and outgoing pipe diameters should also be shown. This has been provided however there should be alignment between this and model which currently isn't the case.
- At full application, SAB will need to see the modelled diameters for pipework and nodes align with submitted information. Whilst cover and invert levels for all nodes will need to align.
- The SAB also request Manhole references, cover and invert levels are shown on layout, which currently isn't the case.
  Levels and exceedance points:

  Whilst a proposed levels plan has been provided, the SAB would also request the applicant highlights the low point (exceedance) in each network for the SAB to identify where flooded volume would occur in the system during extreme events, and also to determine the level of freeboard provided in the system.

Permeable paving:

- If modelled, the SAB request the applicant models the formation level at the exceedance point, with the lowest cover level inputted as the exceedance level. The inputted slope should then reflect the slope of the subbase. The SAB would request the depth then aligns with the subbase depth, with paving layer and bedding layer not modelled as storage. The porosity inputted should be 30% based on an appropriate specification of clean stone.
- The SAB require slope, areas, surface levels and formation levels are detailed in submitted information so the SAB can confirm modelled appropriately. noted exceedance levels and slopes are shown but formation levels should also be detailed for clarity.

Extreme event exceedance management of surface water runoff

At full application stage the SAB will require an exceedance flow plan is provided which evidences how runoff will convey during extreme events and in the event of blockage. It should be ensured all exceedance flows convey away from any receptors.

The applicant has provided an exceedance flows plan which shows all runoff will be conveyed away from the proposed buildings which is suitable.

At full application the SAB also request the applicant provides a model of the Q1000 event, which evidences where any flooded volume would occur and then the plan should evidence the volume and how it would convey.

Evaluation of impact of potential failure of a drainage system

The SAB request the applicant incorporates an overflow which bypasses the flow control chamber/s during the Q100% 40% CC event. The overflow must be situated above the max water level in the system, but below the exceedance point where flooded volume occurs in the network. The applicant should be aware of this for systems where the exceedance point is elsewhere in the system and not within the FC itself. For example networks 1 & 3. For these networks, the SAB would not object to an overflow not being proposed should the applicant evidence the consequences of failure would be acceptable, with a bypass door being sufficient.

The applicant has provided a construction detail which shows an overflow pipe in the chamber. The SAB require the exact level of overflow is stipulated on drawing for each chamber.

Should an overflow be proposed in the flow control, the SAB require clarification that the proposed overflow will not impede on the design of the chamber, and that construction of the overflow pipe with concrete surround/ or weir at the proposed level can actually be facilitated. SAB request depth of brickwork, cover and frame and cover slab is detailed.

Should it not able to be facilitated, the applicant should contact the SAB for discussions regarding whether a bypass door would be sufficient.

Summary:

In summary, the proposed design **does not demonstrate a compliance** with Standard S2. A summary of compliance with S2 is detailed below.

- Compliant with interception criteria subject to suitable design
- Proposed drained area plans should include the areas (m²) annotated either on plan or within a table on the drawing. The total contributing area of each catchment should also be clear within the plan.

- The applicant should provide an existing contributing area plan for the existing networks on site, with the areas included on plan or table within the drawing. The total contributing area to each network should also be clear.
- Should any areas remain as existing and not be drained, they must be made clear that they are being discounted and drawings should reflect proposal for these areas.
- All collection mechanisms, such as downpipes and gullies should be shown on the existing drawings to make it clear these areas would in fact have been collected in the existing.
- Greenfield runoff estimation required to evidence greenfield flows for network 1. Should this be the case discharge of 8l/s is suitable based on the information provided.
- Proposed discharge rate from network 2 is suitable, subject to the applicant evidenced the existing area aligns with that utilised in the existing model.
- Discharge rate **principle** for network 3 is suitable for site completion, however proposed rate isn't reflective of existing layout and revised calculations needed.
- Discharge rate from network 3 for phase 1 needs to be clarified, given applicant cannot provide a Q2 30% betterment on flows during this phase given the existing buildings are to remain during this phase, which would mean additional flow to network. Model required for network during both phase 1 and phase 2.
- Discharge rate principle for network 4 isn't suitable. SAB have issues with methodology.
- Applicant needs to annotate the areas in m² on the contributing area plans so it is clear as to the area contributing area to each node. Appears model inputs are mostly appropriate based on layout but above required to confirm.
- At full application, SAB will need to see the modelled diameters for pipework and nodes align with submitted information. Whilst cover and invert levels for all nodes will need to align.

- Several discrepancies noted between model and submitted information. For example, cellular storage inputs, PP depths, levels etc. At full application, inputs in the hydraulic model need to be evidenced by the supporting documents and there must be alignment between both. Issued detailed further in sections above.
- Flooded of system noted in network 1 whilst discharge rate for networks 2 & 3 in model exceed to proposed in strategy and plan.
- Exceedance flow plan is appropriate, but SAB also request Q1000 is modelled to determine exceedance flow paths and volumes during extreme events.
- Exceedance points where flooded volume occurs should also be made clear in system

- Applicant needs to consider overflows in FC where appropriate and ensure they can actually be constructed above max water level but below exceedance in system.

Please see table 6 which summarises the documentation required to satisfy standard S2.

Table 6. Documentation required to satisfy Standard S2 for the Full Application

Supporting Documentation			
Criteria	**Information/ Documentation**	**Provided**	**Required**
Detailed whole Site SuDS Drainage Design Proposals	Drainage Strategy	**Yes ☒ No ☐**	**Yes ☒ No ☐**
Plans/Layout	Existing catchment Plan	**Yes ☒ No ☐**	**Yes ☒ No ☐**
	Proposed Catchment Plan	**Yes ☒ No ☐**	**Yes ☒ No ☐**
	Existing Level/topographical Survey Plan	**Yes ☐ No ☒**	**Yes ☒ No ☐**
	Proposed Level and Contour Plan	**Yes ☒ No ☐**	**Yes ☒ No ☐**
	Interception Plan	**Yes ☒ No ☐**	**Yes ☒ No ☐**
	General Engineering Layout	**Yes ☒ No ☐**	**Yes ☒ No ☐**
	Exceedance Plan	**Yes ☒ No ☐**	**Yes ☒ No ☐**
	Contributing Area Plan	**Yes ☐ No ☒**	**Yes ☒ No ☐**
	Schematic Plan	**Yes ☒ No ☐**	**Yes ☒ No ☐**
Hydraulic calculations	Greenfield/ brownfield runoff rate evidence	**Yes ☒ No ☐**	**Yes ☒ No ☐**
	Hydraulic model	**Yes ☒ No ☐**	**Yes ☒ No ☐**
	If infodrainage, has model been provided	**Yes ☒ No ☐**	**Yes ☒ No ☐**

6.3 STANDARD S3 – WATER QUALITY

The proposed development of the new school building and associated infrastructure results in pollutant loadings to the surface water runoff (table 7). This assessment will consider the proposed land use and associated treatment from the proposed SuDS.

Given the intention is for all SuDS to be permeably lined, this assessment will cover the water quality of surface water discharge to the existing system and also the suitability of allowing infiltration to ground from the SuDS and protection of groundwater from contamination.

To determine the level of treatment offered by the proposed design, the SAB have analysed the treatment mechanisms for each catchment/land use area based on an assumption as to how the areas drain, which is noted below.

Table 7. Pollution hazard level and pollution indices for each of the proposed land uses Proposed based on Ciria SuDS Manual C753, table 26.2

Area	Proposed Land Use	Pollution Hazard Level	Total suspended Solids (TSS)	Metals	Hydrocarbons
1	Roof area	Low	0.3	0.2	0.05
2	External areas/ playground areas to permeable surfacing	Low	0.5	0.4	0.4
3	External areas to raingardens	Low	0.5	0.4	0.4
4	Car parking/access road	Low	0.5	0.4	0.4
5	Sports pitches and MUGA	Low	0.5	0.4	0.4
6	Footpaths	Very low	0.2	0.2	0.005

Table 8. Mitigation indices for proposed SuDS on site

Area	Contaminant	Risk Indices	Permeable paving	Bioretention areas	Green roof	Filter drain	Total Mitigation indices	Compliant
1	TSS	0.3	N/A	N/A	0.8*	N/A	0.8*	Y
	Metals	0.2	N/A	N/A	0.8*	N/A	0.8*	Y
	Hydrocarbons	0.05	N/A	N/A	0.8*	N/A	0.8*	Y
2	TSS	0.5	0.7	N/A	N/A	N/A	0.7	Y

	Metals	0.4	0.6	N/A	N/A	N/A	0.6	Y
	Hydrocarbons	0.4	0.7	N/A	N/A	N/A	0.7	Y
3	TSS	0.5	N/A	0.8	N/A	N/A	0.8	Y
	Metals	0.4	N/A	0.8	N/A	N/A	0.8	Y
	Hydrocarbons	0.4	N/A	0.8	N/A	N/A	0.8	Y
4	TSS	0.5	0.7	N/A	N/A	N/A	0.7	Y
	Metals	0.4	0.6	N/A	N/A	N/A	0.6	Y
	Hydrocarbons	0.4	0.7	N/A	N/A	N/A	0.7	Y
5	TSS	0.5	0.7	N/A	N/A	N/A	0.7	Y
	Metals	0.4	0.6	N/A	N/A	N/A	0.6	Y
	Hydrocarbons	0.4	0.7	N/A	N/A	N/A	0.7	Y
6	TSS	0.3	N/A	N/A	N/A	0.4*	0.4*	Y
	Metals	0.2	N/A	N/A	N/A	0.4	0.4	Y
	Hydrocarbons	0.05	N/A	N/A	N/A	0.4	0.4	Y

** treated as raingarden subject to design clarification*
*** Subject to appropriate maintenance schedule*

A risk indices approach as per the Ciria SuDs Manual has been undertaken with the proposal at concept stage (table 8). The results of which found that sufficient treatment of runoff will not be provided for all areas, subject to suitable design. A more detailed analysis per area is conducted below per area.

To note, SuDS only deliver their respective indices if they follow the design guidance with respect to hydraulics and treatment requirements outlined in the Ciria SuDS manual. Some of the requirements the applicant will need to evidence compliance with at full application are shown below.

<u>*Analysis – Roof (Land use 1)</u>

The applicant is proposing that the entirety of the roof area is to consist of a green roof. Whilst no particular indices is provided, it is considered that subject to appropriate design, similar treatment to a rain garden will be provided. Evidence of a construction detail for the green roof area is required demonstrating appropriate retention depth, appropriate filter medium specification, and planting. It is noted the indices for the roof could not be confirmed and is assumed currently. However, this is unlikely to be an issue. As such the SAB are satisfied should the roof consist of green roof then the area will be compliant with the treatment criteria subject to suitable design.

- **To note, the SAB will request a manufacturers specification is provided which shows the construction of the green roof. However, the applicant**

must note that the SAB will not be responsible for reviewing the structural integrity and suitability of the proposal. The SAB will simply be ensuring the modelled storage is provided and that the design will provide sufficient interception and treatment of runoff.

Analysis – external areas to permeable surfacing (Land use 2, 4 & 5)

The applicant is proposing that the MUGA areas, some external yard areas, sports pitch, playground areas, and new parking areas/access road are to consist of permeable surfacing. These will all drain their own area with exception of the car parking areas which will drain an additional small area of impermeable surface via lateral inflow, and the permeable paving adjacent to the MUGA which will drain some external hardstanding area via lateral inflow.

As per the risk indices approach, should these areas consist of permeable surfacing sufficient treatment of runoff will be provided. Whilst the risk indices approach deems sufficient treatment will be provided, the SAB have made the following observations regarding the level of information required to determine if sufficient treatment will be provided at full application.

For areas draining to permeable surfacing, as per section 20.6 of the Cira SuDS manual, the majority of treatment and pollutant removal from permeable/porous surfacing occurs in the upper surface layers. The design of permeable surfacing should ensure that the surface layer has sufficiently small voids to trap silt within the upper 30mm of the surface, and therefore a jointing material consisting of 2/6.3mm should be utilised to meet this requirement for permeable surfacing, while this requirement is also met by suitably designed porous asphalt, and other forms of permeable surfacing.

As noted in S6, these features are to be appropriately designed for treatment and as such the SAB are satisfied sufficient treatment of runoff for of these areas is to be provided.

For the permeable car parking areas, the applicant is proposing that these areas will collect some runoff from areas of impermeable access road. For any additional area draining to the features, as per section 20.5 of the Ciria SuDS manual, where permeable/porous surfaces drain an adjacent impermeable area, the ratio from impermeable to permeable should be limited to 2:1, to prevent clogging (Kelleher,2013). Based on the information provided this won't be exceeded by the design and as such the SAB have no issue with the proposal and deem sufficient

treatment of runoff will be provided for these areas which will convey to the permeable surfacing via lateral inflow.

Analysis – external areas to raingardens (Land use 3)

The applicant is proposing that some external hardstanding areas such as the courtyard, and some footpath areas are to drain to raingardens. For these areas, the SAB will seek that the features are appropriately designed to offer interception of runoff.

For areas draining to raingardens. Whilst the risk indices approach deems sufficient treatment will be provided, the SAB have made the following observations regarding the level of information required to determine if sufficient treatment will be provided at full application.

- The vegetated area of each raingarden and it's contributing area will need to be evidenced to determine if the features are appropriately sized. Based on the information provided the SAB are satisfied the features are sufficiently sized to offer treatment of runoff.

- For the SAB to determine whether sufficient levels of treatment of runoff are to be provided by the bioretention areas the SAB require further information as to how runoff will convey to the features. For treatment to be offered, it is required that runoff is conveyed to the features at surface level.

  Appears this is to be proposed with point inflow noted for some areas and other areas draining via lateral inflow. However this should be clarified in the constrcution detail as noted at S6.

- The desirable gradient is either horizontal or as close to horizontal as possible, to ensure flow is evenly distributed across the surface of the feature and for treatment of runoff to be maximised.

  Should any gradient be proposed (exceed 1:33) the SAB request the features are either separated and terraced to produce a flat surface, or that check dams are installed along the length features to ensure that the full area of the features is utilised for treatment of small events. This is also required to ensure that erosion of the surface and subsequent sedimentation is less likely to occur, with flow more evenly distributed across the surface of the feature and that velocities through the features aren't excessive.

Should gradients exceed 1:17 then treatment cannot be deemed to be provided regardless of whether check-dams are provided.

The applicant has provided a levels plan which shows the majority of the features are flat, with the exception of the feature to the west of the access road. This is to have a fall from south to north. The SAB require clarification here regarding the gradient and as to whether a check-dam would be required. Further comment in S6.

- The SAB will also require the applicant evidences the location of each overflow within the features on plan, to ensure the overflow is positioned appropriately. Should any surface gradients be proposed then the SAB request the applicant positions the overflow at the low point of the feature and incorporates appropriate interception mechanisms so the overflow doesn't constantly take effect, thus bypassing treatment of runoff.

  The applicant has evidenced the locality of the overflows however the depth is unclear and as such unclear as to suitability.

- In regard to the construction, information is required as to the depth of filter medium, hydraulic conductivity, and depth of the overflows. In regard to the hydraulic conductivity of the filter medium. The SAB require a minimum saturated hydraulic conductivity of 100mm/hr-300mm/hr is proposed to ensure the filter medium has sufficient treatment capacity. The SAB note a minimum depth of 400mm should be provided to ensure suitable design for treatment capacity, while a suitable composition in line with box 18.1 of the Ciria SuDS Manual should also be proposed.

  Section A-A and F-F shows suitable depth and composition of filter medium, however unclear if this applies to all raingardens. See comment in S6 for further detail.

- SAB request minimum depth of depression is to be 150mm, which is of sufficient depth to provide temporary shallow ponding where losses to evapotranspiration can occur. Overflow should then be set 50mm lower than the exceedance point (low point of kerb). SAB request this is detailed. Current details depict 150mm depth of depression in section A-A and F-F but unclear if applies to all and depth of overflow also unclear.

- The SAB will require an appropriate planting schedule is provided to ensure appropriate vegetation is proposed to provide sufficient treatment of runoff. This is currently unclear.

Analysis – areas draining to Filter drains (land use 6)

The applicant is proposing that the proposed footpath and some terraced area are to drain to a filter drain/stone trench, which will also collect greenfield runoff from the upslope areas. As per the risk indices approach sufficient treatment of runoff is to be provided, however the level of treatment offered will be subject to appropriate design in accordance with section 16 of the Ciria SuDS manual. A review of this has been conducted below.

- Pretreatment should be provided by a vegetated filter strip where features receive runoff via lateral inflow as is proposed.

- As per note 2 of table 26.3 of the ciria SuDS manual, whilst filter drains can remove suspended solids this is subject to a suitable maintenance schedule being proposed in accordance with table 16.1 of the manual.

  The SAB would request the topsoil layer is removed and a sacrificial layer of CGA is proposed, with the maintenance schedule including replacement of this layer.

- To ensure adequate treatment, the depth of filter drain should be evidenced to be at least 500mm deep. Currently unclear as to depth to soffit.

- Filter drain width should give appropriate surround. Appears will be provided.

- Suitable filter material should be proposed as per sections 18 and 30 of the ciria SuDS manual. this currently isn't clear, should be type B, 4/20mm, type 3 of 4-40mm.

Should the applicant ensure the design of the filter drains and stone trenches are as above, the SAB will deem sufficient treatment of runoff for these areas will be provided by design.

*To note, some section of footpath near the main building will be collected traditionally and conveyed via gullies to network 2. This area is minimal and as such the SAB raise no objection from a treatment perspective and the gullies are likely to trap and silt and sediment from entering the underdrain system downstream.

Analysis – existing car park and access road

The applicant is proposing that the existing access road by the entrance is to be collected by a raingarden. It's noted this access road will simply be re-surfaced and as such is not subject to compliance with the treatment criteria, however the SAB acknowledge the applicants proposal here will provide a significant betterment by providing treatment of runoff for an existing area.

This is also the case for the existing car park area, with the applicant proposing to drain the area to a PTS unit. The applicant is proposing a downstream defender to treat the runoff from the existing car park at node SCP39.

The applicant has provided product sheets and data information which show the hydro international downstream defender select vortex model is to be utilised with a unit reference of DDC12-100-C-300.

This is to have a treatment flow capacity of 30l/s, max catchment of 4000m², hydraulic capacity of 84l/s and a 300mm inlet and outlet.

The mitigation indices provided is to be as follows

TSS – 0.3
Metals – 0.2
Hydrocarbons – 0.2

Firstly, the SAB acknowledge the applicant does not need to ensure this area is compliant with the standards and that the proposal will result in a betterment. However the SAB would query whether the advanced vortex unit could be proposed to ensure the mitigation indices offered exceeds that of the risk indices for the area.

Regarding the design, the SAB note the treatment flows and catchment capacity are suitable for the drained area.

Groundwater contamination from mobilisation of existing contaminants :

As per section 25.2.4 of the Ciria SuDS manual, the SAB require that the proposal won't increase the risk of mobilisation of existing contaminants to ground.

It's noted contaminants testing was conducted on site and identified exceedances of iron, manganese, and aluminium. These were deemed to be due to local background

concentrations of these metals which is a characteristic of mining areas in South Wales. As such it is considered these exceedances do not pose a risk to groundwater.

However, exceedances of ammonia and ammonium were noted at TP04. The GI states given there is expected to be an increase in hard cover which will reduce infiltration, there is no significant risk to controlled waters when also considering the impermeability of the glacial till.

However, the SAB do query that by lining all SuDS, there is likely to be an increase in the natural levels of infiltration on site compared to the baseline which contradicts the GI. Whilst the SAB acknowledge that the poor permeability on site will inhibit leachate transport to groundwater, and that the systems will be undertrained so there is to be little infiltration regardless, the SAB would request further clarification is provided that partial infiltration via the proposed design would not increase the risk of groundwater contamination on site, especially when considering the made ground extent which is likely within the extent of the proposed SuDS. This could potentially result in leaching from the anthropogenic materials and pose a local issue on site rather than to groundwater itself.

It is not anticipated that groundwater contamination is to be a reason for the features to be lined, however should it be deemed the proposal would pose a risk of contamination, the SAB would not object to the applicant proposing to line the features where required, despite this resulting in these features not contributing to interception of runoff.

Summary

In summary, the proposed design **demonstrates a likely compliance** with Standard S3. A summary of compliance is noted below

- Green roof to ensure no pollutants from roof area subject to suitable design
- All areas draining to/consisting of permeable surfacing to be complaint with treatment criteria subject to suitable design.
- All external hardstanding areas draining to raingardens to be complaint subject to suitable design
- All external areas draining to raingardens are to be treated subject to suitable design
- Footpath and terraced area draining to filter drain to be sufficiently treated subject to suitable design
- SAB query whether advanced vortex PTS can be used for car park

- Assessment required that by permeably lining the features there will be no risk of mobilisation of existing contaminants to groundwater. Currently unclear.

Please see table 9 which summarises the documentation required to satisfy standard S3.

Table 9. Documentation required to satisfy Standard S3 for the Full Application

Supporting Documentation			
Criteria	**Information/ Documentation**	**Provided**	**Required**
Plan	Water Quality Treatment Plan	**Yes ☒ No ☐**	**Yes ☒ No ☐**

6.4 STANDARD S4 & S5 – AMENITY & BIODIVERSITY

The applicant is proposing several bioretention areas across the site. The SAB believes this will provide acceptable amenity benefits as the green SuDS features will be easily visible from all areas of the development. The proposed bioretention areas will significantly improve the attractiveness of the site by providing attractive, high-quality features. The proposed green SuDS features will provide new habitat for birds, invertebrates and other indigenous wildlife.

There is also extensive use of permeable surfacing on site, which will provide amenity benefit given it will have dual purpose by functioning as part of the drainage system, but also as sports pitches, playground areas, parking areas and MUGA areas.

A planting schedule and landscape plan should be provided by the applicant, and at full application will be passed onto RCTCBC Ecology at full application stage for consultation/comment. Whilst a landscape plan has been provided, it is currently unclear as to what is proposed where. This will need to make clear what planting is proposed where.

Summary:

In summary, the proposed design **demonstrates a likely compliance** with Standard S4.

- Further information required regarding what planting is proposed where. Currently unclear from landscape plan.

Please see table 10 which summarises the documentation required to satisfy standard S4&S5.

Table 11. Documentation required to satisfy Standard S4 & S5 for the Full Application

Supporting Documentation			
Criteria	**Information/ Documentation**	**Provided**	**Required**
Layout	Landscape Layout Drawing	**Yes ☒ No ☐**	**Yes ☒ No ☐**
Schedule	Planting Schedule	**Yes ☐ No ☒**	**Yes ☒ No ☐**

6.5 Standard S6 – Design of Drainage for Construction, Maintenance and Structural Integrity

Construction management plan:

Due to the nature of the development, at full application the SAB will require a construction management plan is provided detailing how the SuDS features will be constructed, ensuring sufficient protection of the features during the construction phase.

The applicant has provided an EMP as part of the submission which outlines that surface water runoff during the constrcution phase is to be managed via attenuation tanks. It is unclear as to whether these will be the same tanks as proposed to drain the site on completion and clarification required given alignment and locality doesn't align. Should they be the same tanks as utilised once the site is complete, the applicant must make a note that these tanks will be remediated prior to handover given constrcution runoff is likely to contain silt and sediments. On completion of works it must be clear that any SuDS utilised to manage constrcution runoff will be remediated prior to handover. Currently plan doesn't outline this.

To note, the plan doesn't outline how SuDS features will be protected during constrcution and at what stage they will be constructed. At this stage the CMP isn't sufficient however this can be conditioned in any approval if required.

Construction phasing plan:

The applicant has provided phased drainage layouts which outline phase 1 will entail the construction of the new school building, external areas and sports pitch. Phase 2 will entail the constrcution of the MUGA and new parking/external areas to the east.

Firstly, the SAB request clarification as to the timeline of the phasing during the full app submission.

The plan, or an accompanying document should also clarify the intention for how each phase will manage runoff ensuring that flood risk in the interim is not exacerbated.

For example, as noted in S2 the applicant is proposing that in phase 1 network 3 (consisting of the southern building area and existing car park) is to drain the same system that currently accommodates runoff from existing building area. The proposed discharge from network 3 has currently been based off the Q2 30% betterment rate of this existing network which drains the existing building. During phase 1 this building is

to remain and therefore the applicant would not be providing a betterment during this phase and the proposal would result in increased flows until such time that the building is demolished.

The applicant must ensure that flood risk is mitigated during this period and only during the time phase 2 is completed can this network discharge at the Q2 30% betterment rate of the outfall at MH130 as is currently the case. Clarification required regarding this and how the applicant intends for network 3 to discharge in the interim between phase 1 & 2. The SAB would expect network 3 discharges at the greenfield QBAR for the drained area in the interim until phase 2 is completed. To note, network 2 can discharge at the Q30% betterment during phase 1, providing it is ensured the car park is drained to network 3 as currently proposed.

The proposal for networks 1, 2, & 5 during phase 1 is suitable (providing existing car park does drain to network 3 during phase).

Maintenance

The applicant has provided a maintenance plan as part of the submitted information. The SAB have reviewed the document and make the following observations:

- Access to site detailed and appendix includes plan of how features are accessed and maintained.
- Overall design clarified which is suitable.
- Maintenance plan provides clarification as to who will be responsible for the maintenance of the proposed SuDS features, which is suitable.
- Cost of maintenance is also detailed which is appropriate.
- Plan outlines performance risks and design intent of features which is suitable
- Appropriate maintenance schedule provided for the cellular storage, permeable paving, filter drains, green roof, RwH, & raingardens in accordance with ciria guidance.
- Appropriate maintenance schedule provided for the flow control accordance with ciria guidance.
- Appropriate maintenance schedule provided for the traditional drainage.
- Schedule for downstream defender needs to be included.

Access principles:

At full application stage all elements of the drainage system will require free and easy access. Access points should be provided in the following locations:

- Every change of alignment, diameter, gradient or pipe material
- Head of all systems
- Point of connection: Where a connection to pipework is proposed and the diameter of connecting pipework is greater than half the carrier line diameter, then an access point should be proposed

Manholes (man entry) should be provided

- Where depths exceeds 3m
- Within an adopted highway as per HDC requirements
- Chambers within an access road.
- For flow control chambers
- Diameter of pipework exceeds 450mm

Where access is provided through a manhole then spacing must not exceed 90m.

Man entry manholes must have a min opening of 600mm x 600mm for type 2/B chambers and 675mmx675mm for type 1/A chambers. Where depths to soffit are less than 1.5m (Type C-D) then minimum opening should be 750mm x 750mm (up to 1.2m diameter) or 1200mm x 675mm multiple cover (1.2m diameter>).

Where access to a pipe is provided through an inspection chamber, then chambers must be no more than 45m apart.

Inspection chambers should be designed to afford reasonable access for equipment to carry out maintenance activities such as rodding and jetting (450mm minimum). However, where depths exceed 1m, then access should be restricted to 350mm via a reduced riser section to ensure chamber is non-man entry.

Where step rungs and ladders are used, there must be a maximum distance of 675mm to the first step from surface, with a minimum one course of brickwork. Ladders and step rungs should be positioned in conjunction with access opening and should ensure minimum clear opening isn't obstructed. There must also be at least 900mm of clear access behind the ladder. The applicant should be aware of this where weirs are proposed in flow control chambers.

At the foot of each step rung or ladder, a 600mm x 450mm square landing area should be provided from the outer edge of the ladder or step rung to main channel.

It is noted there may be some instances where installing access points (chambers) at the point of every connection isn't viable. As such, in instances where a lateral needs to connect to the main carrier line, the SAB would be willing to accept Y connections,

however it must be ensured the vertical angle of connection is between 60 and 0 degrees.

Access assessment:

The SAB have reviewed the submitted information and are mostly satisfied with the proposal from an access perspective.

The raingardens and permeable paving will all be accessible for maintenance, with access points provided where required upstream and downstream of the underdrains ensuring they can be maintained. For the flow controls, appears access can be obtained from the adjacent permeable surfaced areas. Plan provided shows access by foot and by vehicle access. The SAB are satisfied with the arrangement.

Access points are for pipework proposed at appropriate locations where there is a change in alignment, gradient, or diameter. Access points are also mostly provided at the head of all systems which is suitable.

The proposed constrcution of the chambers (reviewed in S6) is suitable from an access perspective. Access to PCC chambers shown which clarifies ladders and step rungs will be positioned appropriate with cover opening offset to ensure it is in line with access. This is suitable.

The inspection chambers will be at least 450mm in diameter as per manhole schedule which is sufficient to allow easy access for maintenance.

However, the SAB do note that as per the manhole schedule SCP57 is down as type 12 chamber but this isn't suitable based on depth to soffit. Should be a man entry chamber (type 1) with ladder access as depth to soffit exceeds 3m.

Likewise for FC04 which is down as plastic, again inappropriate and this will need to be a PCC type 1 man entry chamber with ladder access based on depth to soffit which exceeds 3m.

Chambers are mostly appropriate diameter based on size of incoming pipe, however SAB query whether SCP70 & SCP72-74 should have a larger internal diameter based on largest pipe diameter within chamber, as chambers are 450mm with largest pipe being 300m.

- Cellular storage access: The SAB do have issue with how the cellular storage structures will be accessed for inspection and maintenance. Based on design,

appears the cellular storage is to outlet and receive runoff via filtration into the cellular storage from the adjacent subbase of the permeable paving. The applicant is proposing that underdrains will convey adjacent to each of the cellular storage at a lower level, with runoff conveying to and from the underdrains via filtration.

The SAB query this proposed arrangement. Firstly, SDS tanks typically have a perforated pipe running through a filter trench through the feature from inlet to outlet. These aren't shown. Noted underdrains are shown next to the features beneath the adjacent PP but this doesn't typically reflect SDS design. Clarification required at full application.

The SAB would typically request the design of the cellular storage has chamber access upstream and downstream, which provides access for inspection and maintenance of the tank.

The SAB would query whether the applicant could provide access for inspection and maintenance of the features which currently isn't provided. For example, the cellular storage should have its own perforated pipe which connects to the adjacent underdrains, with chamber access provided downstream of crate at point of connection but also upstream.

<u>Traditional drainage:</u>

SAB request details and schedule for pipework and chambers is in accordance with sewers for adoption 8th edition.

SAB request manhole schedule provided at full application, which shows invert levels, cover levels, chamber diameter, chamber type, cover and frame type, and orifice/hydrobrake details. Incoming and outgoing pipe diameters should also be shown.

Where manholes are required as noted above, chamber type should be as follows:

- 6m + bespoke design.
- 3m - 6m = Type A1/A2
- 1.5 – 3m = Type B
- 1m - 1.5m Type C.
- Less than 1m = Type D

Where adoptable inspection chambers are required:

- Must be Type E (min 450mm diameter) as per SFA 8th edition with concrete surround.
- Where depth from cover to soffit exceeds 1m, then the chamber should have a reduced access opening which is restricted to 350mm via a reduced riser section.
- To note, these chambers not suitable where subject to adoption within an access road or adopted highway, or where depth to soffit exceeds 3m regardless of where subject to adoption.

Where private chambers are proposed to serve single dwellings:

- Type F chambers as per SFA8th edition are suitable up to 2m depth from cover to soffit.
- Type E chambers should be proposed for private chambers where depth exceeds 2m from cover to soffit.

The SAB require the cover and frame type is in accordance with BS EN 124. This should be clearly detailed. Within an adopted access road at minimum a D400 cover and frame should be proposed.

Rocker pipe: should be provided at entry to and from manholes when rigid pipes are used. Construction detail should depict an appropriate length of rocker pipe based on the pipe diameters.

Manhole chamber diameters: should be in accordance with table B1 of SFD 8th edition. Where there is more than 1 incoming pipe, diameter should be increased to accommodate the minimum width of benching.

Pipeline schedule requested which should show whether type S or Z bedding is required, with min depth from cover to soffit detailed for each pipe. Pipe material should also be made clear.

***The applicants compliance with the above has been reviewed in the box below 'SuDS design review'**

Cellular storage

Given for the proposal for cellular storage, the SAB will need to see evidence there will be appropriate depth to cover and request levels and datasheet are provided for cellular storage to determine if appropriate. Whilst likely suitable based on the information provided, this will need to be evidenced at full application.

Permeable paving:

A detailed review of the proposed permeable paving has been conducted below. However, a summary of constrcution and operation criteria are noted below.

A suitable depth of surface layer, bedding layer/base course, sub-base and capping layer should be proposed depending on the Californian Bearing Ratio (CBR) and traffic loadings as per section 20.9 of the Ciria SuDS manual – this appears to be provided by design however clarification required as noted in the box below regarding what permeable paving type is proposed where.

Given the proposal for permeable surfacing, it will need to be demonstrated that the surface gradient of the permeable paving areas is not steeper than 1:20. This will need to be demonstrated as a slope greater than this will not allow for all of the surface water to infiltrate as it causes runoff to flow over the component. Should a gradient exceeding 1:20 be proposed the SAB request collection mechanisms such as aco channels are incorporated at low points to convey any runoff back into the subbase. SAB note levels plan has been provided which shows suitable gradients for all areas with exception of area in new parking area. However, it is noted PP is proposed downstream of this and would collect any exceedance flows, so no aco is required here.

The SAB also query as to whether porous asphalt should be proposed for the new access road as opposed to permeable paving, which could be confined to the parking areas.

As per section 20.5 of the Ciria SuDS manual, where permeable/porous surfaces drain an adjacent impermeable area, the ratio from impermeable to permeable should be limited to 2:1, to prevent clogging (Kelleher,2013). This is provided via design.

Material specifications should be in accordance with section 20.11 of the ciria SuDS manual. This is provided as noted in the box below.

It should be specified that the subbase will be laid in 100-150mm layers and compacted to ensure maximum density is achieved for the material without crushing and reducing porosity. A note should be added that once laid, the subbase cannot be trafficked unless a DBM/AC or sacrificial layer is used

If trafficked, a layer of DBM should be used (AC) which is then punctured with 75mm holes at 750mm on orthogonal grids after use. The bedding layer then sits on top of this. Alternatively, a sacrificial subbase layer can be used.

It is acknowledged the applicant has proposed an AC layer for some of the areas, however the CMP should clarify as to which areas will be trafficked and how the above will be incorporated during the construction phase.

Permeable paving outlets: As per section 20.5.1, outflow from the subbase should be via a system of perforated pipes or fin drains that provide a large surface area for water to flow into. Perforated pipes should extent at last 1m into the subbase and should be slotted or have circular holes formed as part of the manufacturing process.

Based on the initial proposal, the SAB are satisfied with the outlet mechanisms for all PP with the exception of the area to the west of the northern MUGA area where no outlet is shown, and for the area to the west of the terraced play area where it's unclear as to whether the feature will share a subbase with an adjacent section of PP. both issues clarified in box below.

Where possible, the adjacent landscaped area should be set at least 50mm below the surface, or should flow away from the permeable surface. Where the feature could receive runoff from a landscaped area the applicant should ensure the surface is stabilised to ensure the mobilisation of silt and sediment is mitigated – based off the proposal, the applicant is proposing to mitigate the risk of runoff from landscaped area from conveying onto the surface of the PP and it is noted stone trenches with a depression are proposed along the upslope which is suitable. As such the risk of mobilisation of silt and sediment from these areas onto th surface has been mitigated.

HDC:

Whilst HDC have not been consulted as part of the pre application, the applicant should be aware of the following:

- The applicant should consult with HDC regarding the use of beany kerb drainage for the existing car park. HDC typically raise issue as they can be a

maintenance issue in urban areas, as jetting can result in silt and sediment spraying onto the surrounding area.

Mode of connection:

The SAB request a mode of connection drawing is provided for each connection.

Principles

Proposed drainage system will not require the use of pumping, which is one of the principles of the SuDS national standards.

The drainage proposal includes predominantly underground storage infrastructure, and therefore issues cannot be identified at the surface which is a fundamental principle of the Statutory Standards. However, the SAB acknowledge there is extensive use of permeable surfacing and raingardens which will allow issues to be identified at surface. Whilst cellular storage isn't the ideal solution for the SAB and there would be a preference for green infrastructure such as swales and basins, the SAB won't object to the applicants proposal given the nature of the site and constraints.

DCWW

Whilst Dwr Cymru Welsh Water have not been consulted as part of the pre-application, on previous sites, they have stated the following regarding the interaction of permeable systems and their adoptable assets "Service strips within permeable paved areas apply for all adoptable drainage, so any pipe that is conveying flows of more than one property, or a single property carrier pipe that leave the curtilage of a property (lateral)". It is also noted DCWW will not accept any SuDS structure crossing or overlying their existing or any proposed adoptable infrastructure. DCWW have requested an easement of 3m either side of the centre line on previous applications. It is recommended that DCWW are contacted for advice prior to the SAB full application should DCWW apparatus be identified.

Information and communications plan:

The SAB will require an information and communications plan is provided which details as to how the applicant will make the site users aware of the function of the drainage system, its benefits, and performance risks. The measures put in place should be clearly detailed and as to how they will be implemented.

Summary:

In summary, the proposed design **demonstrates a likely compliance** with Standard S6. Summary of compliance is shown below

- Construction management required and current one isn't suitable, but can be conditioned.
- Clarification required that runoff from network 3 in phase 1 won't exacerbate flood risk downstream.
- Maintenance plan is mostly appropriate but additional schedule required for Downstream defender.
- Access requirements mostly suitable, but need to be as above with better access provided to the cellular storage
- Construction design needs to be amended as per box 'SuDS design' review below.
- Extensive use of cellular storage not ideal as against SuDS principles but acceptable given constraints.

Please see table 11 which summarises the documentation required to satisfy standard S6.

Table 11. Documentation required to satisfy Standard S6 for the Full Application

Criteria	Information/ Documentation	Provided	Required
SuDS Drainage Design Drawings	Standard/ Construction Details	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	Cross section	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	Longitudinal Section	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	Constraints Plan	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	Manhole Schedule	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
Detailed SuDS Assets Maintenance Plan	Private Drainage Maintenance Plan	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	Adoptable Drainage Maintenance Plan	**Yes** ☐ **No** ☒	**Yes** ☐ **No** ☒
Communication	Information and communications plan	**Yes** ☐ **No** ☐	**Yes** ☒ **No** ☐
Construction	*Construction Management Plan	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐
	*Construction Phasing Plan	**Yes** ☒ **No** ☐	**Yes** ☐ **No** ☐
DCWW/Highway Connection	Mode of connection drawing (construction detail)	**Yes** ☐ **No** ☒	**Yes** ☐ **No** ☒

Please note the asterisk illustrates documentation that is required, but can be conditioned as part of any approval.

7 SUDS Design Review

Perforated pipes:

Underdrains are shown on plan and in section drawings for the permeable paved areas and raingardens. Underdrains are shown as in deepened trenches, with the underdrains in permeable surfaced areas being deeper than the cellular storage where proposed. The perforated pipes are set on type S bedding.

- SAB require clarification that minimum aggregate size is greater than size of any perforations, or SAB request the perforated pipes are wrapped in a permeable geotextile.

- SAB query as to why perforated pipes are all underlain by type s bedding. SAB request perforated pipe is set 50mm above base of the drainage layer and not above type S bedding. This should simply just be the CGA layer with the perforated pipe within.

- Widths of trenches where perforated pipes are proposed should be sufficient to provide sufficient surround (150mm).

- Where half perforated should be clear as to which half.

Raingardens:

There are 7 raingardens proposed in total across site. The applicant has provided section details for the raingardens in the courtyard (section A-A) and the raingarden that is to be constructed in network 3 (section F-F)

Details depict the raingarden edging will be bullnosed kerbing with a 150mm depth of depression provided, with exception of the edging from embankment at section F-F, where no edging is shown.

An IC chamber is shown which is to be a 450m type 13 catchpit chamber with a 600mm x 600mm grated cover. Depth unclear.

Filter medium is to be a minimum of 500mm depth, with a minimum SHC of 100mm/hr and void ratio of 30%. Specification is to be as per box 18.1 of the ciria SuDS manual which is suitable.

The details depict Terram T1000 is to separate the filter medium from the min 300mm depth of 4/20 CGA drainage layer. The terram will also line the sides and base, although in section FF it is not shown fully along the base beneath the perforated pipe and against the type 1 subbase beneath the kerb separation as required.

Perforated pipe is to be within what appears to be a deepened trench which will act as outlet mechanisms. The perforated pipe is to be 150mm in diameter and half perforated.

On review of the detail the SAB make the following observations:

- Detail required which reflects construction of all raingardens. SAB would expect a typical detail is provided, and then section/separate drawings are provided where construction differs from the typical detail and is bespoke. Based off current information it is unclear as to the construction of the raingarden serving the access road entrance for just one example.

- Minimum depth of depression should be 150mm with overflow set at least 100mm above base. Currently unclear as to overflow levels in relation to exceedance, however depth of depression suitable for section A-A and F-F. Needs to be clear this is provided for all raingardens.

- Locality of overflow must be clear on plan and evidenced to be within appropriate locations. Appears the overflows are to be the IC catchpit chambers with grated covers. These are all shown on layout within the vicinity of the features, with exception of rain garden serving the access road entrance. Overflow required here. Locality appears suitable for remaining features based on levels.

- IC chambers type 13 are suitable as overflows and will provide sufficient access for maintenance

- Based off the levels drawing, all raingardens are to be flat, with exception of the RG shown in the figure below. SAB query as to the gradient here and whether a check-dam would be required to maximise the treatment area and area contributing to interception of runoff. This avoids the bottom overflow taking effect prematurely and bypassing treatment of runoff.

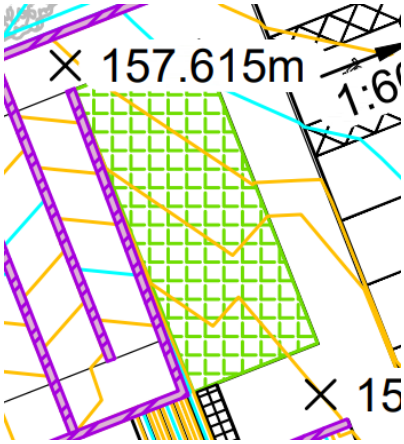

Figure 5. raingarden in question

- SAB note the inlet mechanisms to the features must be shown on detail. For example, raingarden in section F-F is to receive point inflow, as will the raingarden to the east and serving the access road. However, detail doesn't depict how runoff will inlet. Assumed remaining raingardens will be point inflow.

- Erosion mitigation must be provided at the entry points, this must also be clear within the drawings. Composition and dimensions of mitigation must be detailed.

- For raingardens, where runoff is draining from an impermeable surface and is collected by the SuDS component laterally (compound and playground area), then the collection mechanism should provide an appropriate edge detail which allows easy conveyance but also ensures the risk of erosion and channelling is mitigated. Tactile paving blocks (setts) or gravel strips should be incorporated along the perimeter edge to mitigate the risk of erosion and channelling. SAB request this is provided.

- SAB note composition and minimum depth of the drainage layer (300mm) and filter medium layer (500mm) detailed in sections are appropriate. Should this be provided for the other raingardens the SAB have no objections.

- However, the SAB do note the layout shows trees within one of the raingardens in the courtyard and another in the playground area. SAB query this given depth of filter medium should be 900mm where trees are proposed as per ciria guidance. SAB request clarification regarding this.

- SAB query as to why perforated pipe is underlain by type s bedding. SAB note perforated pipe should be set 50mm above base of the drainage layer and not above type S bedding. This should simply just be the CGA layer with the perforated pipe within.

- For section F-F the terram is not shown fully along the base beneath the perforated pipe and against the type 1 subbase beneath the kerb separation as required.

- Where proposed, side slopes of raingardens should never exceed 1:3 and should ideally be 1:4. F-F shows 1:3 but unsure as to whether side slopes are proposed elsewhere so details should reflect above. Based off levels drawing appears only raingarden by the entrance will have a side slope, and the remainder will be a straight depth of depression, presumably 150mm as per detail A-A.

- Terram T1000 is a suitable separation layer and suitable to line the sides and base providing no issues with S1. 300mm lap noted which is suitable.

- Given the proposal for raingardens, the SAB request a bioretention schedule is provided, depicting the areas, exceedance level, formation level, depth of depression, depth of filter medium, depth of drainage layer, and depth of overflow.

- For raingardens adjacent to trafficked areas the SAB require appropriate kerbing and protection is proposed to mitigate the risk of these features being inadvertently trafficked.

<u>SDS tanks</u>

Layout depicts 4 SDS geolight tanks in total across site. The layout depicts the following areas and levels.

- SDS network 1: 36m L x 10m W, X 0.8m D at invert of 179.450.
- SDS network 2: 42m L x 5m W, X 1.2m D at invert of 166.875
- SDS network 3: 20m L x 15m W, X 01.2m D at invert of 158.000
- SDS network 4: 150m² X 01.2m D at invert of 155.900

The section drawings provided show there is to be a 100mm compacted sharp sand layer above and below the tank, with the tank then wrapped in an SDS 'permeable membrane'. Surround of tank at sides to be 150mm min of 10/20mm single sized bedding.

The SAB have reviewed the drawings and make the following observations.

- Membranes aren't permeable. If to allow infiltration should be an SDS non-woven permeable geotextile, not membrane.

- SAB request each tank has its own detail at full application. SDS detail should be provided. Dimensions of trench and material specifications (clean stone, geo-textile) should be clear.

- Based on design, appears the cellular storage is to outlet and receive runoff via filtration into the cellular storage from the adjacent subbase of the permeable paving. The applicant is proposing that underdrains will convey adjacent to each of the cellular storage at a lower level, with runoff conveying to and from the underdrains via filtration.

  The SAB query this proposed arrangement. Firstly, SDS tanks typically have a perforated pipe running through a filter trench through the feature from inlet to outlet. These aren't shown. Noted underdrains are shown next to the features beneath the adjacent PP but this doesn't typically reflect SDS design. Clarification required at full application.

  The SAB would typically request the design of the cellular storage has chamber access upstream and downstream, which provides access for inspection and maintenance of the tank.

  The SAB would query whether the applicant could provide access for inspection and maintenance of the features which currently isn't provided. For example, the cellular storage should have its own perforated pipe which connects to the adjacent underdrains, with chamber access provided downstream of crate at point of connection but also upstream.

Typical permeable paving:

To be 80mm block pavers set on 50mm depth of 6.3-2mm grit. This is to be underlain by terram T1000 which encapsulates the subbase which is to be a minimum of 320mm of 4/20mm aggregate based on CBR of 5%.

Permeably paving – Heavy duty:

To be 80mm block pavers set on 50mm depth of 6.3-2mm grit. This is to be underlain by a 90mm AC32 layer which will have 75mm holes cored on an orthogonal grid of 750mm. Holes are then to be filled with type 3 subbase or bedding sand. This is then to be underlain by terram T1000 which encapsulates the subbase which is to be a minimum of 320mm of 4/20mm aggregate based on CBR of 5%. All permeable paving is to outlet via underdrains which are to vary in diameter and are to be half perforated as per detail above. The following is noted:

- SAB would request type 3 is used to infill the holes.

- SAB would also note that the Terram should not be laid beneath the AC layer given the risk of melting during construction. This separation layer should be proposed on top of the AC layer once cored to stop migration of the grit into the subbase.

- SAB request it is clear as to where the heavy-duty detail is proposed. This is required for traffic category 5 and above and therefore should be proposed for areas where there is occasional overrun of maintenance vehicles, car parks with commercial vehicles.

  The SAB's anticipation is that the new proposed car park in the eastern catchments will be the heavy duty detail. It's noted a section drawing also depicts the pedestrian areas around the building will be as per the heavy duty detail, however clarification required as to why at full application, and as to construction type for all areas.

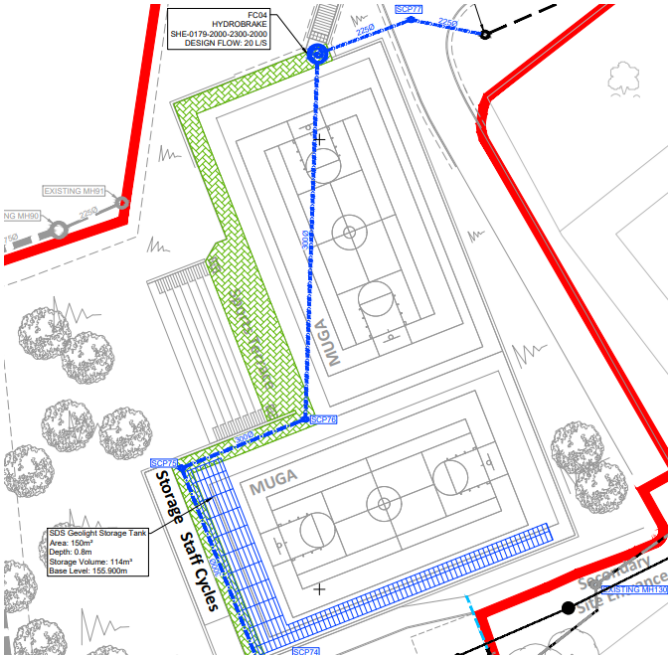

Figure 6. Area where assumed perforated pipe extent should cover northern MUGA and PP

- Unclear as to how MUGA and PP outlets here. No perforated pipe or underdrain shown for northern sections and would assume would be required to ensure adequate collection. Clarification required.

- SAB request formation level drawing is provided for all features, showing proposed base levels.

- Where formation differs to surface slope, then details should outline minimum subbase depth.

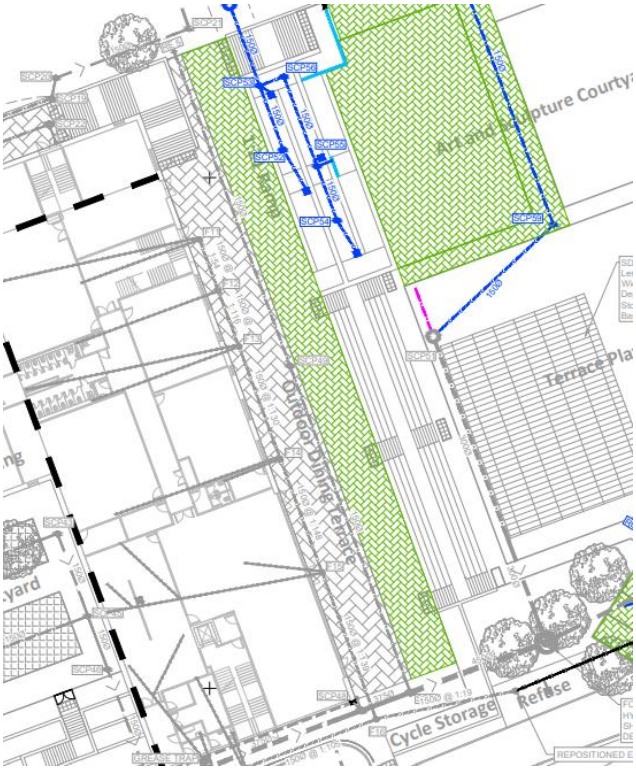

Figure 6. areas where unclear if subbase will be shared or separated.

- Assumed this PP will share subbase with PP constructed in phase 1 and will share underdrain outlet, however clarification required to confirm.

Section C-C: Permeable paved playground around building (north)

Detail shows playground PP will have 1:100 fall at subbase towards underdrain with perforated pipe. To be a 300mm half perforated pipe. Detail to be as per perforated pipe details noted above. Perforated pipe to convey through feature downstream towards outlet chamber at south.

Permeable paved area to have stone trench along upslope perimeter intercepting greenfield runoff from embankment which is suitable. This is to have a 75mm depression below the PP which is advisable to stop greenfield runoff from conveying onto feature. Suitability of stone trench detail reviewed below.

Section B-B: SDS tank beneath playground

Shows SDS tank is proposed beneath the playground area here. Design as noted in SDS section above. Formation of PP to slope towards underdrains and SDS crate.

Deepened underdrain proposed. Design as per perforated pipe section and to be 300mm in diameter. To be at lower level beneath invert of crates.

MUGA areas (section H-H & section G-G):

To consist of a 30mm thick 6mm ultiporous surface course layer set on a 50mm thick 20mm ultiporous binder layer. This is then to be underlain by Terram T1000 which is to encapsulate the 370mm thick 4/20mm aggregate subbase.

MUGA area to have a cellular storage tank situated beneath the subbase. Detail to be as per above.

Subbase is to be flat and it to be shared with the adjacent permeable paving which will have an underdrain outlet situated at a lower level within a deepened trench. This perforated pipe is to half perforated and is to be 300mm diameter.

- Again, the SAB note the Terram should not be proposed beneath the binder course due to the risk of melting. Should be shown along sides and base.

- SAB also query how northern MUGA pitch and permeable paving will drain given no outlet shown here or underdrain as noted in S2.

Artificial pitch & section D-D

To be provided by specialist designer, however in principle it is to be an infill system with rubber granules or organic infill set on a shock pad layer, with an engineered base of 40mm thick 10m porous asphalt below. This is then to be underlain by Terram T1000 which is to encapsulate the 320mm thick 4/20mm aggregate subbase, with perforated pipes proposed conveying to downstream chamber. The design at this stage is indicative. Full detail required at full application stage.

As per the section drawing D-D, the feature is to have a formation level with 1:100 fall, which will convey towards the perforated pipes. The perforated pipes are to be situated in a deepened trench which will run alongside the proposed SDS storage tank which is to filter into trench. Perforated pipe to be 225mm and half perforated.

- Again, the SAB note the Terram should not be proposed beneath the binder course due to the risk of melting. Should be shown along sides and base.
- At full application, the SAB request clarification regarding the permeability of the surface layers.

- Subbase level shown as flat (1:100) on drawings, however SAB note pitch is to have 1:60 fall. Therefore, the stated subbase depth should state minimum of xx, to highlight depth of subbase at exceedance point.

Filter drains/stone trench:

Filter drains are proposed at several locations across the site. Standard detail provided which shows to have 150mm of topsoil with 75mm depth of depression. Topsoil will be underlain by drainage layer which is to be Type A/C filter material wrapped in terram T1000. Perforated pipe proposed set on 75mm bedding layer which is assumed to be type S based on other details.

Applicant has also provided section E-E detail which covers filter drain which drains the embankment between the school pitch and main building.

The applicant is proposing the filter drain along the upslope area of the paths to intercept greenfield runoff from the embankment.

The section drawing provided by the applicant shows the filter drain is to have a topsoil layer over the surface, which is to be 150mm minimum depth and is to form a 75mm depression over the surface.

The filter drain itself is shown as to consist of type A/C filter material wrapped in Terram T1000, with a 150mm half perforated pipe underlain by type s granular bedding.

A stone trench is then proposed along the downslope perimeter to collect runoff from the footpath, which is simply a 300mm wide stone trench of A/C filter material.

The SAB have reviewed the drawings and make the following observations:

- At full application, a construction detail will be required for the filter drains, covering all types of construction. I.e if any differ in construction then details will need to cover all proposed and it must be clear what detail is proposed where.

- For the filter drains, the SAB request the topsoil layer is removed and replaced by a sacrificial layer of CGA wrapped in terram T1000. However, should clean stone not be allowed given the nature of site (School), then topsoil should be replaced with engineered filter medium.

- To ensure adequate treatment and function, the depth of filter drain should be evidenced to be at least 500mm deep to soffit of the underdrain.

- Filter drain width should give appropriate surround for diameter of pipe (150mm). minimum acceptable width is 0.400mm.

- Suitable filter material should be proposed as per sections 18 and 30 of the ciria SuDS manual. This can be type B, or 4/20mm, or type 3. SAB would request this extends beneath the perforated pipe to provide sufficient cover.

- It is unclear as to how the stone trench will convey runoff. It is also not shown on the layout and the SAB request this is shown. The SAB would query whether a filter drain would be required here to drain the footpath and covey the runoff downstream unto the system.

Flow control chambers:

4 FC chambers proposed in total. Standard detail for FC provided which shows a type 2 chamber as per SFA, with suitable access opening. Detail shows PCC chamber with 150mm concrete surround. Each FC will have a bypass door and pull handle, with the hydrobrake fitted to concrete mounting block at outlet via stud anchor fixing bolts. Proposal for each chamber is noted below

FC01: To have cover of 180.705, invert of chamber to be 178.775, and invert of outlet/hydrobrake to be 179.150. To be 1.2m in diameter with D400 cover and 600x600mm opening. Sump to be 375mm. Hydrobrake reference to be SHE-0130-8000-1100-8000 as per layout and hydro international drawing.

FC02: To have cover of 168.519, invert of chamber to be 165.880, and invert of outlet/hydrobrake to be 166.360. To be 1.8m in diameter with D400 cover and 600x600mm opening. Sump to be 480mm. Hydrobrake reference to be SHE-0188-2000-1715-2000 as per layout and hydro international drawing.

FC03: To have cover of 161.594 invert of chamber to be 157.180, and invert of outlet/hydrobrake to be 157.710. To be 2.1m in diameter with D400 cover and 1000x600mm opening. Sump to be 530mm. Hydrobrake reference to be SHE-0224-3000-1890-3000 as per layout and hydro international drawing.

FC04: To have cover of 157.953 invert of chamber to be 153.880, and invert of outlet/hydrorbake to be 154.410. To be 2.1m in diameter with D400 cover and

1000x600mm opening. Sump to be 530mm. Hydrobrake reference to be SHE-0179-2000-2300-2000 as per layout and hydro international drawing.

The SAB have reviewed the details for the FC and make the following observations:

- Cover frames are to be D400 as per schedule which is suitable.
- Chamber diameters are suitable based on size of pipe.
- Chamber design is suitable.
- To note, overflow pipe is shown for flow control chamber on detail. Given this, applicant will need to clarify the overflow level in each camber within the schedule or constrcution detail. This must be above max water level but below the exceedance point in the system. This is prevalent for systems where the FC isn't the low point of the network US such as is the case for network 1.
- Should an overflow be proposed in the flow control, the SAB require clarification that the proposed overflow will not impede on the design of the chamber, and that construction of the overflow pipe with concrete surround/ or weir at the proposed level can actually be facilitated. SAB request depth of brickwork, cover and frame and cover slab is detailed.
- FC03 & F04 must have ladder access based on depth to soffit and step rungs aren't suitable. Applicant must ensure detail reflects this. Manhole schedule shows FC04 as a plastic chamber also which isn inappropriate
- SAB also query whether access opening should be 1200mm x 675mm for FC03 & FC04.

<u>Downstream defender:</u>

The applicant is proposing a downstream defender to treat the runoff from the existing car park at node SCP39. The manhole schedule depicts the feature will be 1.2m in diameter with a 600mmx600mm access opening and D400 cover and frame.

The applicant has provided product sheets and data information which show the hydro international downstream defender select vortex model is to be utilised with a unit reference of DDC12-100-C-300.

This is to have a treatment flow capacity of 30l/s, max catchment of 4000m², hydraulic capacity of 84l/s and a 300mm inlet and outlet.

The mitigation indices provided is to be as follows

TSS – 0.3
Metals – 0.2
Hydrocarbons – 0.2

The SAB have no objection from an S6 perspective regarding the design and it is clear as to what is being proposed.

Green roof

No detail provided. At full application this is required and the SAB are anticipated manufacturers specification is provided. To note, the SAB are simply seeking to ensure it will function as a green roof and will not be approving the structural integrity and suitability of the proposal. This is for specialists to determine.

RwH: Detail required at full application.

Kerb drainage and gullies:

Details are suitable, however applicant should contact HDC for consultation regarding the use of beany kerb drainage as proposed.

Chambers and pipework:

The applicant has provided details for Type 1 chambers (both A&B), type 2 chambers, and type 3 inspection chambers in accordance with SFA 7th edition. Access to PCC chambers shown which clarifies ladders and step rungs will be positioned appropriate with cover opening offset to ensure it is in line with access. This is suitable.

Catchpit details also appropriate with the type 12 PCC and type 13 detail being suitable, with 300mm sumps proposed. Details regarding constrcution and access are suitable for the chambers.

Table for manhole diameters also suitable as per SFA.

Backdrop detail provide is also suitable, but SAB request only vertical ramp detail is used.

Details for pipework are suitable, with class Z and P shown. Detail for connections also appropriate with spigot and socket joint detail shown. Rocker pipe detail also suitable as per SFA. Flexible joint detail within concrete surround also appropriate,

The SAB have reviewed the manhole schedule and make the following observations regarding what chambers are proposed where.

Phase 1:

Proposed chambers within pedestrian or landscaped area are all to be type 13 catchpit chambers. These are all suitable given no depth to soffit exceeds 3m.

In landscaped areas cover and frames are to be B125 which is suitable. Within the permeable paved areas and access road D400 proposed which is suitable.

Access to catchpit type 13 chambers is to be restricted to 300mm x 300mm or 350mm where depth to chamber exceeds 1m which is suitable as per detail given these are not man entry chambers.

Chamber types all suitable based on depth to soffit.

Chambers are mostly appropriate diameter based on size of incoming pipe, however SAB query whether SCP40-SCP-41 & SCP47-SCP51 should be type 12 chambers given the pipe diameter. The SAB would anticipate these chambers are man entry chambers given the internal diameter of largest pipe is 375mm>. Clarification required.

Chambers within the access road are to be type 12 PCC catchpit chambers which is suitable, however SAB note access cover opening in schedule contradicts detail which shows 675mm x 675mm.

Phase 2:

Proposed chambers within pedestrian or landscaped area are all to be type 13 catchpit chambers. These are all suitable given no depth to soffit exceeds 3m.

In landscaped areas cover and frames are to be B125 which is suitable. Within the trafficked access road D400 proposed which is suitable.

Where trafficked the chambers should also be type 12 PCC. For example SCP71, SCP72, and SCP77 shown as type 13 which isn't suitable.

SCP57 down as type 12 chamber but this isn't suitable based on depth to soffit. Should be a man entry chamber (type 1) with ladder access as depth to soffit exceeds 3m.

Likewise for FC04 which is down as plastic, again inappropriate and this will need to be a PCC type 1 man entry chamber with ladder access based on depth to soffit which exceeds 3m.

Chambers are mostly appropriate diameter based on size of incoming pipe, however SAB query whether SCP70 & SCP72-74 should have a larger internal diameter based on largest pipe diameter within chamber, as chambers are 450mm with largest pipe being 300m.

8 TERMINOLOGY/ GLOSSARY

Application Form – Online form on RCTCBC Webpage. This must be fully completed for it to be deemed submitted.

Drawing Issue Sheet - A formal document used in construction, engineering, or architectural projects to record and communicate the release of technical drawings. A drawing issue sheet must contain the following:

- Drawing number and title
- Revision number
- Date drawing issued
- Purpose of issue (Construction, tender etc)
- Who the drawing was issued to

Construction Area Extent – Drawing that depicts the extent of the construction work with drainage implications.

Location Plan – A Red Line drawing depicting the location of the development (Scale 1:2500).

EIA Statement – If stated YES on the application form that an EIA is required, a simple statement from the applicant detailing why this is the case.

Cost of entirety of the drainage system – Utilised to calculate the Non-performance Bond. This does not apply to all sites. This document must include for a detailed list of all drainage elements and the associated unit cost for these features. The total cost of the construction will be provided.

List of the SAB adoptable drainage items (and associated units/quantities) – a document that details out all of the drainage features subject to adoption (includes voluntary if proposed/stated). The document must only include the exact unit and quantities of each feature subject to adoption i.e. 50m of swale. Where differing diameters, these must be separated. For example, rather than 100m of pipework, it would note 75m of 150mm and 25m of 225mm. This is required for the SAB to calculate a commuted sum, as part of the adoption agreement. The document can be in either word (pdf) or excel form.

Adoption Plan – A plan that details the Developer's Land edged red, the adoptable SUDS coloured blue, non-adoptable drainage orange and any Easement Strip edged green for ease to pass onto RCTCBC legal department. **Only required for sites where the mandatory duty to adopt applies or where the developer intends to request the SAB to voluntary adopt the infrastructure.**

Landowner Statement (intention of ownership) – this is a statement from the developer confirming land boundaries and future ownership of plots. For example, Social Housing developer maintain ownership of more than 1 plot, thereby meaning the mandatory duty to adopt does not apply. Must be provided in letter form from the developer.

Drainage Strategy – A strategy document that outlines how the surface water will be managed on the proposed development and information related to the site.

RWH Statement – A statement or document that outlines the viability for RWH (or lack of) and sufficiently details one of the exemption criteria.

Geo-technical and factual report - A Geotechnical Factual Report that presents the raw data collected during a site investigation, without any analysis or interpretation. It is objective and descriptive.

Geo-technical interpretative report - A Geotechnical Interpretive Report that builds on the factual report (detailed above) by providing engineering analysis, interpretation, and design guidance based on the site investigation and associated findings. Where infiltration is proposed onsite, this report would have to duly consider all requirements set out in the Statutory Standards and ultimately evidence the proposed method of surface water drainage is appropriate for the geology of the site; and will continue to perform to its design criteria for the lifetime of the development.

Where not proposed, it should clearly outline as to why infiltration isn't feasible in line with the exemption criteria in section G1.8 of the SuDS national standards.

Geo-environmental interpretive report – A Geo-environmental Interpretive Report is a technical document that evaluates the environmental conditions of a site, based on data collected during a ground investigation and as detailed in the factual report. It will provide a thorough analysis of the findings from the factual including identifying potential risks to receptors and offering recommendations for land development or remediation.

Geological log – This is a detailed, structured record of the ground conditions encountered during a site investigation. It documents the stratigraphy, lithology, and physical characteristics of soil and rock layers observed in exploratory holes such as boreholes, trial pits and window samples. The following should be noted on the log:

- Information on the location of where log was taken (i.e. Trial Pit co-ordinates and associated ground level)
- Depths of each layer
- Layer description – material type, colour, texture etc.
- Details on where samples were taken.

- Groundwater observations.
- Visual observations (i.e. contamination).

Trial Pit Location Plan – A plan showing the locality of every exploratory hole or pit undertaken on the development site.

Photographic evidence of testing – In the event where water levels do not drop during infiltration testing, date and time stamped photos of the testing are required to evidence this lack of movement.

Permeability Testing – This is the results of any infiltration testing conducted on the site including calculations and graph. It is requested that testing is undertaken in accordance with BRE365.

Groundwater monitoring – A document that details out groundwater monitoring undertaken of the site completed over a period of time.

Ground Conditions Plan – A plan that depicts the subsurface ground conditions across the development site.

Unstable Land Report – A report to identify the presence, location and nature of any unstable land on or close to the site.

Existing Catchment Plan – A plan that depicts the existing catchments on the development site, whether that be greenfield or brownfield catchments, and their current destination. Catchments must be delineated and appropriately annotated. This plan must show any watercourses on the site, if present.

Proposed Catchment Plan – A plan that depicts the proposed catchments on the development site, whether that be proposed landscaping and hardstanding and their proposed destination. Catchments must be delineated and appropriately annotated.

Existing Level Survey Plan – A plan depicting the existing levels of the development site via topographic survey. This document would accompany any existing catchment plan.

Proposed Level and Contour Plan - A plan depicting the proposed levels of the development site. This would include the surface contours with minimum 1m contours provided. This is separate to the engineering layout with the focus on this drawing to primarily detail all surface levels across the site post development.

Interception Plan – A plan that depicts and details the interception required by the hardstanding and associated interception provided by the proposed SuDS.

General Engineering Layout – Drawing that depicts the drainage system and includes the following:

- Cover and invert levels
- Pipe diameter and gradient
- Storage dimensions etc

Exceedance Plan – A plan that outlines the routes and areas where water will flow or accumulate during **extreme storm events**, such as those with a return period greater 1 in 100 years (including climate change allowances). It ensures that when SuDS features or pipe networks are overwhelmed, the excess water is directed away from buildings, infrastructure, and vulnerable areas, minimising flood risk and hazards.

Contributing Area plan – A plan that depicts all the contributing areas that generate runoff that will drain into the proposed SuDS. The contributing area plan must show the **extent and characteristics of land** that contributes surface water to an individual drainage point or system i.e. 150m^2 to S3. This includes both natural surfaces (landscaped areas) and impervious surfaces.

Schematic Plan – This is a plan that illustrates the layout of the proposed SuDS in relation to the Hydraulic Model i.e. Pipe numbers, nodes etc. It contains a schematic plan of the model to aid review and cross reference between model and drainage layout.

Greenfield/ Pre-development Run-off Rate – Calculations that demonstrate the runoff from the construction area prior to development. The requirements are different for brownfield and greenfield sites. The suitability is not considered at validation and will be determined during the determination period.

Hydraulic Model – A hydraulic Model of the proposed drainage system to ultimately demonstrate it can function hydraulically as per the requirements set out in the Statutory Standards. The hydraulic model can be printouts (except for infodrainage as noted below) outlining the following:

- Pipeline schedule
- Manhole Schedule
- Rainfall parameters
- Storm parameters
- Design parameters
- Simulations results for Q2, Q30 and Q100 plus CC.

Infodrainage model – Where infodrainage software has been utilised, the SAB requires the infodrainage model itself. Printouts can be provided but are not deemed essential.

Water Quality Treatment Plan – A plan to show the associated pollution generated from the proposed land uses and how the SuDS proposal will treat runoff before it either discharges to ground or to a surface waterbody.

Landscape Layout – A drawing that depicts the spatial organisation and arrangement of all landscaping (both hard and soft) on the development site. In the case for the SAB application, this must sufficiently illustrate the locality of the proposed SuDS.

Planting Schedule – A schedule, whether that be in report or plan format that details the planting arrangement for the proposed SuDS. This should tie in with the proposed landscape layout.

Construction Detailed Drawing – A standard detailed drawing of drainage features which details materials and specification. This is a scaled proposed drawing of the engineering construction that depicts the geometry, dimensions, material and construction method for a particular SuDS. It should include the following:

- Depth and composition of all materials
- Specification of all materials
- Reference to appropriate standards

Cross-sectional Drawing – A drawing that shows a vertical cut-through view of a drainage feature. It reveals internal features and layers that are not visible in standard plan views. A cross section is required for all drainage features.

Longitudinal drawing (also called a **long section**) – this is a drawing that illustrates a vertical profile taken along the centreline or alignment of a linear drainage feature. It combines horizontal distance with vertical elevation to show how the feature interacts with ground levels, structures, and other utilities. Longitudinal sections of all linear drainage features i.e. swale.

Constraints Plan – A drawing that demonstrates existing infrastructure and utilities which may result in constraints including the following:

- Bridges
- Culverts including diameter and depth to system
- Retaining walls
- Existing statutory services and utilities and associated easements.

Manhole Schedule – Drawing that depicts the drainage system and includes the following: invert levels, cover levels, chamber diameter, chamber type, cover and frame type, and orifice/hydrobrake details. Incoming and outgoing pipe diameters should also be shown

- Cover level
- Invert levels
- Depth to soffit
- Incoming and outgoing pipe diameter
- Chamber diameter
- Chamber Type
- Cover and frame type
- Where FC, orifice/hydrobrake details
- Where proposed, overflow level

Private Maintenance Plan – A plan that details the proposed maintenance arrangements for all private drainage components for the entirety of the design life of the development. It should include the following:

- Brief narrative on the proposed drainage features.
- A plan should also include access arrangements and person responsible for maintenance.
- Maintenance schedules
- Expected required plant to facilitate maintenance

A private maintenance plan is required regardless if the SuDS are to be adopted by the SAB or not.

Adoptable drainage Maintenance Plan – A plan that details the proposed maintenance arrangements for all drainage components subject to adoption from the SAB for the entirety of the design life of the development. It must include the following:

- Brief narrative on the proposed drainage features.
- Access arrangements.
- Maintenance schedules
- Expected required plant to facilitate maintenance

Information and Communications Plan – A plan that details proposed engagement with the local community in regards to the proposed SuDS and set out the engagement stages, how they are delivered, the resources available to deliver them, and the timescale within which an outcome needs to be delivered. Required on sites with public engagement such as schools, transport etc.

Construction Management Plan – A plan that details the construction activities and temporary works deployed for constructing SuDS, ensuring that key construction site issues such as drainage, flooding, sediment control, pollution prevention, compression of infiltration areas, storage of materials & existing amenity and natural habitats etc. are sensitively and effectively managed until the site construction is complete. The

plan MUST detail how SuDS features will be constructed, ensuring sufficient protection of the features during the construction phase. **This may be conditioned as part of the approval.**

Construction Phasing Plan – A plan that details how the development and/or phase/s of the development will drain during the construction and occupation of the development prior to adoption. **This may be conditioned as part of the approval.**

Mode of connection drawing (construction detail) – A drawing detailing the mode of connection to the downstream system. This applies to all types of systems including:

- Ordinary Watercourse (both open and culvert)
- Main River
- Highway Drain
- Surface Water Sewer
- Dwr Cymru Welsh Water

For clarity, the SAB is **not responsible** for confirmation that the mode of connection is suitable with focus on that the connection can be facilitated. However, as part of the determination and associated consultation, the relevant department or body will be consulted when the connection impacts their apparatus.

Additional SAB requirements

All documents must be in a form that is accessible and readable.

Where possible, the SAB requests the DWG file of the engineering layout.

Please note that all documents detailed above must be issued separately. Whilst they can be within an appendix in a document i.e. drainage strategy document, for ease of review, the SAB requires all drawings are submitted individually and not tied to one another.

9 FURTHER INFORMATION

9.1 USEFUL WEBPAGES

For further information, it is recommended you visit the below webpages:

RCT SAB Pre-application Webpage –
https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/SustainableDrainage/PreapplicationAdvice.aspx

RCT SAB Full application Webpage –
https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/SustainableDrainage/MakeaSustainableDrainageApplication.aspx

RCT Ordinary Watercourse Consent Webpage -
https://www.rctcbc.gov.uk/EN/Business/LicencesandPermits/Otherlicences/OrdinaryWatercourseConsenting.aspx

Natural Resources Wales Environmental Permitting Website -
https://naturalresources.wales/permits-and-permissions/environmental-permits/?lang=en

Welsh Government – Sustainable Drainage Systems on new Developments -
https://gweddill.gov.wales/topics/environmentcountryside/epq/flooding/drainage/?lang=en

Susdrain Website - https://www.susdrain.org/

Wallingford Hydrosolutions – http://www.uksuds.com/drainage-calculation-tools/greenfield-runoff-rate- estimation

Ciria Website - https://www.ciria.org/

Dwr Cymru Welsh Water Website - https://www.dwrcymru.com/en/Developer-Services/Pre-Planning.aspx

Please note:

The advice given in this response represents an informal opinion, provided in accordance with the Council's Pre-Application Service. In particular, it is emphasised that while this pre-application advice will be carefully considered in reaching a decision or recommendation on an application, the final decision on any application that you may make can only be taken after we have consulted statutory consultees. It does not therefore prejudice any decision which the SuDS Approval Body may make should an application be submitted.