WEPco | Rhondda Cynon Taf County Borough Council

RCT 3 Primaries Batch

Pontyclun Drainage Strategy Report

RH0201-ARP-01-00-RP-C-20001

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Initial SAB Consultation

1 Introduction

The Client is promoting the re-development of an existing primary school site located in Pontyclun, Rhondda Cynon Taf. The site is currently an operational school and the proposal is to construct a new single school building with associated car parking and Multiple Use Games Area (MUGA). This will require phased demolition of the existing school buildings. Ove Arup & Partners Ltd. (Arup) has been commissioned to support masterplan development, and compile the planning application and supporting technical assessments for the proposed development including a Drainage Strategy report.

This report discusses the proposed drainage strategy, taking into account the site conditions, the topography and connection points.

2 The Site

Pontyclun Primary School is currently an operational school located in Rhondda Cynon Taf, South Wales. Topographical survey of the site is contained in Appendix A.

The site is approximately 1.16 Ha in area and located within Pontyclun town (centred around OS grid reference 303518,181147), approximately 1.5km south of Talbot Green. The school location is shown on Figure 1.

Figure 1: Site Location (circled in red) (streetmap.co.uk)

The proposed site for the new school building and associated car park and MUGA is located on the grounds of the existing school. The school site is accessed from the north from Palawyf Avenue and Heol y Felin from the south.

2.1.1 Site Terrain/Topography

In plan view, the site has an irregular polygonal shape and is at its widest at approximately 138m in a northwest /southeast plane (see Figure 2).

The site contours are shown on drawing RH0201-ARP- ZZ-00-DR-C-00001 in Appendix B. The site generally slopes from north east to south west at approximate 1:30 slope however the gradient is steepest at 1:6 between the eastern building and southern boundary. There are a number of local slope direction changes as well as existing walls, ramps and steps to serve the buildings. The elevation ranges from approximately 47.7mOD in the west down to between 45.5m-46.5m OD along the eastern boundary.

There are 6 existing school buildings surrounded by predominantly impermeable asphalt.

Figure 2: Site Location on OS Mapping

The site is bounded on all sides by built development including an access lane to the north and west, allotments to the east and residential development/library to the south.

There are two vehicular access points to the site. The one in the north eastern corner connects to Palalwyf Avenue and the south western access connects to Heol y Felin. The Heol y Felin access is directly on to the public highway, whereas a short section of road with residential properties either side connects to the Palalwyf access to Palalwyf Avenue.

There are a number of existing trees within the site, located to the west of the Palalwyf site entrance.

There are no watercourses within the site boundary and the nearest watercourse is the River Ely located approximately 110m south east of the site.

3 Published Flood Risk Maps

The Flood Risk maps hosted on the Natural Resources Wales (NRW) web portal and the Welsh Government website have been reviewed for the site.

The maps available are:

- TAN 15 Development Advice Maps

- NRW River and Sea Flooding Maps
- NRW Surface Water Flooding Map

3.1.1 Development Advice Maps

The TAN 15 Development Advice Map (DAM) is for land use planning purposes based on NRW's extreme flood outlines and the British Geological Survey drift data which helps to determine whether a site is within a flood zone.

The new TAN15 DAM is due come into effect on 1st December. Both the current and proposed DAMs have been obtained.

The previous version TAN l5 DAM has been obtained and is shown in Figure 3.

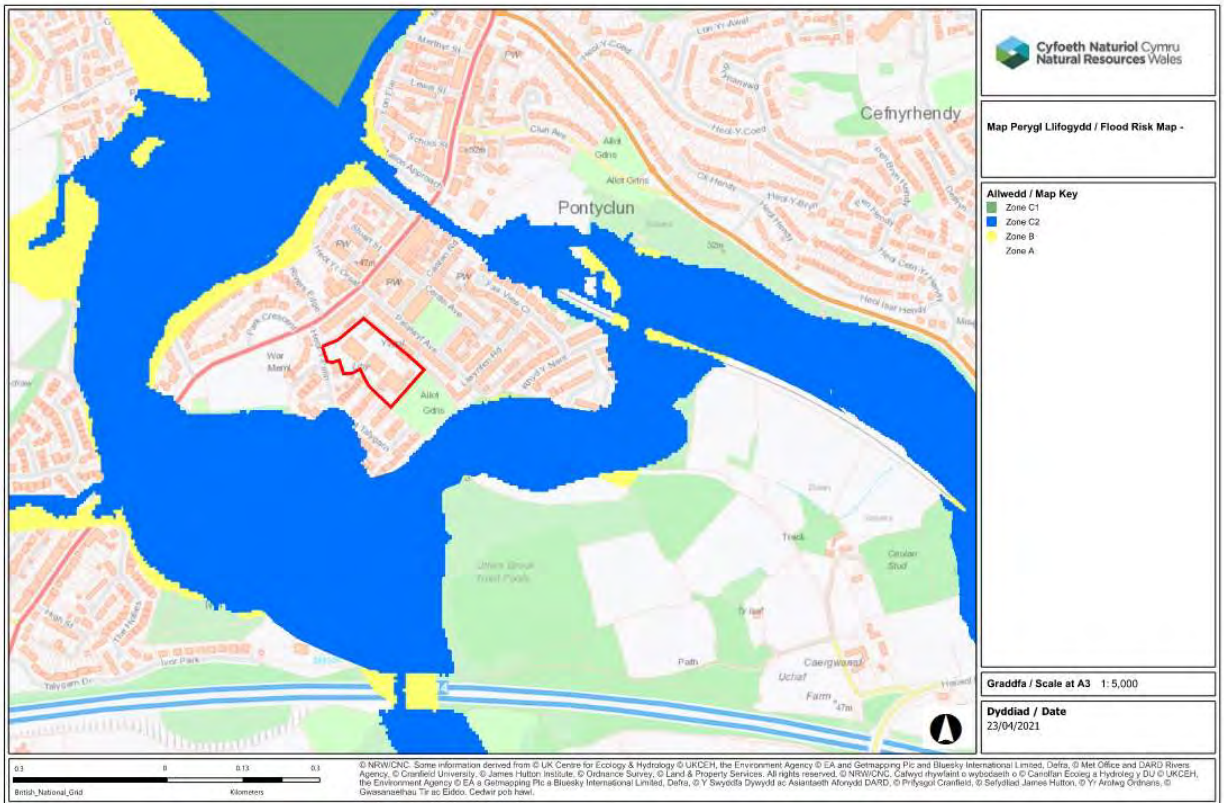


Figure 3 – Pontyclun TAN 15 Flood Map

The River and Sea flood zones depicted in the 1st December Flood Maps are shown in Figure 4.

Figure 4 – Pontyclun 1st December TAN 15 Flood Map

The current DAM shows the site is within Zone A which is considered to be at little or no risk of fluvial or tidal/coastal flooding. The 1st December DAM show the site is outside Flood Zone 2 and 3. As the site is in Zone A and not in Zone 2 or 3, a Flood Consequence Assessment (FCA) will not be required covering the River and Sea flooding.

3.1.2 Fluvial, Reservoir, Coastal and Surface Water Flooding

NRW's flood maps show the sites risk from Fluvial, Reservoir or Coastal Flooding. NRW Long Term Flood Risk Maps show flood extent, depths, velocities and hazard.

Figures 5 shows the site is located outside of the River and Sea flood risk zone and also shows no surface water flooding on the Pontyclun site.

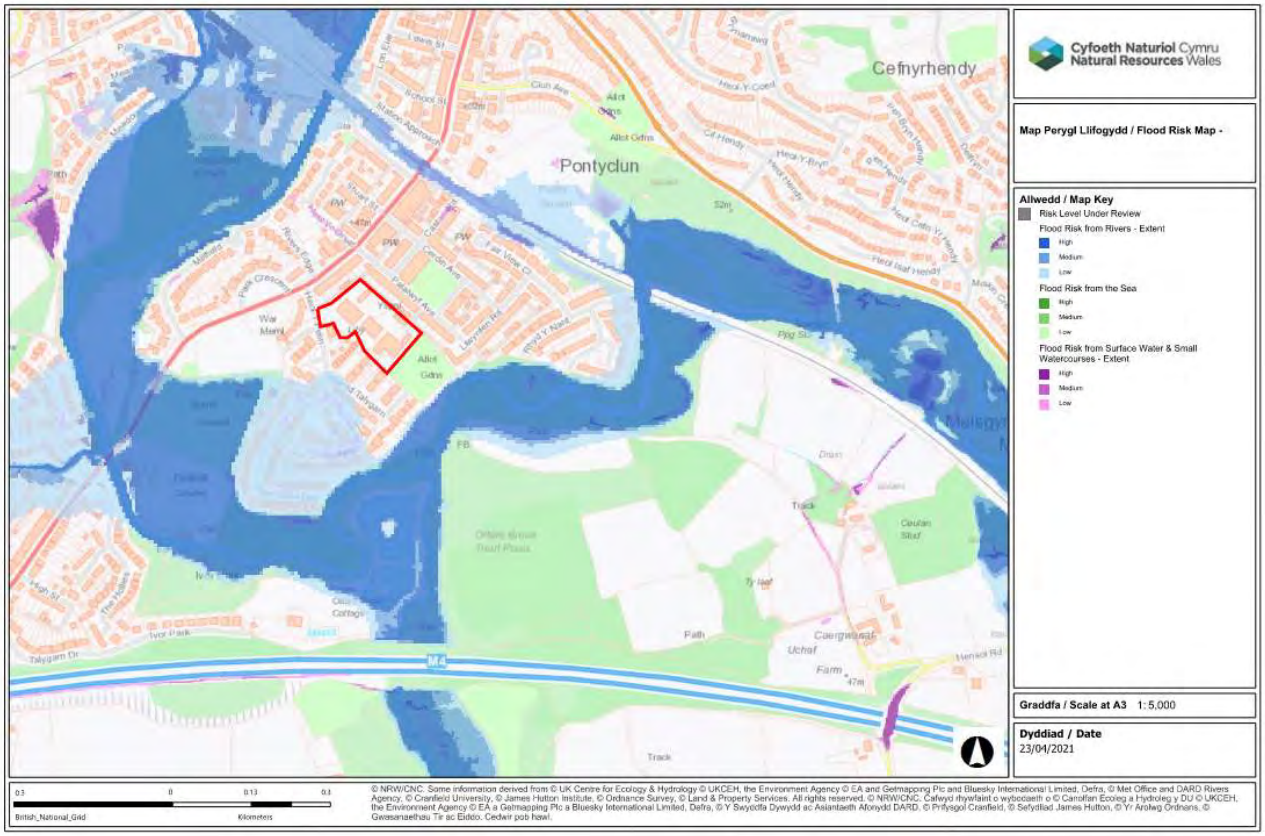


Figure 5– Pontyclun NRW Flood Map

Figure 6 shows the flooding from surface water and small watercourses indicated on the 1st December DAM in pink (Flood Zone 2) and purple (Flood Zone 3). No surface water and small watercourse flooding has been identified on the site meaning an FCA is not required for Pontyclun.

Figure 5– Pontyclun 1st December TAN15 Flood Map

4 Existing Drainage

The site is currently served by a positive foul and storm drainage network.

The foul drainage is collected either through a private foul sewer and outfalled to a DCWW combined network west of the site or through a combined sewer to a connection point to the DCWW combined sewer northeast of the site.

The storm drainage captures the runoff from the buildings and portions of the hardstanding areas and conveys to two storm outfalls on the southern boundary and the combined outfall on the north eastern corner.

Topographical, drainage and utility surveys were undertaken by Technics Group Ltd between August and September 2019. These surveys have been used to assess and understand the existing drainage within the site.

The surface water and foul drainage pipework identified in the non-intrusive survey is shown on drawings RH0201-ARP-ZZ-00-DR-C-00021.

4.1 Foul Drainage

The DCWW assets located adjacent to the site are shown in Figure 6.

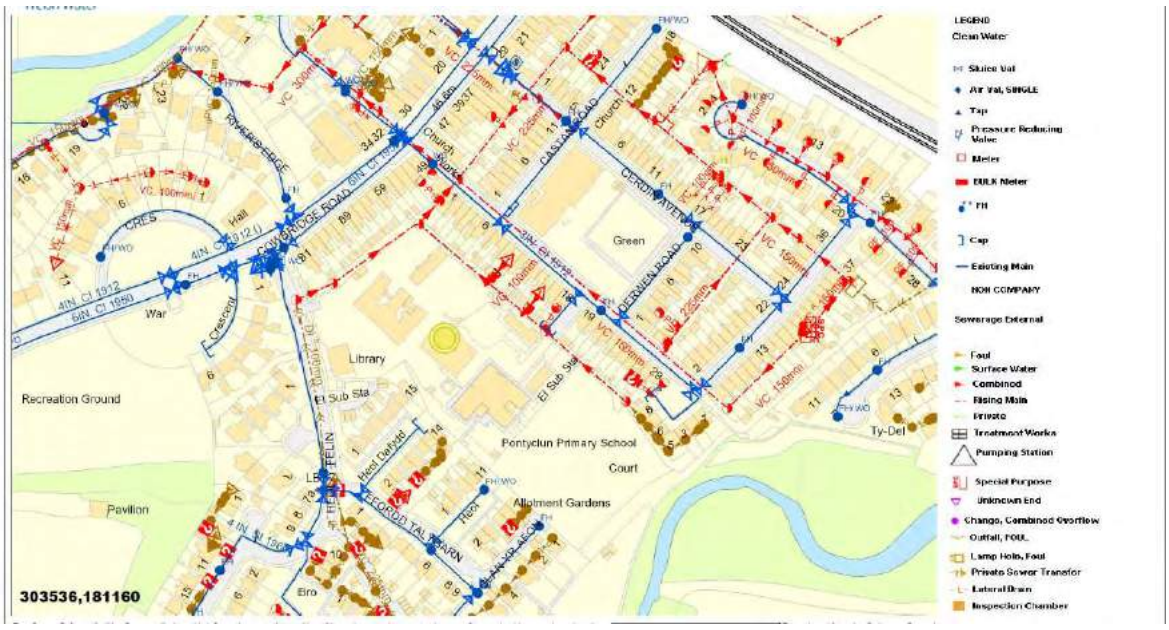


Figure 6: Public sewers plans (DCWW)

A foul rising main runs in a northern direction in Heol y Felin, south of the site. This outfalls into a combined chamber with the combined piped network continuing in a north eastern direction outside the site boundary to the northern corner of the site before continuing north east. A combined network also runs in a north westerly direction (located just outside the north east site boundary) and connects to this network at the northern site corner.

The Pontyclun school buildings are served by a private foul drainage network shown on RH0201-ARP-ZZ-00-DR-C-00021. Each of the existing school buildings has at least one foul drainage outlet which eventually outfalls into the 225mm diameter DCWW combined sewer that is located just outside of the site boundary to the west and north. The outfall points and catchments are shown in Figure 7.

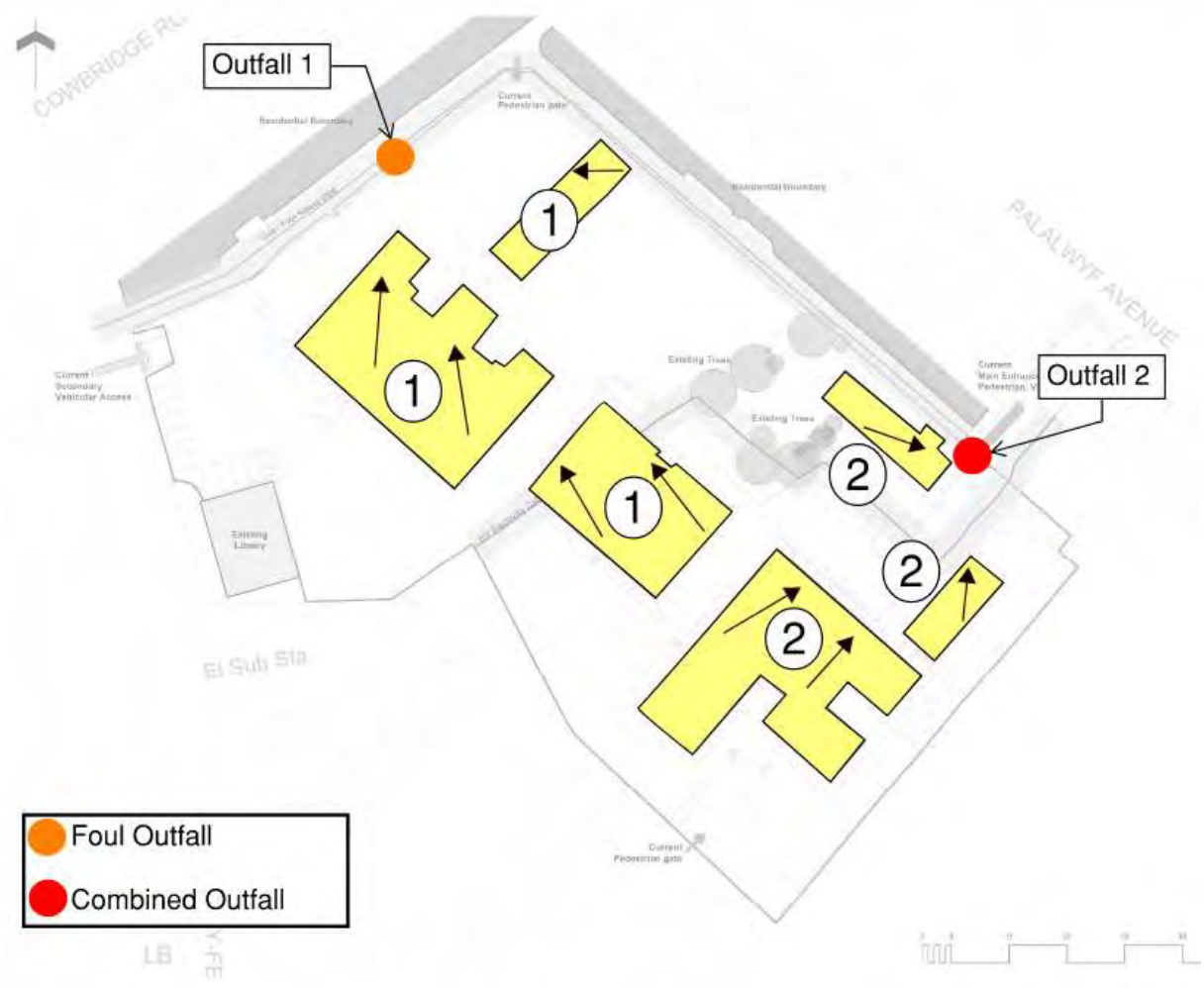


Figure 7. Pontyclun outfall points and catchments

The central building and the two western buildings connect into a spine drainage network that runs east to west through the centre of the site and outfalls to the sewer just beyond the western site boundary.

The building adjacent to the Palalwyf road site entrance, the eastern most building and the larger building on the south eastern area are assumed to outfall into the DCWW sewer at the site entrance. The foul flows from these buildings are captured in a combined network that also takes storm water entering the system from the hardstandings in the catchment. The non-intrusive survey does not show a piped connection to the DCWW sewer from the nearby manhole although this is the assumed destination.

4.2 Storm Water Drainage

A significant proportion of the existing site is impermeable with the land use being either buildings or asphalt surfaces for carparking, playgrounds etc… There is a large proportion of overland flow and the rainwater falling on these impermeable areas is captured either through roof gutter/downpipe, gullies or channel drainage and is then piped to a network outside of the site boundary.

There are three existing surface water catchments inside the school site as shown in Figure 8.

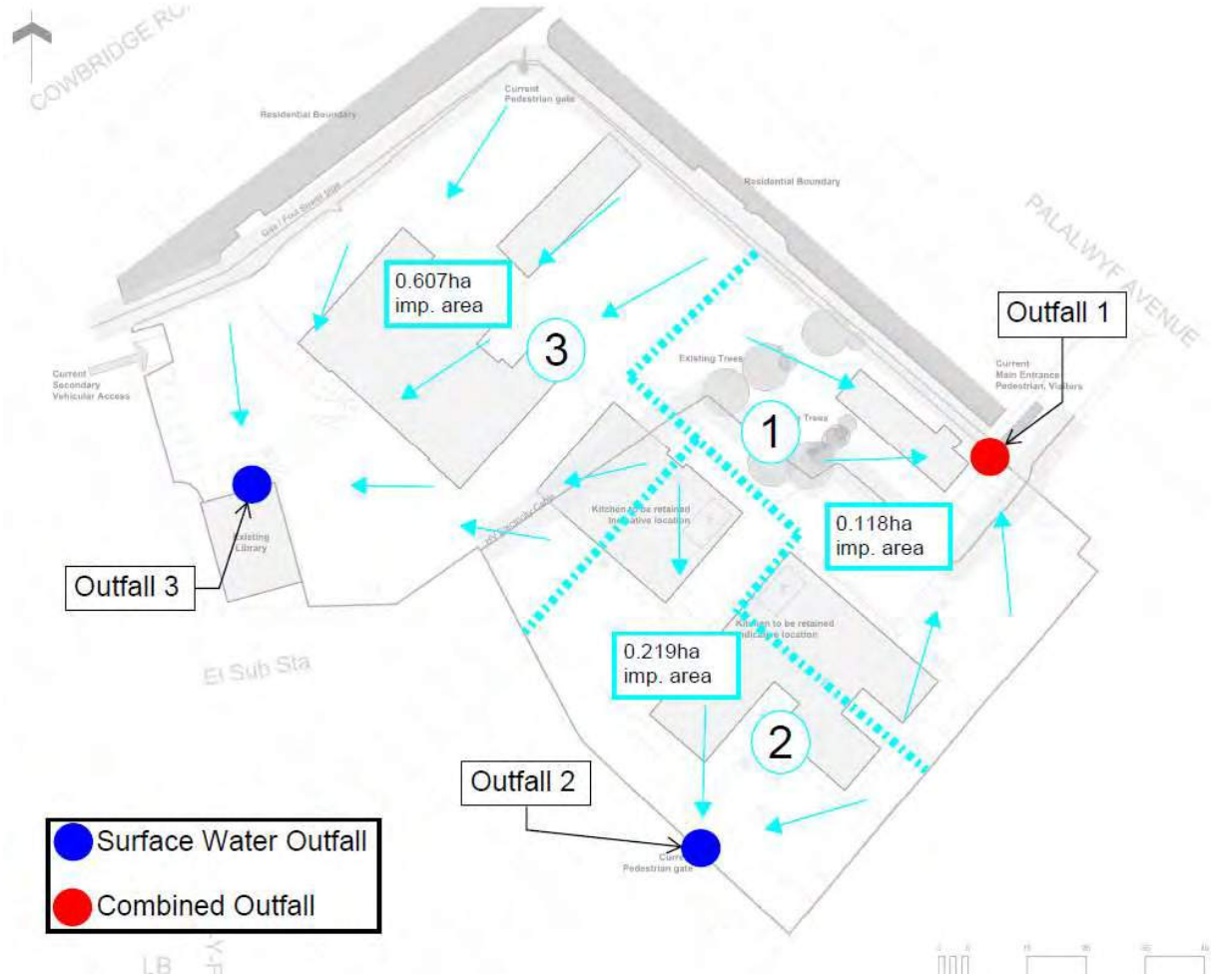


Figure 8: Pontyclun storm drainage outfall points and catchment

The catchment boundaries are derived by the surface contours of the playground, carparks and hard surface areas as well as the existing roof pitches, guttering and downpipe locations and routes of the underground storm drainage pipework. All catchments exit the site in a piped network.

The western catchment exits the site boundary just west of the existing library (Outfall 3) and the south eastern catchment exits to the site in the direction of Fford Talygarn (Outfall 2). The destination of these pipes however is unknown as the DCWW sewer maps indicate no combined and storm sewer in Heol y Felin or Fford Talygarn. Further investigation is required to determine where these pipes outfall.

The storm water in the north east catchment is collected in an internal combined network and is assumed to connect to the 225mm diameter DCWW combined sewer (Outfall 1) on the site perimeter. This catchment considers both building drainage as well as overland drainage of the car park captured in road gullies. There is a grassed area in this catchment and it is assumed that the rainwater either percolates into the ground locally or runs overland to the adjacent impermeable area where it is collected in the site internal drainage network. There is an existing pond in the catchment although this is assumed not to serve as a storm drainage function.

It is assumed that no significant flow enters the site overland from the surrounding areas. The general topography runs from north east to south west and although there is a narrow lane directly adjacent to the northern boundary, beyond the lane are residential property gardens.

It is assumed that the catchments are unattenuated.

4.2.1 Greenfield Runoff Rate

Hydrological analysis was undertaken for the site to determine the site's Greenfield Runoff Rate (GRR). The Institute of Hydrology 124 (IoH124) method was used to calculate the GRR for the 1:1, 1:30 and 1:100-year rainfall events. These values are to determine how the site would behave if undeveloped including the consideration for climate change.

The GRR values for the site are shown in Table 1. For further details of the assumptions, calculations and conclusions, refer to the Hydrology Calculations technical note in Appendix C.

Table 1 – Greenfield Runoff Rate for the site calculated using the IH124 method

Return period Event	Greenfield Runoff Rate (l/sec/ha)
1:1 Year	3.6
1:30 Year	7.2
1:100 Year	8.9
Qbar	4.1

As the site is predominantly developed and majority of area impermeable with runoff collected through a piped network, the GRR does not represent how the catchments are currently behaving.

4.2.2 Brownfield Runoff Rate

The site has been developed previously as it is currently a school. Investigations conclude that the current site has a conventional drainage network that discharges to 3 locations outside of the school site. The northern discharge point is into the 225mm DCWW sewer however it is unknown where the two southern outfalls discharge. With no watercourse nearby, it is assumed these outfall into another

piped network. The site can be considered brownfield which will be used to inform the discharge rates from the proposed site.

The existing storm drainage network, based on the topographical and utility survey, was modelled using Microdrainage software and the 1-year runoff rate for each catchment was calculated as shown: in Table 2

Table 2 – Brownfield Runoff Rate for the site calculated using the IH124 method

Catchment	Estimated Impermeable Area (ha)	Indicative Estimated 1-Year Flow (l/s)	Indicative Estimated 100-Year Flow (l/s)	1-Year Flooded Volume (m3)	100-Year Flooded Volume (m3)
Outfall 1	0.118	11.9	29.3	0	1
Outfall 2	0.219	24.2	43.7	0	16
Outfall 3	0.607	30.1	50.7	0	86
TOTAL	0.944	66.2	123.7	0	103

For these calculations, it is assumed that the green areas on the site do not enter the drainage network. It is likely therefore that these figures are an underestimate.

Refer to Appendix C for further information.

5 Proposed Development

To provide the appropriate school facilities, the proposed site will contain a single school building, 2 number MUGA pitches, car parking and a mixture of impermeable and grassed landscaping

The location of the various site features are influenced by numerous factors. Foremost, the masterplan needs to function as a school but also needs to consider the existing constraints including utilities, topography and site phasing.

The existing school needs to remain operational during construction. The Pontyclun site area is particularly constraining, meaning temporary classrooms and utility diversions are required to allow buildings to be demolished so the new building can be constructed. Once the new building is constructed and functional, school operations can be moved to the new building allowing the rest of the site to be developed. This significantly limits the location of the proposed building and crucial infrastructure needed for the new building to become operational. This has an impact on the location of drainage features including raingardens and attenuation basins.

The proposed masterplan is shown in Appendix B.

Due to the constrained nature, the primary driver of the finished levels is to provide a site that complies with the Equality Act with suitable slopes achieved across all land uses, whilst minimising the number of retaining structures. The levels and slopes have been designed to retain the existing site slope directions (and therefore catchments) where possible and to allow the foul and storm drainage to drain via gravity where possible. As explained in Section 6.1, a foul pumping station is likely to be required to serve the new development.

5.1 The masterplan and finished levels

The proposed school building is located on the western portion of the site. The MUGA pitches, hard and soft landscaping are located on the western portion of the site. The car parking is located along the southern site boundary.

It is assumed that the school operations will be moved to the existing eastern buildings and temporary buildings which allows the western buildings to be demolished to form the buildable area. Once the new buildings are constructed and operational in this western area, the school operations can be moved into these to allow the demolition and works on the eastern side of the site.

Due to the complex existing utility network on site, there will be a need to provide temporary supply or divert the existing utilities to ensure the required school buildings remain operational. This will be the case for the utilities that run to the western boundary from the central school building e.g. foul drainage, and utilities that connect to the network supporting the western buildings e.g. storm drainage. Any utilities that cross underneath the new building footprint that need to remain live to serve the central and eastern school buildings will require an alternative route/provision. Temporary building locations will need to be coordinated with the existing utilities.

A new site entrance is proposed just west of the library on to Heol y Felin. The existing vehicular site entrances will become pedestrian only site entrances.

There is a Western Power 11kV High Voltage (HV) electricity cable running from the Palalwyf Avenue site entrance to the centre of the southern site boundary. From the site entrance, it travels west before turning in a south west direction and crossing underneath an existing school building before reaching the site boundary. All proposed site features have been located outside of the electricity cable easement/wayleave.

Reprofiling will be required to provide a suitable platform for the new building footprint which is set at 46.6m Finished Floor Level (FFL). 46.6m FFL has been used as this enables a 1:25 slope along the footway to the northern entrance, a 1:40 gradient to the pedestrian access to Heol y Felin and minimises retaining wall heights. A retaining structure is required north of the building so that all earthworks remain within the site boundary. A wall will also be required to the south and south east of the building around the car park again to retain all works within the site boundary. It is likely that the wall around the car park will require a vehicle restraint barrier.

In general, a 1:40 slopes have been used around the site however 1:20 slopes have been used where necessary. Earthwork fill batters and cut slopes have been limited to 1:3. A 1:100 slope has been proposed across the MUGA.

The proposed finished levels are shown on drawing RH0101-ARP-ZZ-00-DR-C-00031.

6 Proposed Foul Drainage

The existing school development has a foul and combined network serving the site and the proposed development will also require a foul drainage network to serve the proposed buildings including canteens, classroom sinks, toilets and welfare facilities.

A pre-planning application has been submitted to DCWW to confirm the proposed foul connection point. The flows from the site are expected to increase from the existing scenario, due to the higher population, and DCWW have commented on capacity. Correspondence is contained in Appendix D.

Any foul drains constructed for DCWW adoption will be subject to a Section 104 Agreement and will require DCWW technical and legal consent. A Section 106 Agreement will be required for any new connections into DCWW's network and S185 will be required for the diversion.

6.1 Pontyclun Domestic Flows and Strategy

The proposed quantum has been considered in assessing the foul flows generated from the proposed development. The peak flow generated from the development has been estimated as 3l/s based on assuming 619 persons (split between pupils and staff) per day. An allowance for an expansion of 30 additional pupils has been accounted for in the 3l/s assumption.

The peak flow is based on a 20l/day/person and a peaking factor of 6.

As the building is located on the western portion of the site and over the footprint of the existing western building footprints, it is proposed that all foul drainage outlets from the new building are connected through a private foul drainage piped network which will outfall into the DCWW combined sewer located just outside the western site boundary. There is an existing foul connection outfall from the site at this location therefore the intent is to reuse the existing connection if possible (subject to condition survey).

The population levels and estimated peak flows were communicated to DCWW in a pre-planning application to ascertain if sufficient capacity exists within the local network to facilitate the proposed development. DCWW stated that their network could accommodate the domestic flows from the site and offered a connection point to the 225mm combined sewer outside the western boundary between manholes number ST03814102 and SST03815202. This is where the existing foul connection is located therefore the intent is to reuse the existing connection if possible (subject to condition survey).

The pre-planning response letter and details of further discussions can be found in Appendix D.

A foul drainage ring has been provided around the building and taken to a low point near to the DCWW connection point. It is proposed to connect the drainage ring to the existing private foul manhole chamber just inside the red line boundary. Due to the length of the ring and as the existing manhole invert is approximately only 1.5m invert level, from the low point, the foul drainage will need to be pumped to the existing manhole.

The existing foul connections to the 225mm DCWW combined pipe north of the site from the existing eastern school buildings will not be required in the fully built case although will remain operational whilst those school buildings are operational.

7 Proposed Stormwater Drainage

7.1 Introduction

The planned surface water drainage strategy for the proposed developments will need to implement Sustainable Drainage Systems (SuDS) measures in accordance with the 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems 2018'. The proposed network will need to be approved by the local SuDS Approval Body (SAB). The SAB responsibility is administrated by Rhondda Cynon Taf County Council.

Early engagement with the SAB has been sought and a meeting with the RCT SAB officer was held on the 2nd of March 2021 where the initial drainage strategy was presented and discussed. A pre drainage strategy review has been undertaken by the SAB and received in August 2021. The level of detail provided to the SAB was suitable for early design therefore a full drainage strategy review could not be completed. This review is contained in Appendix E.

The proposed storm water drainage strategy is currently under discussion with the SAB. Therefore, the proposals are subject to confirmation through the SAB Pre-Application process. The Pre-Application sets out the principles of the proposed storm drainage strategy and describes how it conforms to the Statutory Standards. The Pre-Application for the scheme is in the process of being submitted to the SAB.

The site has the opportunity to utilise rainwater harvesting to reuse grey water for flushing toilets etc. Rainwater would be collected from the building rooves and conveyed to an underground tank via gutters/downpipes. From here the water would be pumped into a small break tank located within building and then pumped around the building to the required locations.

The areas of the roof not contributing to the rainwater harvesting tank, and the other impermeable areas, the intention is to collect water through raingardens. These ensure that the drainage solution offers the required water quality, amenity and biodiversity qualities.

Where raingardens are not possible, surface water run-off generated from impermeable areas of the proposed development can be collected via rainwater pipes, gullies, in built fall linear drainage channels, bioretention drainage channels or through permeable paving.

The intent is to reuse the two existing southern outfalls from the site if condition allows.

In general, the runoff will be collected by a drainage network and be attenuated to an agreed rate before outfalling to the existing connection points. Raingardens, a dry basin, underground attenuation cells and pervious pavements are proposed in conjunction with hydraulic control measures to attenuate the flows to achieve the required runoff rate. The desire of the headteacher is to avoid standing water where possible.

As the site is a previously built development which is assumed to outfall to the receiving receptor unattenuated, it is proposed that the outfall rate from storms up to the 1:100 year event will be reduced to 70% of the existing 1:1 year flow rate.

7.2 Schedule 3 of the Flood and Water Management Act

Schedule 3 of the Flood and Water Management Act 2010 establishes SABs in local authorities. Since the 7th January 2019, developments greater than 100m^2 or developments containing more than one building require submitting a SAB application. This application requires developers to utilise SuDS in their surface water management for a development.

SuDS aim to manage rainfall on site using methods that mimic natural processes, by making use of the landscape and vegetation to control the flow, volume and quality of the surface water runoff. In addition, SuDS also provide amenity benefits by providing aesthetically pleasing and natural landscapes, and biodiversity benefits by creating habitats for wildlife and vegetated areas.

The Welsh Government's Statutory Standards for Sustainable Drainage Systems contains six standards, which details the requirements for the surface water drainage. The standards are as follows:

S1. Runoff destination

S2. Hydraulic control

S3. Water quality

S4. Amenity

S5. Biodiversity

S6. Construction, operation and maintenance

These form a set of principles which must be considered in the design of the SuDS features in order to obtain approval by the SAB.

The proposed storm water drainage provisions are shown on drawing RH0201-ARP- ZZ-00-DR-C-00041

7.3 S1 – Runoff Destination

The Welsh Government's SuDS Standard S1 provides a discharge hierarchy for surface water from developments, as well as exemption criteria for each level that must be met before the next level can be considered. The discharge hierarchy is shown below:

- Level 1: Surface water runoff is collected for use;
- Level 2: Surface water runoff is infiltrated to ground;
- Level 3: Surface water runoff is discharged to a surface water body;

- Level 4: Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;
- Level 5: Surface water runoff is discharged to a combined sewer.

The aim of this is to encourage developments to use runoff as a resource and ensure that runoff is sustainably managed to avoid any negative impacts from the development, such as increased flood risk.

7.3.1 Level 1 – Collected for Use

Rainwater harvesting is proposed to be used on Pontyclun and an 80m^3 volume tank is proposed. Although rainwater harvesting is being utilised, the demand is not high enough to discharge all water through this method. There are also other catchments that will not contribute and will need another runoff destination.

7.3.2 Level 2 – Infiltrate to Ground

Level 2 of the hierarchy promotes infiltration of runoff to ground, mimicking natural infiltration and recharging below ground aquifers. The concept of infiltration is intended at trying to prevent runoff from sites when there are small rainfall events. The goal is to minimise the discharge of polluted runoff from entering streams and rivers, particularly in summer periods when there is low flows. The emphasis is on achieving no runoff for small rainfall events which are less than 5mm.

The Phase I Geo-Environmental Desk Study Report indicated that the site is underlain by glacial till, which generally comprises sands, gravels, silts and clays. A Ground Investigation has been proposed to determine if infiltration measures will be possible hydraulically.

The location and size of a potential soakaway system would be limited due to the underground utilities e.g. the HV cable, the close proximity of the surrounding residential properties and potential contaminated land. Even if a soakaway could dispose of a portion of the surface water, it likely that another disposal route is required to supplement.

It is proposed that raingardens are to be employed as a SuDS solution. Due to their proximity to the building, they will need to be lined, which will limit their ability to contribute to interception. Evapotranspiration in summer is a key mechanism for reducing runoff.

The area of impermeable area on the site has been reduced significantly (by approximately 50%) and has been replaced with permeable paving or grassed landscaping. The landscaping will encourage infiltration in the top soil layer as well as offer evapotranspiration benefits. The permeable paving will hold and slow the water compared to the existing regime.

As a part of the storm water management network for the eastern catchment, a lined detention basin is proposed. Along with the lined raingardens, these will contribute interception of the first 5mm of rainfall with evapotranspiration.

7.3.3 Level 3 – Discharge to a Surface Water Body

As there are no watercourses within or near to the site, discharging to a surface water body is not achievable.

7.3.4 Level 4 – Discharge to a Surface Water Drainage

It is proposed that the main form of discharge from the site will be through the two existing outfalls on the southern site boundary. The existing northern outfall towards Palalwyf will no longer be required. The proposed catchments are shown in Figure 9

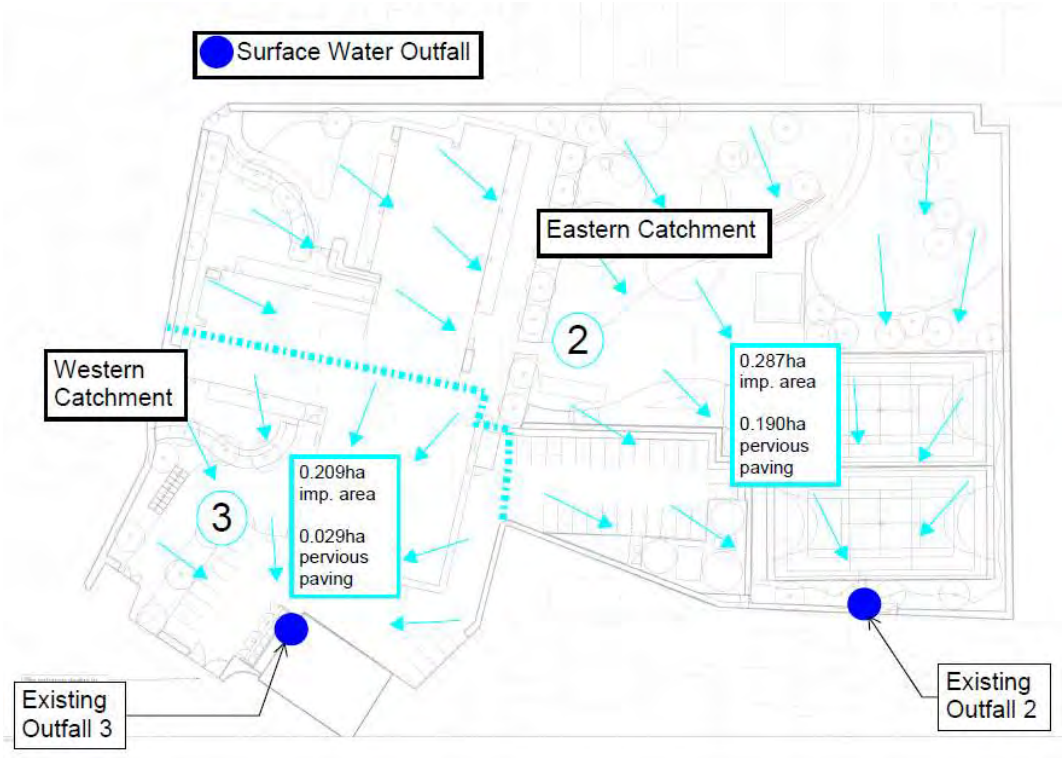


Figure 9: Proposed Pontyclun catchments

The western catchment would serve the proposed car parking area south west of the building and a portion of the western side of the site and building. This catchment would then outfall through the existing outfall towards Heol yr Felin, adjacent to the library.

The majority of the site is proposed to drain through the eastern outfall on the southern boundary towards Fford Talygarn. Storm flow will be conveyed from the impermeable areas north west of the building and the network will capture all impermeable areas north and east of the building. The permeable paved car parking and the permeable surfaced MUGA will also drain through this outfall.

7.4 S2 – Surface Water Runoff Hydraulic Control

Standard S2 details the requirements for hydraulic runoff from the site. It is broadly split into three main sections, runoff control, volumetric control and interception.

7.4.1 Runoff Control

The majority of the site has been previously developed and is considered impermeable. Figure 10 and Table 3 shows the comparison between the existing and proposed permeable and impermeable areas

Figure 10: Pontyclun existing impermeable/permeable areas

Table 3: Existing Impermeable Area versus Proposed Impermeable Area			
Outfall	**Existing Impermeable Area (ha)**	**Proposed Impermeable Area (ha)**	**Proposed Pervious Pavement (ha)**
Outfall 1	0.118	0	0
Outfall 2	0.219	0.209	0.029
Outfall 3	0.607	0.287	0.190
TOTAL	**0.944**	**0.496**	**0.219**

The majority of the existing site is impermeable and the site investigations conclude that the existing site has a conventional drainage network that discharges at an uncontrolled rate to 3 outfall points. This drainage networks serves the entire site area with the limited green landscaping either infiltrating to ground or conveying water to a nearby impermeable area. Therefore, the pre-developed

sections of the site can be considered brownfield sites which will be used to inform the discharge rates from the site.

The proposal is to retain the two southern outfalls and form two rainwater catchments.

Rainfall will be captured in the western catchment through a number of ways. Water falling on the roof will be captured through guttering and downpipes before running into a raingarden. The overland flow will be directed into raingardens, permeable paved areas or through a bioretention drainage channel. All will connect the outfall point via a piped network. Flow will be controlled using a combination of attenuation cells and vortex control devices to restrict the discharge.

In the eastern catchment, the same capture methods apply as per the western catchment. In addition, however, the majority of the catchment will flow through a dry basin which will supplement the adjacent attenuation cells to provide the required attenuation volume. The MUGA will be permeable paved and will offer storage volume. The MUGA and other permeable paved areas are likely to be lined and this will be informed by the site surveys.

The amount of existing brownfield contribution for each proposed catchment has been considered. It is proposed that the outfall rate from storms up to the 1:100 year event will be reduced to 70% of the existing 1:1 year brownfield flow rate for each existing catchment

The existing catchment brownfield 1.1 year rate and proposed catchment discharge rates are as per Table 4:

Site	Proposed Impermeable/Permeaable Area (ha)	Existing 1:1 Discharge Rate (l/s)	Proposed Discharge Rate (l/s)	Required Attenuation Volume – including porous paving (m^3)
Outfall 1	0	11.9	0	0
Outfall 2	0.477	24.2	16.9	290
Outfall 3	0.238	30.1	21.0	30
TOTAL	**0.715**	**66.2**	**40.1**	**320**

Table 4 – Proposed catchment flow restrictions

It is proposed that the total discharge rate from the development into the existing Outfall 2 should be limited to 16.9l/sec and the discharge rate into Outfall 3 is proposed to be limited to 21l/sec. This represents a reduction at Outfalls 2 and 3 of 30% in the 1-year event and by up to 55% in the 100-year event (+ 40% climate change).

Outfall 1 is no longer required. These flow rates will be achieved by installing vortex flow controls upstream of the discharge locations. The total flow leaving the site is significantly reduced compared to the existing scenario.

A climate change allowance of 40% has been proposed for the development.

7.4.2 Volumetric Control

It is common practise to meet greenfield runoff behaviour for green landscaped areas, however there are very limited existing green landscaped areas and these are sloped towards the impermeable site areas. The existing green areas are generally proposed to be retained as green areas and additional green space is proposed meaning there is a higher percentage of green space provided compared to existing. As the majority of the existing site is impermeable and not acting as a greenfield, it is proposed the site is controlled to brownfield runoff parameters only. There is a small pond near the eastern boundary, however this is assumed a feature only and does not contribute to the overall drainage regime.

Table 3 in Section 7.4.1 demonstrates that the existing impermeable area is 0.944Ha and the proposed impermeable area has been reduced to 0.497Ha. The remaining site area comprises porous paving and green landscaping. The area of impermeable area has significantly reduced from the existing scenario.

The proposed landscaped areas are assumed to slow the runoff and offer a degree of infiltration. Any overland flow however will run directly into the attenuation basin, raingardens or an area of permeable surfacing e.g. the MUGA.

7.4.2.1 Western catchment

The network has been sized to accommodate the 1:100 year flow plus climate change. A vortex flow control near the outlet will restrict the flow in all return periods up to the 1:100 year storm to 21l/sec. Storage of the attenuated storm water upstream of the flow control device will be in the network pipes as well as 30m^3 underground attenuation cells provided adjacent to the building entrance. Storage will likely be provided in the rain gardens and permeable paved car parking bays however this volume has not been included in the calculations.

7.4.2.2 Eastern catchment

The network has been sized to accommodate the 1:100 year flow plus climate change. A vortex flow control near the outlet will restrict the flow in all return periods up to the 1:100 year storm to 16.9l/sec.

A total of 160m^3 storage is required. Storage of the attenuated storm water upstream of the flow control device will be in the pipes in the network as well as 20m^3 in the dry basin and 140m^3 underground attenuation. The dry basin has been designed with a maximum storage depth of 1m with 0.3m freeboard to the top of the basin for a 100 year period including an allowance for climate change. Side slopes will be 1 in 3, with one side slope 1 in 5. A combination of attenuation cells and the dry basin is required due to special constraints.

The MUGA will offer a degree of storage and is assumed to contribute 130m^3 of storage in the pavement layers.

As with western catchment, storage volume provided in the rain gardens and the permeable parking bays has not be included in the calculations.

7.4.3 Interception

The Welsh Governments "*Statutory Standards for Sustainable Drainage Systems*" require that, as far as practical, there should be no discharge from a site during the first 5mm of a rainfall event. This attribute is considered to be met by utilising systems as described in Table G2.1 of the standard or by demonstrating compliance through other means.

The concept of interception is to prevent any runoff taking place from sites when there are small rainfall events. The aim is to minimise the discharge of polluted runoff from entering streams and rivers, particularly in summer periods when they have low flows. Impermeable surfaces generate runoff from nearly all rainfall events, and this can have a negative impact on the morphology and ecology of receiving water bodies. Interception is aimed at trying to replicate greenfield runoff conditions although it should be noted that the existing site is brownfield and not behaving as greenfield.

Interception mechanisms are based on runoff retention. This can be achieved using rainwater harvesting, using soil storage and evaporation.

A green roof has been considered for the site however, following further assessment, has been discounted from the scheme due to the ongoing maintenance and the increased imposed weight on the roof.

Reviewing Table G2.1 and giving consideration to the site the following SuDS features offer a suitable approach to meet the interception criteria:

- Rainwater harvesting
- Bioretention areas/ raingardens;
- Detention Basins; and
- Permeable surfaces.

The site is to employ rainwater harvesting. The harvesting system is designed to take runoff falling on certain sections of the roof and recycle this water for use within the building. This runoff therefore will not enter the drainage network. This is an effective use of water in smaller storm events however when the tank is full, the effects are lost as runoff will likely bypass the harvesting system and enter the piped network. The rainwater harvesting system is designed to accommodate 80m^3 of rainwater. Table G2.1 assumes that all surfaces drained to rainwater harvesting systems are treated as long as the system design is based on regular daily demand for non-potable water from surface water runoff.

There are approximately 440m^2 of bioretention features on Pontyclun. The total amount of bioretention features across the site has been maximised to provide a

greater contribution to interception requirements however the majority are likely to be lined due to proximity to the proposed school buildings. Those that may be unlined are subject to further ground investigations . Potential for infiltration is therefore anticipated to be low and may be insufficient to intercept all of the first 5mm of rainfall. In accordance with Table G2.1 in the Welsh Statutory Standards for Sustainable Drainage, it can be assumed that the first 5mm of rainfall from contributing impermeable areas equal to five times the unlined vegetated bioretention areas can be intercepted.

There is approximately 4960m^2 impermeable area on Pontyclun and if all 440m^2 of bioretention is unlined, there is the potential for 2200m^2 of impermeable area is sufficiently intercepted through this method. It is however unlikely the raingardens will be unlined.

There is insufficient space available on the proposed site for bioretention systems with a plan area equivalent to a fifth of the impermeable area as the land use is required for other purposes for the school to function.

A dry basin is proposed on the site as part of the storm drainage network to attenuate and treat flows. The basin on Pontyclun is assumed lined however if unlined and Table G2.1 states that areas up to five times the base area of the basins can be assumed to meet interception requirements. The base area of the dry basin is only 3m^2 therefore the contribution would be negligible.

It is proposed to use permeable pavement for the car parks and MUGAs. There is approximately 2500m^2 on Pontyclun and Table G2.1 states that all permeable surfaces can be assumed to comply provided that there is no additional area drained to the permeable surface. In all cases, additional flow will enter the permeable paving therefore only the surface area of the permeable paving itself has been considered and sufficiently intercepted through this method.

In total, based on the figures above, it is calculated that the amount of impermeable area on site that can be deemed to be compliant with interception requirements is approx. 0.25ha assuming that the raingardens and dry basin are lined. Given that the total amount of impermeable area on site is 0.496ha, these measures are providing 50% of the required interception of flows on site, which equates to approximately 2.5mm of the first 5mm of rainfall. Although not the entire 5mm is captured, this is providing significant betterment to the existing regime and this excludes the rainwater harvesting contribution.

Disposal of significant events using solutions such as soakaway units or infiltration basins usually requires infiltration rates of the order of 1 x 10^{-6} m/s or higher. However, effective infiltration can be achieved with lower rates under units such as permeable pavements due to the large storage and infiltrating surface area available and the removal of sediment which would otherwise blind the infiltration surface. Therefore, the true interception provided through the permeable surfacing may be greater than suggested.

The lined bioretention components adjacent to the main building will also contribute to the interception requirements in terms of evapotranspiration. Additionally, the proposed bio-remediation channels in the car park will also provide some additional interception through the soil storage.

It should also be noted that the impermeable area has been reduced by nearly 50% therefore there is significantly more grassed area compared to the existing case. This will naturally provide more interception compared the existing case before considering additional interception added with raingardens the dry basin and the permeable paving.

7.5 S3 – Water Quality

The Welsh Standard S3 covers the necessary water quality requirements for a scheme to prevent negative impacts on receiving waters.

During construction, it is likely that silts will be mobilised by rainfall which if uncontrolled will be conveyed to the downstream watercourses or pipework. The contractor will need to control silt runoff, particularly during the earthworks stage. This will be detailed in the Contractor's method statements.

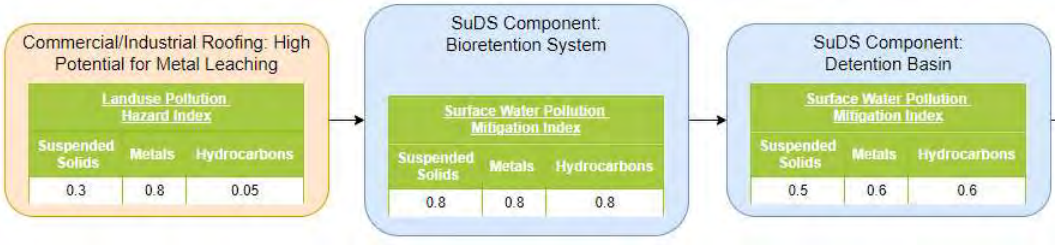
The Simple Index Approach has been used to determine the pollution hazard index for the runoff and appropriate mitigation measures through SuDS. The strategy is to treat runoff at source and then connect to the main storm water network. Appropriate stages of treatment, often referred to as 'treatment trains' will be required to ensure adequate pollution mitigation is provided.

There are several zones within the development that require different treatment considerations. The various treatment zones are:

1. Main building roof
2. Car Parks;
3. Site Access and internal circulation road in the car park;
4. MUGAs
5. Footpaths, school yard, and hard paved areas

7.5.1 Main Building Roof

The construction makeup of the roof for the proposed building is an aluminium type. As such, it has conservatively been assumed that the "Commercial/Industrial Roofing: High potential for metal leaching" land use category could apply. With the source control bioretention system option required for interception, the SuDS treatment train would be as Figure 11:



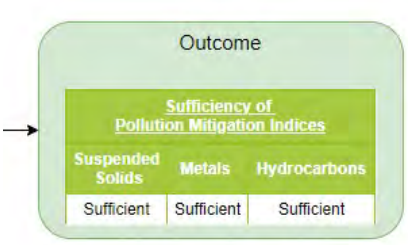


Figure 11: Roof Treatment Train (Simple Index)

Therefore, a bioretention system would be suitable to treat the water to a sufficient level prior to discharging from the site. The dry basin adds an additional treatment where the roof runoff drains through this.

7.5.2 Car Parks

All carparks have been assumed "Non-residential car parking with frequent change" category.

It is proposed to use a pervious block paving build-up for the car park, resulting in the surface water in this area draining and being treated at source. The SuDS treatment train is as Figure 12.

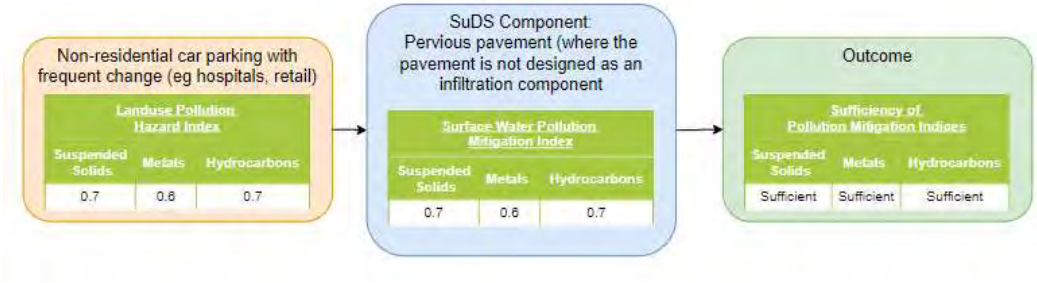


Figure 12: Car Park Treatment Train (Simple Index)

Therefore, pervious pavement would be suitable to treat the water to a sufficient level prior to discharging from the site. Those sections of the car park not captured by pervious paving will be captured through the bioretention channel and as bioretention features provide more treatment than pervious pavement, the water will be treated to an adequate amount.

7.5.3 Site Access and internal circulation road in the car park

In general, the site access road and circulation road to the eastern car park is captured by the car parking pervious paving or the bioretention channel. Infrequent LGV movements are expected on site with some deliveries to the school and weekly refuse vehicles using the road. Therefore, the 'low traffic roads' category was selected for all sites and treatement shown in Figure 13.

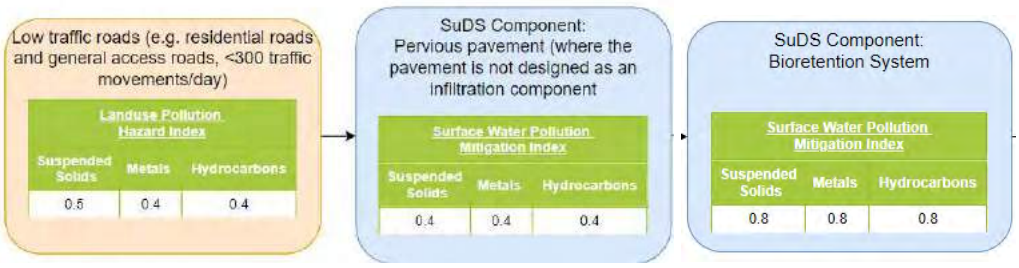


Figure 13: Site Access Road Treatment Train (Simple Index)

Pervious paving treats the metals and hydrocarbons to a sufficient level however will not fully treat the suspended solids. It should be noted that the refuse vehicle is due to collect refuse from the side of the road rather then enter the site therefore this scenario is very unlikely to occur. The internal road to the eastern car park is partially captured by the bioretention channel which offers treatment sufficient to treat the suspended solids, metals and hydrocarbons.

7.5.4 MUGAs

Traffic is not expected on the MUGAs however the lowest category in the simple index tool is 'low traffic roads' therefore this has been used as benchmark in Figure 14.

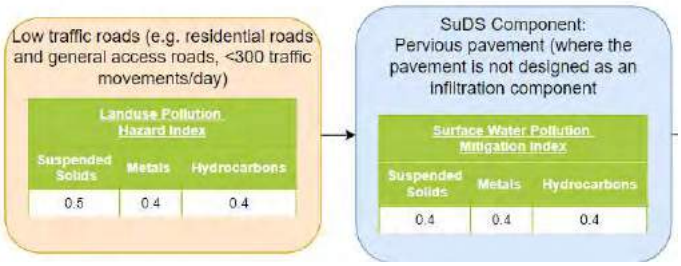


Figure 14: MUGA Treatment Train (Simple Index)

The MUGA storm flow will be treated by the pervious paving meaning that if the MUGA is classed as a low traffic road, the treatment is insufficient for suspended solids. No vehicles will use the surface however therefore low traffic road is an 'over classification' and as the suspended solid treatment is insufficient by 0.1, this is deemed sufficient.

7.5.5 Footpaths, school yard and other hard surfaces

Occasional emergency access is expected in these areas of the site. Therefore, the 'low traffic roads' category was selected however the volume of traffic is in emergency only in Figure 15.

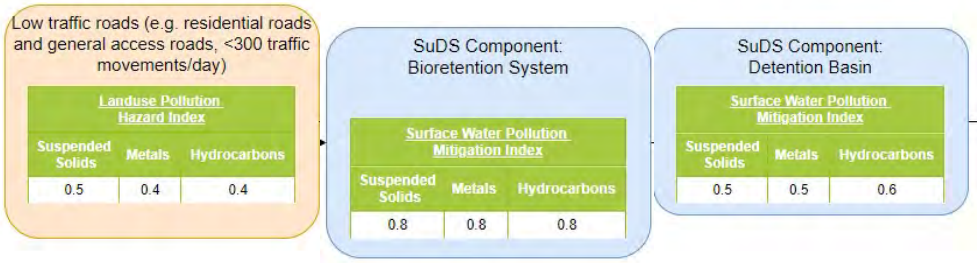


Figure 15: Footpaths, School Yard and other hard surfaces treatment train (Simple Index)

The majority of the hard surfaces are captured through raingardens. This bioretention system would provide sufficient treatment alone. The hard surfaces that are not captured by bioretention features will be captured through inbuilt fall channels are drained through the detention basin. The water is therefore treated to a sufficient level prior to discharging from site.

7.6 S4 – Amenity and S5 Biodiversity

The Welsh Standard S4 states that the surface water management systems should maximise amenity benefits.

Raingardens are proposed to capture the storm water for the majority of the site. The raingardens will likely be planted with trees and lower level shrubs which provide the opportunity to house birds, small mammals and insects as well as offering a visual benefit from the school and development outside of the school boundary.

Well positioned raingardens with trees can provide natural shaded areas for the children in the summer months and those near to the buildings windows can aid with keeping the classrooms cool in hotter periods.

Raingardens and other green infrastructure may also offer an educational opportunity with green landscaping generally improving physical health, e.g. clean air from trees improving air pollution and children's wellbeing, e.g. the 'restorative' experience where landscape increases relaxation levels, reducing stress and improving concentration. This can lead to positive effects on emotional, behaviour and cognitive development.

Locating raingardens adjacent to the pedestrian walkways will allow them to be enjoyed as people enter, leave and move around the site.

A portion of the attenuation is proposed to be through a dry basin. The basin could be planted with appropriate plant species for the wet/dry conditions adding additional habitat variety. The location of the basin is adjacent to the pedestrian route form Palalwyf Avenue so people using the path can enjoy the feature

As the majority of the existing site is impermeable asphalt, the aim of the masterplan is to provide more green space and planting and therefore the added benefits that good landscaping delivers. There are number of the existing trees which are to remain on the site which will be supplemented by additional planting

and by incorporating drainage into some of these landscaped areas would be an efficient use of space on a site with limited area.

Although not green infrastructure, the use of permeable paving combined with storage cells at the low point of the site means that the hard areas are providing a dual purpose (similar to the landscaping and rain gardens). This allows the proposed green landscaping to be strategically placed where is offers the most value to the school users rather broken up around the site to serve the drainage function i.e. if the car park had to drain through a basin, the basin would need to be located at the low point along the southern boundary meaning the car parking spaces brought closer to the centre of the site. This would split the green play area and also increasing the chance of the school children coming into contact with the car park.

7.7 S6 – Construction, Operation and Maintenance

Standard S6 requires that the proposed surface water drainage systems are designed such that they can be constructed, operated and maintained easily, safely and cost effectively for the whole design life of the systems. They should also aim to minimise the use of natural resources and embedded carbon.

These aspects will be considered through the design of the drainage system. A SuDS Management Plan will be developed to determine how the proposed SuDS features can be effectively and efficiently managed with associated ongoing costs for maintenance included where possible. Where possible, natural resources will be utilised.

The SuDS management plan will be submitted as part of the full SAB application.

A flat width has been provided around the dry basin to provide a safe platform for inspection and maintenance. Access to the basin has been incorporated into the design with the feature located adjacent to the car park.

8 Summary

This drainage strategy has considered the existing site conditions and constraints, the proposed development at Pontyclun together with potential discharge points. DCWW have been consulted to determine an appropriate foul connection to their network and the SAB consulted regarding the storm drainage. The storm drainage follows the principles of the Welsh Government's Statutory Standards for Sustainable Drainage.

Flood maps have been acquired for the site and the site is outside of Zones 2 and 3 for river and sea flooding and outside Zones 2 and 3 for surface water and small watercourse flooding.

The site is currently an active primary school with a dense private utility network including storm drainage and either foul or combined drainage disposing the foul discharge. The topography slopes generally from north east to south west and there are two vehicular access points and dedicated pedestrian access points.

The proposed school site is to contain a new building, car parking, MUGA, hard landscaping for play areas and circulation, and green space for play and landscaping. When determining the locations of the features, a number of constraints needed to be considered. These included site phasing as the existing schools need to remain operational during construction, existing utilities, topography and a working proposed masterplan with a suitable relationship between proposed uses. These constraints limit the location of the proposed building and crucial infrastructure for the new building to be made operational, including drainage.

In general, the existing access points to all site are being retained. The existing vehicular access points are being repurposed to pedestrian access with a new vehicular access proposed on the southern boundary. All existing pedestrian access points are to remain.

Earthworks reprofiling is required to form the level plateau for the building and suitable slope directions and gradients for the other land uses. The proposed earthworks have shaped and informed the drainage strategy. Retaining walls will be required.

Foul flows have been estimated based on the anticipated school population and use and a pre planning application has been submitted to DCWW to determine a suitable foul drainage connection point. The desire is to reuse the existing western outfall point. DCWW supported this by confirming the connection could be made to their asset in that location. The flow is likely to require pumping for a short section.

The surface water drainage strategy has been considered in accordance with the Welsh Government's Statutory Standards for Sustainable Drainage Systems. Consideration has been given to the proposed runoff destination, hydraulic control, water quality, amenity and biodiversity.

Rainwater harvesting will be employed however is not sufficient to manage all of the rainwater. Soakaways tests have been proposed to inform whether infiltration to the ground will be possible hydraulically. The possibility of infiltration needs to consider pollutant risk and proximity to buildings

It is proposed the two existing southern storm water outfalls leaving the site are reused although the ultimate outfall is unknown. It is assumed these connect to another piped network in Heol yr Felin and further survey has been proposed to investigate this. This existing combined outfall north of the site will become redundant.

Rainwater landing on the roof will be captured using guttering and downpipes which will then be fed to a raingarden. Raingardens will be used to capture surface water runoff where possible but will be supplemented with bioretention channels and in built fall channels. Permeable block paving has been employed in the car parking bays and the MUGAs will be constructed using permeable asphalt paving.

The existing catchments have been analysed with the piped networks modelled to determine the existing catchment areas and the brownfield flow, assuming all catchments an unattenuated. The GRR has also been calculated.

The proposed impermeable area is 50% less than the existing site with the remainder of the site either permeable paving or grassed landscaping. As the existing site is brownfield, the existing brownfield rates can be used to inform the proposed discharge rates from the site. It is proposed to limit the flow at each outfall to the existing 1:1 year brownfield rate with a 30% betterment.

For the green landscaped areas runoff will either naturally infiltrate or run overland to a proposed impermeable area. This replicates the existing regime therefore it is proposed that the green landscaped areas are unattenuated. The runoff that does flow on to the impermeable areas will be captured through the piped network and be attenuated as part of the wider drainage network.

To attenuate the flow, the western catchment will utilise attenuation cells and pipe storage. The eastern catchment will be attenuated through a dry basin supplemented with attenuation cell. Vortex control devices will be used to limit the discharge. The MUGA will provide an attenuation function and although raingardens and permeable paving in the parking bays will offer attenuation, these have not been included in the calculations.

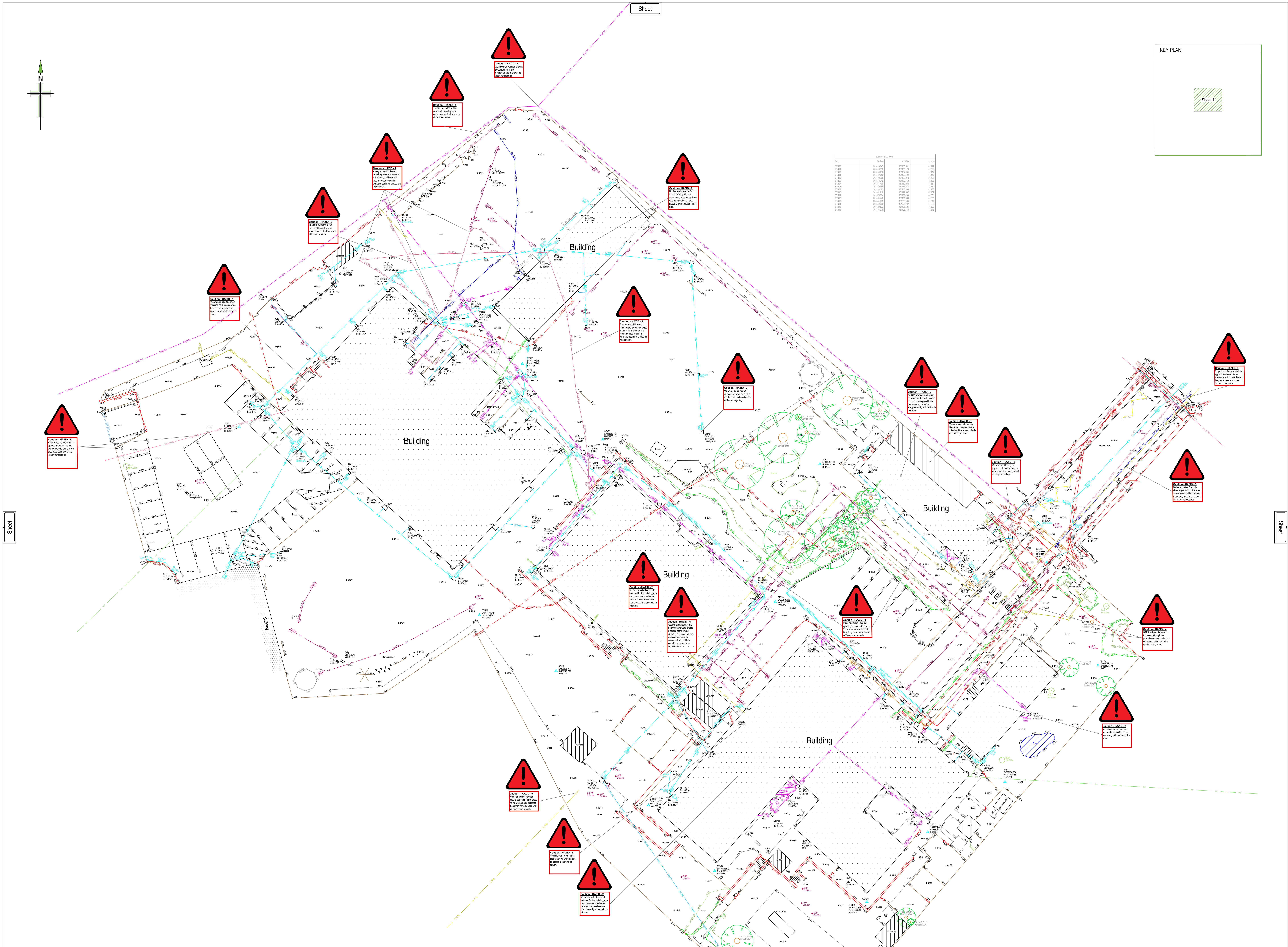
Through these systems, the first 2.5mm for rainfall will be intercepted. Although this is not the entire first 5mm, this is a significant betterment compared to the existing situation. The treatment train for each land use has been calculated and all uses are adequately treated apart from the MUGA and site access. The traffic level assumed for the MUGA is an overestimate and the use of the site entrance by commercial vehicles is also an over estimate.

The storm drainage proposals for the development will need to be approved by the local SAB and an initial pre drainage strategy review has been submitted. The SAB has agreed in principle to the proposed discharge rates on confirmation of the assumptions made through additional survey.

Amenity, biodiversity and construction, operation and maintenance have all been considered and will be further detailed in the SAB application.

Appendix A

Existing Topography Drawing



DESKTOP UTILITY RECORDS		
Utility Type	Provider Details	Date Acquired
Gas	Wales and West	07/08/19
Water + Sewers	Welsh Water	06/08/19
Electric	Western Power	07/08/19
BT	Openreach	07/08/19
Telecoms	Virgin Media	02/07/19

1.Warning:
Water and Gas utilities to individual properties are often of a size that cannot be detected using EML or GPR investigation. Whenever possible the route has been added from surface evidence (pipe risers, valves, etc), but this should be viewed as a guide only. Safe digging techniques shall be used at all times, in line with the requirements of HSG47 and current CDM regulations.

2.Warning:
Assumed Route (AR) positions are indicative only and are in an approximate position. Safe digging practices in accordance with HS(G)47, must be used to verify the information and establish their actual position.

3.Warning:
Records information (TFR) and positions are indicative only and are in an approximate position. Safe digging practices in accordance with HS(G)47, must be used to verify the information and establish their actual position.

GENERAL NOTES:

Electrical Comments:
Please note that ratings for electrical services i.e. LV, HV and EHV are taken from statutory records provided by the client. Technics hold no liability for misidentification of the rating for cables as there is no detection technology that will confirm the rating of a cable. Where no statutory records are provided we will show all cables as LV unless there is evidence to the contrary.

Methods Used:
Radio-frequency, Flexitracing and sonde and Ground Penetrating Radar techniques may be used in the location of underground utilities. The results are not infallible and vacuum excavation (QL-A) should be carried out to confirm positions of the identified utilities. Although great efforts have been made in conducting the survey the completeness of the underground utilities information cannot be guaranteed.

Accuracy Statement:
For Radio frequency depths shown have been obtained by electromagnetic means and can be subject to high levels of interference and distortion at the source or from surrounding services so can not be relied upon. In areas where depth is of high importance Technics would advise you to use PAS128 QL-A to obtain accurate depth readings.

Drainage:
Drainage connectivity will be proven by either a bang test or by drain dye. Unless otherwise specified in project spec the line shown between connecting manholes will be assumed as running straight. Where a connecting manhole can not be found or is thought not to run straight, the line of the pipe will be sonded as far as possible at the time of survey.

For Ground Penetrating Radar (GPR) methods the depth surveyed varies according to the subsurface ground conditions and level, and is normally characterised by the depth of penetration of the radar signal. In areas where depth is of high importance Technics would advise you to use PAS128 QL-A to obtain accurate depth readings. The average penetration will be greater in sandier regions than in clay regions, but will typically be in the range 2.0m to 2.5m. In exceptionally good or exceptionally bad conditions the depth may exceed 3m or be restricted to 1.2m to 1.5m. Clay conditions and water logged areas offer a greater restriction to the surveyor and can in some cases render the GPR ineffective in locating services within some areas. Where the client issues statutory records we will highlight the services that could not be found for this reason. This is not possible when the client does not issue statutory records and may require further investigation prior to commencing with the project.

Unless otherwise stated, all services shown on this plan have been surveyed using approved detectors and the connections between manholes, if unable to be traced, have been assumed to be direct. The detection confidence for each utility segment is depicted in line with the scheme and outlined within the PAS128:2014 Quality Level Guide only if survey has been requested to PAS128 prior to survey starting.

Information depicted as QL-C, QL-D,QL-B4, TFR and AR cannot be guaranteed as it is based on historic utility records or assumed routes which can be inaccurate and incomplete.

Depicted service routes may reflect the routes of multiple cables or pipes. It is not always possible to differentiate between buried construction features, utilities and other subsurface linear features therefore it is possible that some features shown are not utility related, and due to the limitations of electromagnetic techniques all utility identifications should be treated with caution and verified prior to any design/building works.

If the location or depth of services/features is of importance to a project then it is recommended that discussions are held with Technics Group regarding any possible limitations or anomalies. It is also advised that trial excavations should be undertaken to verify survey results within key areas of importance prior to any design/building works.

No utility mapping survey can be considered a 100% accurate depiction of the sub-surface environment, and the use of these drawings does not remove the requirement for the use of safe digging techniques at all times, in line with the requirements of HSG47 and current CDM regulations.

PAS128: does not apply to standard utility surveys

Greatest confidence

- QL"A" Horizontal (±50mm) and vertical (±25mm) position verified visually.
- QL"B1P" Horizontal (±150mm or ±15% of detected depth) and vertical (±15% of detected depth) position detected by multiple methods with post processing of data.
- QL"B1" Horizontal (±150mm or ±15% of detected depth) and vertical (±15% of detected depth) position detected by multiple methods.
- QL"B2P" Horizontal (±250mm or ±40% of detected depth) and vertical (±40% of detected depth) position detected by a single method with post processing of data.
- QL"B2" Horizontal (±250mm or ±40% of detected depth) and vertical (±40% of detected depth) position detected by a single method.
- QL"B3P" Horizontally positioned (±500mm) data with post processing
- QL"B3" Horizontally positioned (±500mm) data only
- QL"B4" Assumed route but no signal detectable using eml or gpr
- QL"C" Route from utility records correlated to visual indicators
- QL"D" Route from utility records

Least confidence

LEGEND:

Utility features:

- Combined Water Sewer
- CW(AR) Combined Water Sewer Assumed Route
- EARTH Earth
- ELEC Electric
- Foul water Sewer
- FW(AR) Foul Water Sewer Assumed Route
- FW(TFR) Foul Water Sewer Taken from Records
- GPR GPR detection
- GAS Gas
- GAS(AR) Gas Assumed Route
- G(GPR) Gas GPR Detection
- G(TFR) Gas Taken from Records
- PIPE Pipe
- RS Road Sensor Cable
- Surface Water Sewer
- SW(AR) Surface Water Sewer Assumed Route
- TELCM Telecoms
- URF Unknown Radio Frequency
- Virgin(TFR) Virgin Taken From Records
- WATER Water
- W(GPR) Water GPR Detection

Topographical features:

- Approximate chamber extents
- Bank - Bottom
- Bank - Top
- Building
- Building canopy
- Concrete
- Drainage Channel
- Fence
- Kerb - Bottom
- Kerb - Drop
- Kerb - Top
- Road marking - yellow
- Road marking - white
- Road - centre line
- Ridge= 74.10 Eaves= 72.19 Roof / Eaves levels
- Surface change
- Visible Trench Line
- Wall

NB: Topographical legend not applicable if Technics utility survey is overlaid onto client's topographical survey.

HAZID warning tag - this symbol means there is important information that needs to be read regarding an asset

QLD Utility line taken from records provided by client and or site features.

GPR Utility \ feature found using ground probing radar which maybe non-metallic.

RF Utility \ feature found using radio frequency locating equipment.

Unable to survey area with GPR due to poor ground conditions.

Area not surveyed.

Unidentified subsurface distortion designated with GPR

X4 Number of ducts entering or exiting the inspection pit

STN1 E=458043.509 N=340010.635 H=30.825 Survey control station

Buildings

OS Buildings

Overhead electrical tower

GPR Baseline

SERVICE DEPTHS:

* Depths of services can be measured from different points:

A 1.20 B 1.20 C 1.20

A Indicates where GPR depth is measured from.
B Indicates where depth is measured from when using radio frequency.
C Indicates where depth is taken from on drainage pipes using a tape measure.

ABBREVIATIONS:

Designation:

BLKD	Blockage	MAR	Man Entry Required	UTL	Unable to Lift
D	Depth to Utility	MKR	Marker Post	UTT	Unable to Trace
DIA	Diameter	NFI	No Further Information	WO	Wash Out
DOC	Depth to Cover	NVP	No Visible Pipe		
DTB	Depth to Base	NVV	No Visible Valve		
EOT	End of Designation	OSA	Out of Survey Area		
GPR	Ground Penetrating Radar	P/S	Poor Signal		
ID	Invert Depth	PEV	Polyethylene Valve		
IL	Invert Level	SOR	Start of Run		

Topographic				Fence and Wall features:	
BOL	Bollard	RE	Rodding Eye	B/W	Barbed Wire
BT	British Telecom Cover	RS	Road Sign	C/B	Close Boarded
DK	Drop Kerb	RSC	Rolled Steel Column	C/M	Corrugated Metal
EL	Electricity Cover	RSJ	Rolled Steel Joist	C/L	Chain Link
EP	Electricity Pole	RWP	Rain Water Pipe	C/P	Chesnut Paling
FH	Fire Hydrant	SC	Stop Cock	HR	Hand Rail
FFP	Flagged Footpath	SP	Sign Post	I/R	Iron Railing
FL	Floor Level	SS	Street Name Sign	Lat	Lattice
G	Gully	STP	Stand Pipe	P/C	Post and Chain
GM	Gas Meter	SV	Stop Valve	P/R	Post and Rail
GV	Gas Valve	SVP	Soil Vent Pipe	P/W	Post and Wire
HT	Height	TFP	Tarmac Footpath	Ret	Retaining Wall
IC	Inspection Cover	THL	Threshold Level		
LP	Lamp Post	TL	Traffic Light		
LH	Lamp Hole	TP	Telegraph Pole		
MH	Manhole	VP	Vent Pipe		
NB	Notice Board	WM	Water Meter		
OSBM	Ordnance Survey Bench Mark	WP	Waste Pipe		
P	Post	WT	Wall Top		
PB	Post Box	WV	Water Valve		

SURVEY AND DATUM INFORMATION:

Pseudo Ordnance Survey plane grid tied to National Grid via GPS observations at survey control point STN02.
Bearing STN02 to STN01: 308°01'25"
Survey control as indicated.

The results of the subsurface survey have been measured utilizing the existing survey control as indicated in the drawing mentioned above.

SURVEY STATIONS			
Name	Easting	Northing	Height
STN02	303493.945	181135.541	46.127
STN01	303456.118	181165.120	46.620
STN03	303480.510	181187.934	47.112
STN04	303492.086	181182.432	47.112
STN05	303500.668	181175.043	47.108
STN06	303513.342	181163.169	47.123
STN07	303547.490	181159.268	47.561
STN08	303540.456	181137.588	46.570
STN09	303583.182	181143.806	47.733
STN10	303591.216	181127.592	47.739
STN11	303576.604	181109.288	47.051
STN12	303564.446	181101.368	46.651
STN13	303554.895	181090.435	46.644
STN14	303530.932	181095.287	46.605
STN15	303520.533	181105.624	46.603
STN16	303505.976	181126.753	45.645

UTILITY NOTES:

Services shown outside the survey boundary are for information only and may not be complete. If information is required outside our survey boundary, please contact a Technics Project Manager.

WEATHER CONDITIONS:

.

Rev.	Date	Revision	Signed
A	03/10/19	First Issue	LW

DO NOT SCALE!

Client:	HSP		
Project:	Ponteclun Primary School Palalwyf Avenue CF72 9EG		
Survey Quality:	Topographical and Utility Survey		
Start Date of Survey:	21-29/08/2019		
Drawing Status: Final	Surveyed: JV	Drawn: LW	Approved: LJM
Digital File: 4436-0819-04.dwg	Original Size: A0	Scale: 1:200	Sheet: 1 of 1

Drawing No.:	Revision:
4436-0819-04	A

Technics
Geospatial Consultant Surveyors

Approach House
109 Great North Road
Woodlands
Doncaster
DN6 7SU
Tel: 01302 330105
Fax: 01302 338920
e-mail: Lee.Mcnichol@technicsgroup.com

Regulated by RICS

Appendix B

Proposed Drawing Pack

A1

Palalwyf Avenue

Heol y Felin

Legend

- Site Boundary
- Proposed Surface Water Drainage
- Proposed Foul Water Drainage
- Proposed Rising Main
- Proposed Bio-remediation Drainage Channel
- HV Cable Easement (assumed 3m)
- Proposed Potable Water
- Proposed Fire Water
- Proposed Hydrant Main
- Proposed LV Electric

Notes

1. Do not scale from this drawing.

2. The details shown on this drawing are based on a RIBA Stage 3 produced for MIMWEP Stage 2. The details will need to be reviewed and revised during subsequent design stages.

3. The topographic survey detail shown on this drawing is based on a survey carried out by 'Technics Group' in August 2019. No responsibility can be taken for the accuracy of this survey.

4. All levels are shown above ordnance datum (m AOD).

5. The details shown on this drawing are subject to change in subsequent design stages and following any potential comments received from statutory authorities.

6. Existing services to the existing school buildings to be removed not shown on this drawing for clarity.

7. Contractor to identify any unknown services prior to commencement of works.

8. Contractor to investigate and identify all known and unknown services prior to commencement of works.

9. Refer to MEP drawings for the utility strategy and how the services are to be removed and at what stage of the project.

10. The existing drainage of the school site will need to be accommodated during construction.

11. No gas is required

Issue	Date	By	Chkd	Appd
P01	24/09/21	IA	JN	IA
Issued for RIBA Stage 3				

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Client
MIMWEP
Rhondda Cynon Taf County Council

Project Title
RCT Batch Primary

Drawing Title
Pontyclun
Proposed Utilities

Scale at A1	Role
1:250	Civils

Suitability
S3- Suitable for Review and Comment

Job No	Rev
281143	P01

Drawing No
RH0201-ARP-ZZ-00-DR-C-00081

J:\281000\281143\00\4 Internal Project Data\4-30 Drawings\4-31 Issue drawings\RH0201-ARP-ZZ-00-DR-C-00081.dgn

Do not scale

A1

PALALWYFA AVENUE

Building

Future junction design to consider vehicle swept path

Legend

- Site Boundary
- Large Refuse Vehicle
- Fire Tender Option 1
- Fire Tender Option 2

Notes

1. Do not scale from this drawing.

2. The details shown on this drawing are based on a RIBA Stage 3 produced for MIMWEP Stage 2. The details will need to be reviewed and revised during subsequent design stages.

3. The topographical survey detail shown on this drawing is based on a survey carried out by 'Technics Group' in August 2019. No responsibility can be taken for the accuracy of this survey

4. All levels are shown above ordnance datum (m AOD).

5. The details shown on this drawing are subject to change in subsequent design stages and following any potential comments received from statutory authorities.

6. Layouts are based on conceptual layouts received from Ares on 11-06-2021 and are subject to ongoing coordination and further design development during subsequent stages.

Issue	Date	By	Chkd	Appd
P01	24/09/21	RL	JN	IA
Issued for RIBA Stage 3				

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Client
MIMWEP
Rhondda Cynon Taf County Council

Project Title
RCT Batch Primary

Drawing Title
Pontyclun
Vehicle Tracking

Scale at A1 1:250 | Role Civils

Suitability S3- Suitable for Review and Comment

Job No **281143** | Rev **P01**

Drawing No **RH0201-ARP-ZZ-00-DR-C-00061**

J:\281\80002811\4-00\4 Internal Project Data\4-30 Drawings\4-31 Issue drawings\RH0201-ARP-XX-DR-C-00061.dgn

Do not scale

Legend

- Site Boundary
- Structure demolition shown by others
- Asphalt and associated pavement removed to bottom of porposed subbase
- Landscaping to be removed to bottom of porposed subbase
- Wall and pallisade fencing to be removed
- Internal wall to be removed
- Existing tree to be removed

Notes

1. Do not scale from this drawing.

2. The details shown on this drawing are based on a RIBA Stage 3 produced for MIMWEP Stage 2. The details will need to be reviewed and revised during subsequent design stages.

3. The topographic survey detail shown on this drawing is based on a survey carried out by 'Technics Group' in August 2019. No responsibility can be taken for the accuracy of this survey.

4. All levels are shown above ordnance datum (m AOD).

5. The contractor should review the bottom of subbase levels and remove and exisitng pavement/landscaping above this level.

6. All existing furniture/equipment/structures to be removed

7. All kerbing to be removed within side boundary

8. All existing sheds/canopies/greenhouses or any other buildings/structures associated with the existing school main buldings are to be removed.

9. All stairsets and walling within the red line boundary is to be removed (excluding the perimater walling around the red line boundary

8. All existing redundant utilities (including chambers to be removed)

8. If possible, contractor to retain existing features e.g. fencing/kerbing and reuse

Issue	Date	By	Chkd	Appd
P01	24/09/21	IA	JN	IA
Issued for RIBA Stage 3				

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Client
MIMWEP
Rhondda Cynon Taf County Council

Project Title
RCT Batch Primary

Drawing Title
Pontyclun
Site Cearance

Scale at A1	Role
1:250	Civils

Suitability
S3- Suitable for Review and Comment

Job No	Rev
281143	P01

Drawing No
RH0201-ARP-ZZ-00-DR-C-00071

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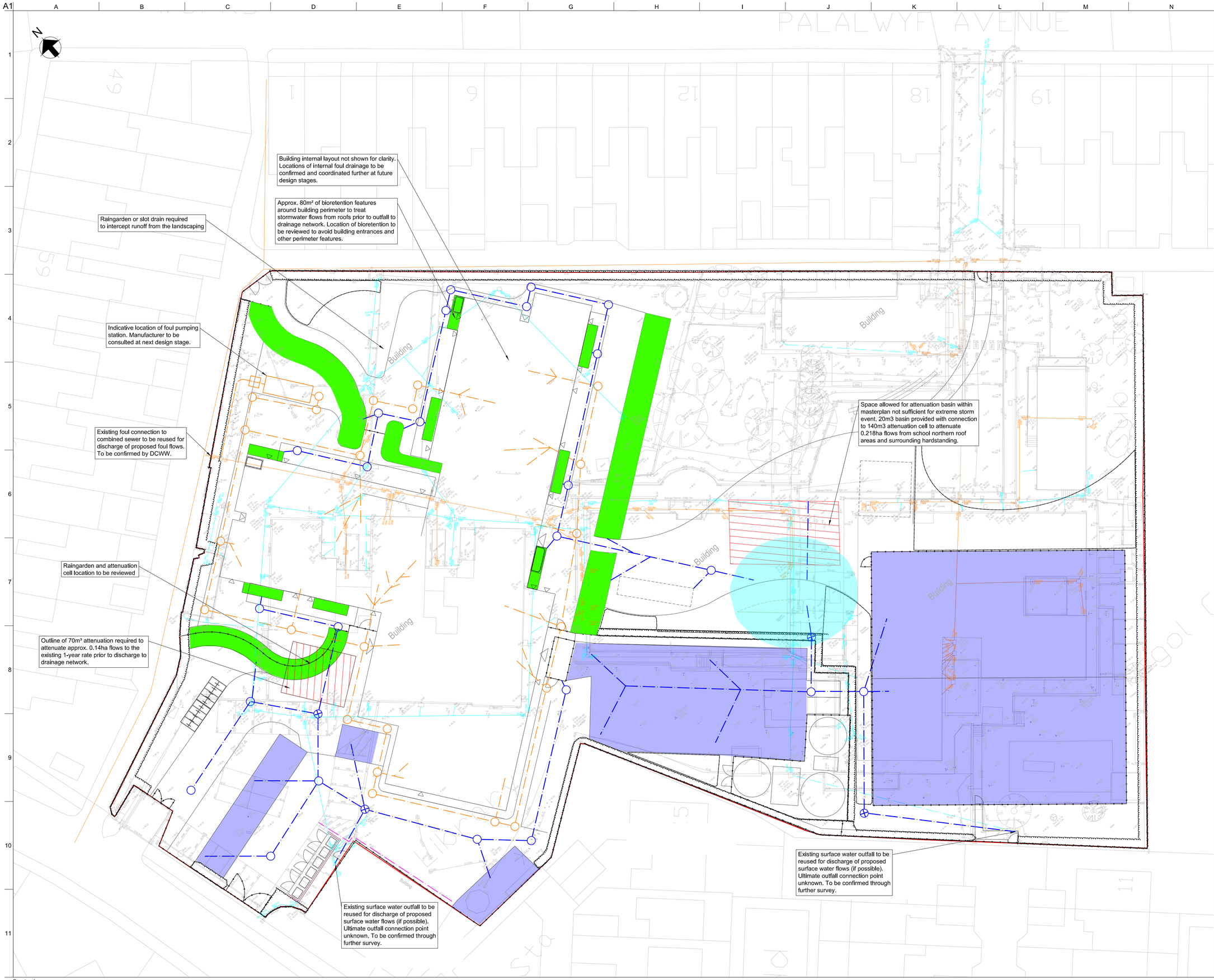
Do not scale



Legend

- Site Boundary
- Existing Storm Sewer
- Existing Storm Sewer (Assumed Route)
- Existing Foul Sewer
- Existing Foul Sewer (Assumed Route)
- Existing Combined Sewer
- Existing Combined Sewer (Assumed Route)
- Proposed Bio-remediation Drainage Channel
- Proposed Bioretention
- Proposed Attenuation Cells
- Proposed Storm Drainage
- Proposed Flow Control
- Proposed Porous Paving
- Proposed Dry Basin
- Proposed Foul Drainage
- Proposed Foul Rising Main

Notes

1. Do not scale from this drawing.

2. The details shown on this drawing are based on a RIBA Stage 3 design produced for MIMWEP Stage 2. The details will need to be reviewed and revised during subsequent design stages.

3. The topographic survey detail shown on this drawing is based on a survey carried out by 'Technics Group' in August 2019. No responsibility can be taken for the accuracy of this survey.

4. All levels are shown above ordnance datum (mAOD).

5. Storm drainage proposals to be agreed with RCT SAB officer including form and location of treatment/attenuation and the outfalling discharge rate.

6. Attenuation sizes are based on attenuating all return periods up to 1:100 to the 1:1 year discharge rate. The area and volume of attenuation required is subject to agreement with the SAB and DCWW.

7. Manhole and pipe sizes/locations to be confirmed in subsequent design stages.

8 Awaiting soakaway test results to determine if a soakaway solution is acceptable. Further Ground Investigation works may be required.

9. Foul and storm drainage provision to be retained for the operational school buildings during construction.

10. Continued coordination with the landscape architect required through the subsequent design stages.

11. Location of rainwater downpipes to be confirmed at future design stages and drainage design to be updated. Locations of bioretention features are indicative and liable to change as as a result. Location of attenuation, rain gardens and pipe routes to be coordinated through future design stages.

Issue	Date	By	Chkd	Appd
P02	24/09/21	RL	JN	IA
Issued for RIBA Stage 3				

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Client
MIMWEP
Rhondda Cynon Taf County Council

Project Title
RCT Batch Primary

Drawing Title
Pontyclun
Proposed Drainage

Scale at A1: 1:250 | Role: Civils

Suitability: S3- Suitable for Review and Comment

Job No: 281143 | Rev: P02

Drawing No: RH0201-ARP-ZZ-00-DR-C-00041

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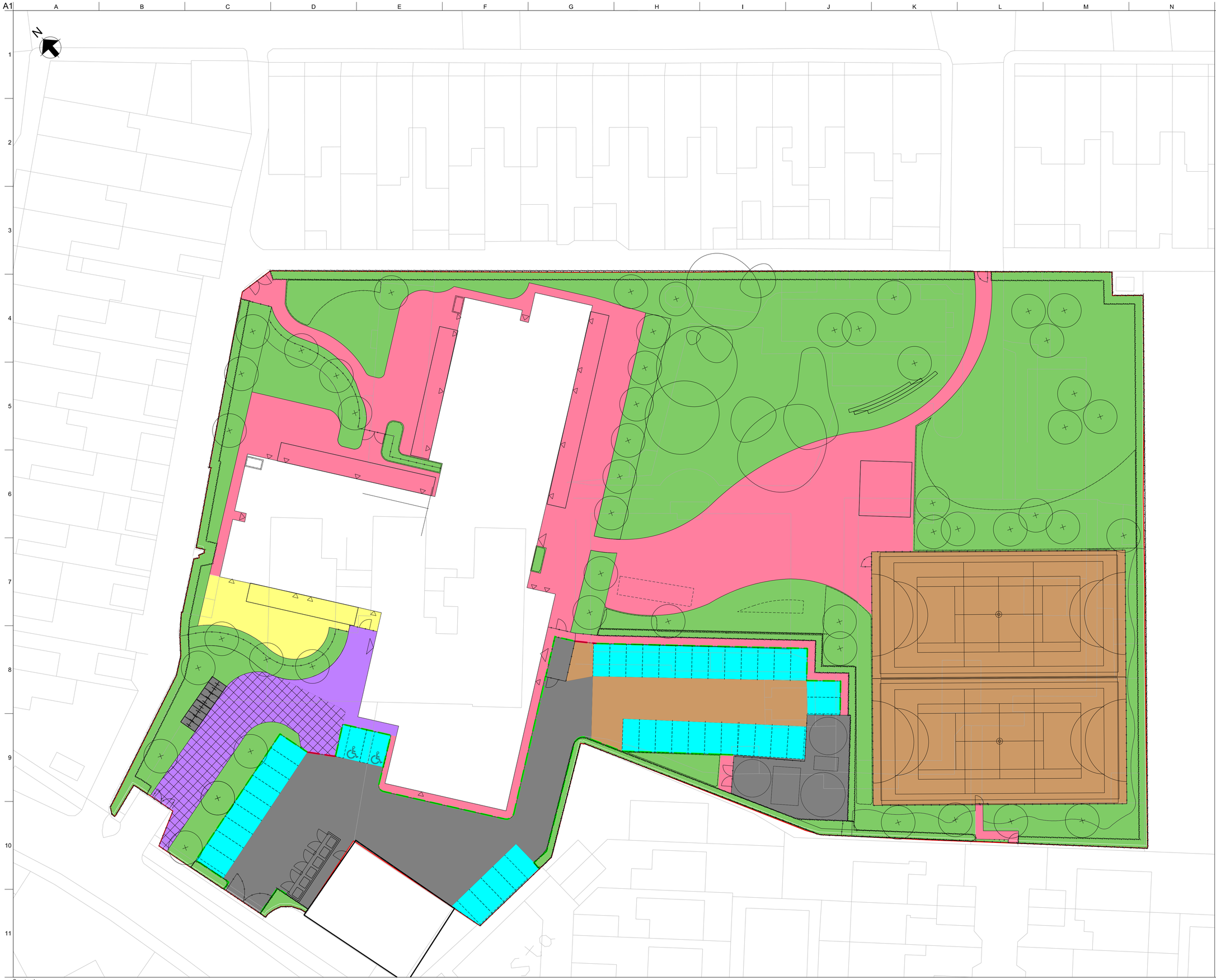
Do not scale



Legend

- Site Boundary
- Proposed Highway - Asphalt
- Proposed Pedestrian Area - Asphalt
- Permeable Asphalt
- Permeable block paving
- Feature paving/concrete block
- Feature paving/concrete block (light trafficked)
- Proposed Landscaping (grass and rain garden)
- 'Wet Pour'
- HB2 kerb
- Flush kerb

Notes

1. Do not scale from this drawing.

2. The details shown on this drawing are based on a RIBA Stage 3 produced for MIMWEP Stage 2. The details will need to be reviewed and revised during subsequent design stages.

3. The topographic survey detail shown on this drawing is based on a survey carried out by 'Technics Group' in August 2019. No responsibility can be taken for the accuracy of this survey.

4. The details shown on this drawing are subject to change in subsequent design stages and following any potential comments received from statutory authorities.

5. Drawing does not show proposed soft landscaping details to be incorporated for the SuDS design.

6. Soft landscaping soil details to be advised by landscape architect.

7. The construction thickness of the permeable block paving, feature block paving and 'Wet Pour' are to be designed by the chosen supplier for the desired use and trafficking

8. An edging kerb to architect specification will be required between all footway and landscaping areas and any change of surface.

9. The construction finishes are designed by the Landscape Architect. Refer to drawing RH0201-ARP-0-0-DR-C-00091 for the construction build-ups.

10. Layouts are based on conceptual layouts received from Ares on 01-09-2021 and are subject to ongoing coordination and further design development during subsequent stages.

11. Transition kerbs will be requierd between flush and HB2 kerbing.

12. All levels are shown above ordnance datum (m AOD)

13. Hard landscaping finishes based on Ares drawings received 20/09/2021

Issue	Date	By	Chkd	Appd
P02	24/09/21	RL	JN	IA
Issued for RIBA Stage 3				
P01	24/05/21	DS	JN	IA
Issued for Information				

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Client
MIMWEP
Rhondda Cynon Taf County Council

Project Title
RCT Batch Primary

Drawing Title
Pontyclun
Construction Finishes

Scale at A1	Role
1:250	Civils

Suitability
S3- Suitable for Review and Comment

Job No	Rev
281143	P02

Drawing No
RH0201-ARP-ZZ-00-DR-C-00051

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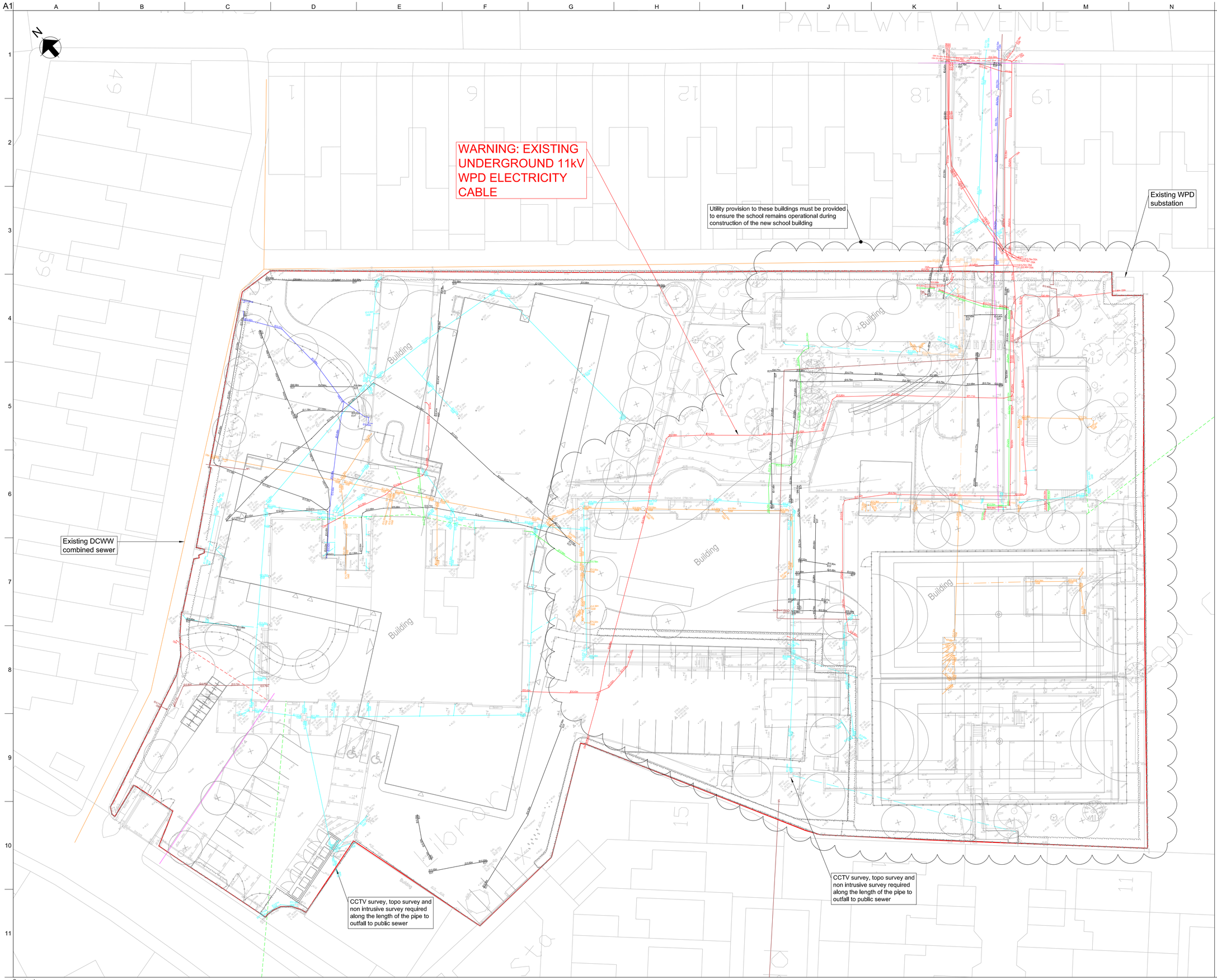
Do not scale



Legend

- Site Boundary
- Storm Sewer
- Storm Sewer (Assumed Route)
- Foul Sewer
- Foul Sewer (Assumed Route)
- Combined Sewer
- Combined Sewer (Assumed Route)
- Gas
- Gas (Assumed Route)
- Virgin
- Water
- Telecoms
- Telecoms (Overhead)
- Electric
- Electric (Overhead)
- Unknown

Notes

1. The positions of services and plant shown on this drawing are indicative only and reflect the level of information obtained from a survey carried out by 'Technics Group' in August 2019. No guarantee is given for the accuracy of this information and it is intended for general guidance only.

2. Services may exist at various depths and their routes may deviate within the vicinity of the routes shown,. The information must not be relied upon for excavation or other works. The onus of locating the services before using mechanical excavator or other plant, rests entirely upon the contractor.

3. Where utilities are indicated there may be multiple cables present.

4. Other utilities may be present underground that are not shown on this drawing. Before any works are undertaken, the contractor is to ensure they are satisfied that the works area is utility free or that any identified utility can be managed safely.

5. Contractor should review all factual information related to utilities, liaise with statutory authorities and undertake further checks and surveys to ascertain location and depth of utilities prior to undertaking intrusive, construction or diversion works.

6. Utility location and depth should be read at the appropriate accuracy in accordance with PAS128.

7. Refer to MEP drawings for the utility strategy and how the services are to be removed and at what stage of the project.

8. The existing drainage of the school site will need to be accommodated during construction. Details to be confirmed at future design stages.

Issue	Date	By	Chkd	Appd
P02	24/09/21	RL	JN	IA
Issued for RIBA Stage 3				
P01	24/05/21	DS	JN	IA
Issued for Information				

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Client
MIMWEP
Rhondda Cynon Taf County Council

Project Title
RCT Batch Primary

Drawing Title
Pontyclun
Existing Drainage and Utilities

Scale at A1	Role
1:250	Civils

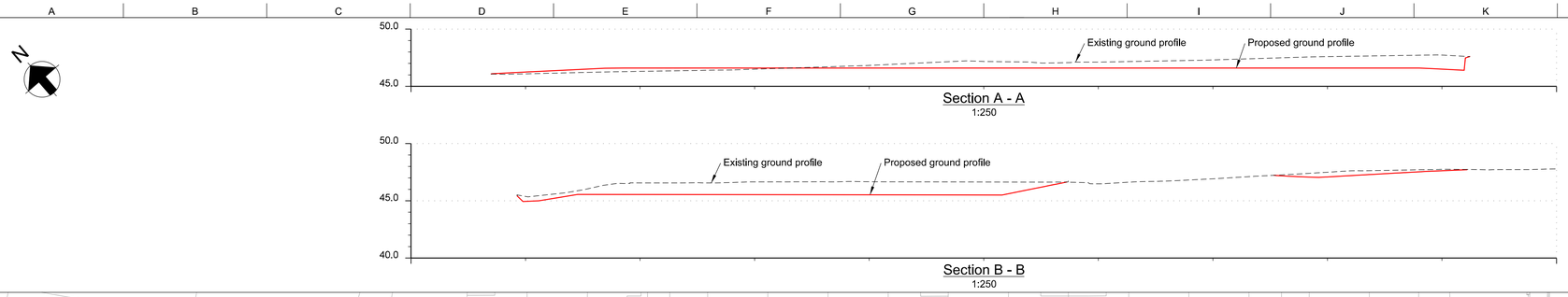
Suitability
S3- Suitable for Review and Comment

Job No	Rev
281143	P02

Drawing No
RH0201-ARP-ZZ-00-DR-C-00021

Do not scale

A1



Legend

- Site Boundary
- 47.00m — Proposed Contour
- C 0.11m — Depth of Cut
- F 0.12m — Depth of Fill
- Proposed Retaining Structure

Notes

1. Cut and fill depths shown are based on the difference between the proposed finished levels and the existing ground level.

2. All levels at the site boundary are retained at existing level.

Issue	Date	By	Chkd	Appd
P02	24/09/21	CB	JN	IA
	Issued for RIBA Stage 3			
P01	24/05/21	DS	JN	IA
	Issued for Information			

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Client
MIMWEP
Rhondda Cynon Taf County Council

Project Title
RCT Batch Primary

Drawing Title
Pontyclun
External Finished Levels

Scale at A1: 1:250 | Role: Civils

Suitability: S3- Suitable for Review and Comment

Job No: **281143** | Rev: **P02**

Drawing No
RH0201-ARP-ZZ-00-DR-C-00031

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Do not scale

A1

Legend

Site Boundary

Notes

1. Do not scale from this drawing.

2. The details shown on this drawing are based on RIBA Stage 3 produced for MIMWEP Stage 2. The details will need to be reviewed and revised during subsequent design stages.

3. The topographic survey detail shown on this drawing is based on a survey carried out by 'Technics Group' in August 2019. No responsibility can be taken for the accuracy of the survey.

4. All levels are shown above ordnance datum (m AOD).

5. The details shown on this drawing are subject to change in subsequent design stages and following any potential comments received from statutory authorities.

6. Layouts are based on conceptual layouts received from Ares on 01-09-2021 and are subject to ongoing coordination and further design development during subsequent stages.

Issue	Date	By	Chkd	Appd
P02	24/09/21	RL	JN	IA
Issued for RIBA Stage 3				
P01	24/05/21	DS	JN	IA
Issued for Information				

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www.arup.com

Client
MIMWEP
Rhondda Cynon Taf County Council

Project Title
RCT Batch Primary

Drawing Title
Pontyclun
Proposed General Arrangement

Scale at A1 1:250 | Role Civils

Suitability S3- Suitable for Review and Comment

Job No **281143** | Rev **P02**

Drawing No
RH0201-ARP-ZZ-00-DR-C-00011

J:\281\00028\143-00\4 Internal Project Data\4-00 Drawings\4-31 Issue drawings\RH0201-ARP-XX-DR-C-00011.dgn

Do not scale

A1

Palalwyf Avenue

Building

Building

Building

Building

Building

Building

Heol y Felin

Topographical survey covering Heol y Felin to allow for the site entrance design requested

46.60m

Legend

Site Boundary

Notes

1. Do not scale from this drawing.

2. The details shown on this drawing are based on RIBA Stage 3 produced for MIMWEP Stage 2. The details will need to be reviewed and revised during subsequent design stages.

3. The topographic survey detail shown on this drawing is based on a survey carried out by 'Technics Group' in August 2019. No responsibility can be taken for the accuracy of the survey.

4. All levels are shown above ordnance datum (m AOD).

5. The details shown on this drawing are subject to change in subsequent design stages and following any potential comments received from statutory authorities.

Issue	Date	By	Chkd	Appd
P02	24/09/21	RL	JN	IA
Issued for RIBA Stage 3				
P01	24/05/21	DS	JN	IA
Issued for Information				

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www.arup.com

Client
MIMWEP
Rhondda Cynon Taf County Council

Project Title
RCT Batch Primary

Drawing Title
Pontyclun
Existing Site Layout

Scale at A1 1:250

Role Civils

Suitability S3- Suitable for Review and Comment

Job No **281143**

Rev **P02**

Drawing No **RH0201-ARP-ZZ-00-DR-C-00001**

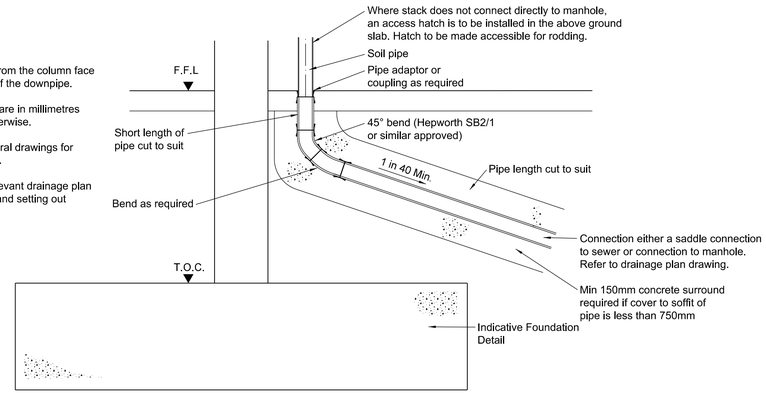
Notes:

1. All offsets are from the column face to the centreline of the downpipe.

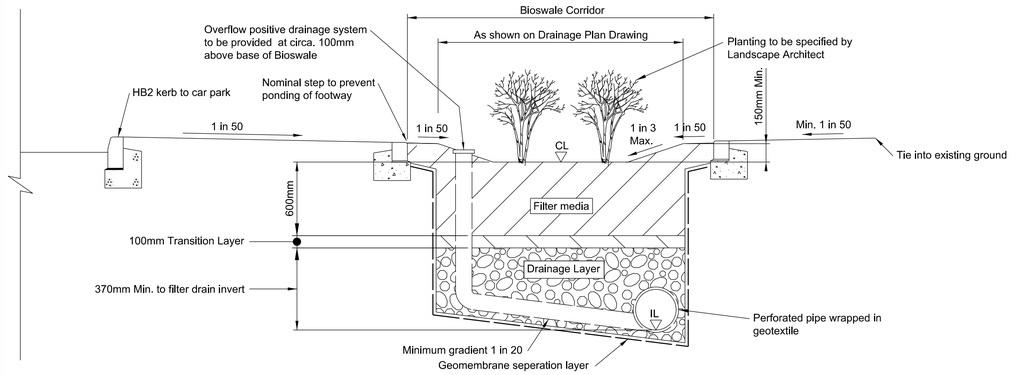
2. All dimensions are in millimetres unless shown otherwise.

3. Refer to structural drawings for foundation details.

4. Refer to the relevant drainage plan drawing for level and setting out information.



Connection Detail For Downpipes



Bioretention Feature with low planting

Scale 1:25

Notes

1. Do not scale.

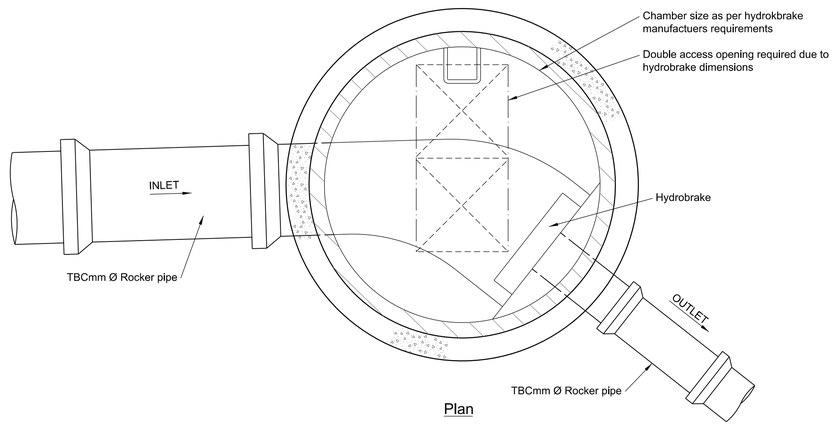
2. All levels are in metres above ordnance datum unless stated otherwise.

3. All propriety products to be installed to manufacturers requirements and specifications.

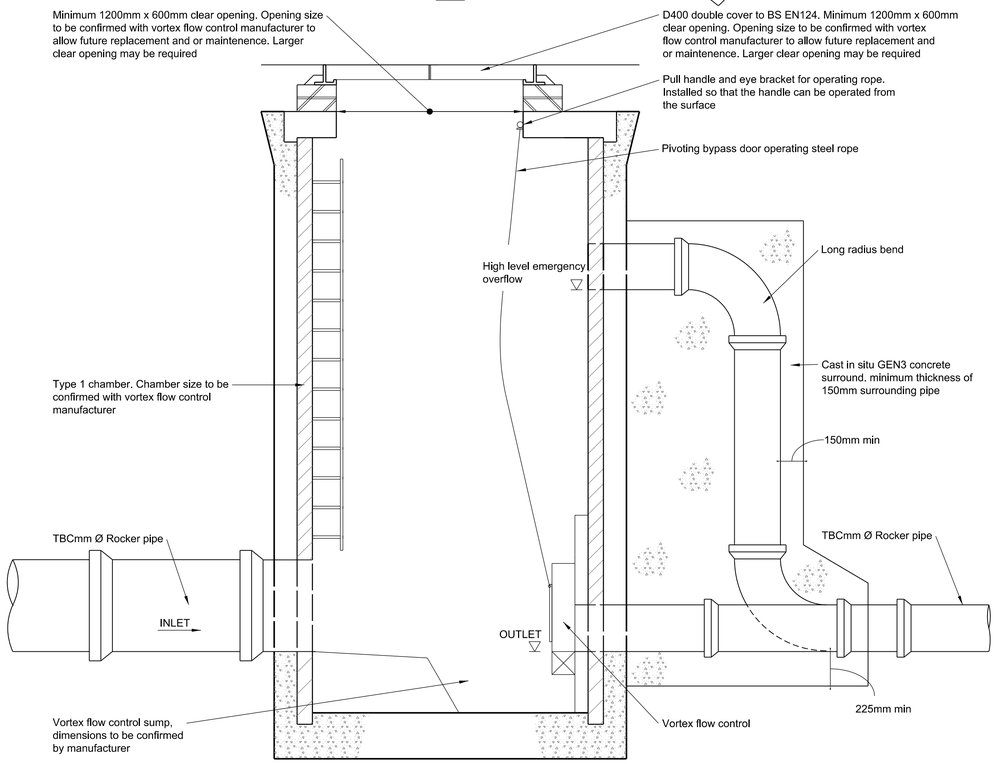
4. Drainage design and construction is in accordance with Sewers for Adoption 7th Edition.

5. The details shown on this drawing are for RIBA Stage 3. The details will need to be reviewed and revised following Full SABS.

6. Refer to drawing RH0201-ARP-0-0-DR-C-00041, RH0301-ARP-0-0-DR-C-00041 and RH04 01-ARP-0-0-DR-C-00041 for plan extents of raingarden features.

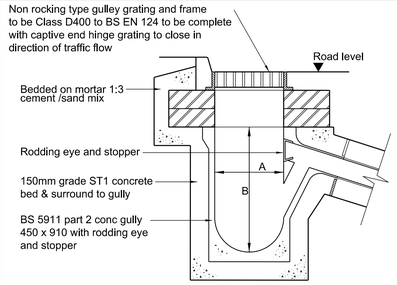


Plan

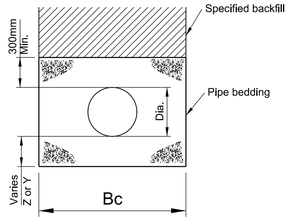


Section

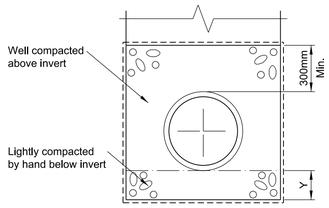
Flow Control Chamber



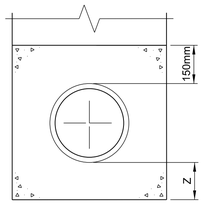
Gully Detail



	Yard Gully	Road Gully
A	300	450
B	600	750



Class S
Granular Bed and Surround
(Bedding factor 2.2)



Class Z
Concrete Bed and Surround
(Bedding factor 4.5)

Legend

- Concrete mix ST4
- Granular pipe bedding material Type 'A' (See Table A)
- Selected excavated material (Refer to specification)
- Clay (See CESWI 7, clause 2.18)

Pipe Dia. (mm)	Aggregate Size: Graded (mm)	Aggregate Size: or single sized (mm)
100	-	10
150	14 - 5	10 Or 14
225-300	14 - 5 Or 20 - 5	10, 14 Or 20
375-525	14 - 5 Or 20 - 5	10, 14 Or 20
EXCEEDING 525	14 - 5 Or 20 - 5 Or 40 - 5	10, 14, 20 Or 40

Table A - Granular pipe bedding material Type 'A'

Table of Dimensions

Letter		Pipe Sizes	Dimension (mm)
L		100 - 450	25
		525 - 900	30
Y*	Y1	100 - 150	100
		225 - 900	150
	Y2	100 - 750	200
		825 - 900	225
Z		100 - 375	100
		450 - 600	150
		675 - 900	225

* Y1 - Unifrom Soil
* Y2 - Rock

Notes:

1. All excavation in excess of Bc shall be backfilled with concrete Mix ST2.

2. Dimension Y2 shall be increased at a rate of 40mm per additional 1000mm cover to pipe in excess of 5000mm.

Pipe Dia.	Width Bc: Max.	Width Bc: Min.	Y: Y1 (Uniform soil)	Y: Y2 (Rock) *	L	Z
						Min.
100	550	450	100	200	25	100
150	600	490	100	200	25	100
225	700	580	150	200	25	100
300	750	680	150	200	25	100
375	1050	950	150	200	25	100
450	1150	1030	150	200	25	150
525	1200	1120	150	200	30	150
600	1350	1240	150	200	30	150
675	1450	1330	150	200	30	225
750	1500	1400	150	200	30	225
825	1600	1490	150	225	30	225
900	2100	1900	150	225	30	225
975	2150	1950	175	250	30	300
1050	2250	2050	175	275	30	300
1200	2500	2250	200	300	30	300
OVER 1200	Outside Dia. + 1000	Outside Dia. + 800	DIA/6	DIA/4	54	400

Table B - Trench widths and other dimesions
* See Note 2

Pipe Bedding Details

Issue	Date	By	Chkd	Appd
P01	24/09/21	RL	JN	IA

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Client
MIMWEP
Rhondda Cynon Taf County Council

Project Title
RCT Batch Primary

Drawing Title
Proposed Drainage Details
Sheet 2 of 2

Scale at A1: N.T.S
Role: Civils
Suitability: S3- Suitable for Review and Comment
Job No: 281143
Rev: P01
Drawing No: RH0101-ARP-ZZ-00-DR-C-00120

	PROPOSED HIGHWAY - ASPHALT	
LAYER	SPECIFICATION	THICKNESS (mm)
SURFACE COURSE	AC10 CLOSE SURF, PSV 65 MIN, AAV 12 MAX TO BE EN 13108-4 AND BS 594987:2015	40
BINDER COURSE	AC20 DENSE BIN 40/60 REC. TO BS594987:2015 AND CLAUSE 906 OF THE SHW	60
BASE COURSE	AC32 DENSE BASE 40/60 REC. TO BS594987:2015 AND CLAUSE 906 OF THE SHW	150
SUB BASE	TYPE 1 GRANULAR MATERIAL TO CLAUSE 803 (SPECIFICATION FOR HIGHWAY WORKS). SEE NOTE 1.	230
CAPPING LAYER	CAPPING TO CLAUSE 613 (SPECIFICATION FOR HIGHWAY WORKS). SEE NOTE 1.	380

	PROPOSED PEDESTRIAN AREA - ASPHALT	
LAYER	SPECIFICATION	THICKNESS (mm)
SURFACE COURSE	AC6 DENSE 100/150 (EXCLUDING LIMESTONE) TO BS EN 13108-1 AND BS 594987:2015 (BUFF COLOURED TO ARCHITECTS SPECIFICATION)	20
BINDER COURSE	AC 20 DENSE BIN 100/150 REC. TO BS594987:2015 AND CLAUSE 906 OF THE SHW	50
SUB BASE	TYPE 1 GRANULAR MATERIAL TO CLAUSE 803 (SPECIFICATION FOR HIGHWAY WORKS). SEE NOTE 1.	225

	PERMEABLE ASPHALT	
LAYER	SPECIFICATION	THICKNESS (mm)
SURFACE COURSE	10mm 'SUPER DRAIN ASPHALT' THIN SURFACE COURSE SYSTEM, BIN 20mm OR SIMILAR APPROVED MATERIAL	30
BINDER COURSE	14mm 'SUPER DRAIN ASPHALT' BINDER COURSE SYSTEM WITH >18% VOID CONTENT OR SIMILAR APPROVED MATERIAL	50
BASE COURSE	32mm 'SUPER DRAIN ASPHALT' BASE COURSE SYSTEM WITH >18% VOID CONTENT OR SIMILAR APPROVED MATERIAL	70
SUB BASE	TYPE 3 GRANULAR MATERIAL TO CLAUSE 805 (SPECIFICATION FOR HIGHWAY WORKS) WITH PERFORATED CARRIER DRAINS AT REGULAR INTERVALS. SEE NOTE 1.	230
CAPPING LAYER	CAPPING TO CLAUSE 613 (SPECIFICATION FOR HIGHWAY WORKS). SEE NOTE 1.	380
SUBGRADE SEPARATION	GEOMEMBRANE WRAPPED IN NON-WOVEN GEOTEXTILE. SEE NOTE 2.	-

	PERMEABLE BLOCK PAVING	
LAYER	SPECIFICATION	THICKNESS (mm)
CONCRETE BLOCKS	TBC BY ARCHITECT	TBC
LAYING COURSE	TBC BY MANUFACTURER. ASSUME 6-2mm OPEN GRADED CRUSHED ROCK WUTH 6mm JOINTS FILLED WITH CRUSHED ROCK	50
SUB BASE	TBC BY MANUFACTURER. ASSUME 20-4mm OPEN GRADED CRUSHED ROCK WITH MARSHALLS MT120 (OR SIMILAR) FILTRATION TEXTILE SEPERATING SUBBASE AND SUBGRADE	200

	FEATURE PAVING/CONCRETE BLOCKS	
LAYER	SPECIFICATION	THICKNESS (mm)
CONCRETE BLOCKS	TBC BY ARCHITECT	TBC (50mm min)
SAND-LAYING COURSE	SAND LAYING COURSE WITH SAND FILLED NARROW JOINTS IN ACCORDANCE WITH BS7533-4	50
SUB BASE	TYPE 1 GRANULAR MATERIAL TO CLAUSE 803 (SPECIFICATION FOR HIGHWAY WORKS). SEE NOTE 1.	360

	FEATURE PAVING/CONCRETE BLOCKS WITH LIGHT TRAFFICKING	
LAYER	SPECIFICATION	THICKNESS (mm)
CONCRETE BLOCKS	TBC BY ARCHITECT	TBC
SAND-LAYING COURSE	SAND LAYING COURSE WITH SAND FILLED NARROW JOINTS IN ACCORDANCE WITH BS7533-4	30
ROADBASE	AC20 DENSE BASE WITH 100 PEN. LAID IN 2 LAYERS	125
SUB BASE	TYPE 1 GRANULAR MATERIAL TO CLAUSE 803 (SPECIFICATION FOR HIGHWAY WORKS). SEE NOTE 1.	360

	PROPOSED SOFT LANDSCAPING - TO BE CONFIRMED BY LANDSACPE ARCHITECT	
LAYER	SPECIFICATION	THICKNESS (mm)
TOP SOIL	CLEAN TOPSOIL	TBC
SUB SOIL	CLEAN SUB-SOIL	TBC

	WET POUR RUBBER SURFACING	
LAYER	SPECIFICATION	THICKNESS (mm)
WET POUR	RUBBER PLAYGROUND SURFACING. REFER TO MANUFACTURER AND ARCITECT SPECIFICATION	TBC
PEDESTRAIN AREA ASPHALT	MATERIALS AS PER PEDESTRAIN AREA ASPHALT. ALL LAYERS REQUIRED	AS PED AREA ASPHALT

Legend

- Proposed Highway - Asphalt
- Proposed Pedestrian Area - Asphalt
- Permeable Asphalt
- Permeable block paving
- Feature paving/concrete block
- Feature paving/concrete block overridden by vehicular traffic (note 4)
- Proposed Landscaping (grassed areas)
- 'Wet Pour' (see note 3)

Notes

1. A design CBR value of 3% has been taken across the site. CBR to be confirmed by contractor.

2. Wrapped geomembrane used for car park areas to stop infiltration due to the potential for water seepage through the construction layer.

3. Wetpour is a rubber surfacing that is to be applied on top of the pedestrian asphalt construction build up. Refer to manufactuer and architecture specification

4. Traffic loading is to be less than 5 vehicles a day with no more than 0.5msa over the pavement lifetime

Issue	Date	By	Chkd	Appd
P01	24/09/21	IA	JN	IA

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Project Title
RCT Batch Primary

Drawing Title
Construction Build-Ups

Scale at A1 1:250 | Role Civils

Suitability S3- Suitable for Review and Comment

Job No 281143 | Rev P01

Drawing No
RH0101-ARP-ZZ-00-DR-C-00091

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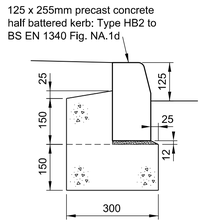
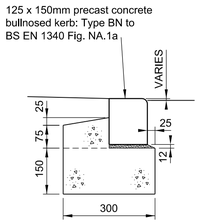
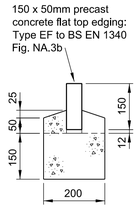


KERB TYPE HB2



KERB TYPE BN (FLUSH KERB)



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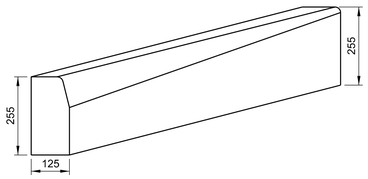
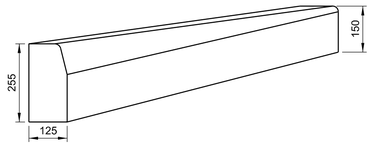
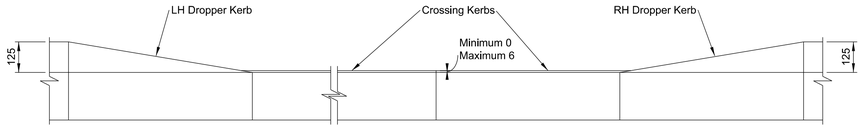


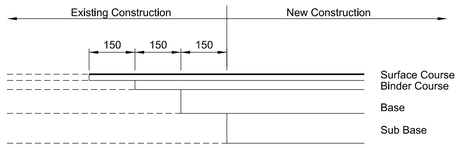
TRANSITION KERB (125x255 HB - BN)



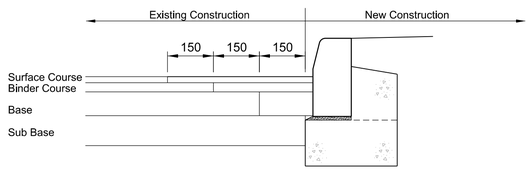
DROP KERB (125x255/150 HB - BN)



DROPPED KERB CROSSING POINT DETAIL - HALF BATTERED TO BULLNOSED



LONGITUDINAL TIE IN DETAIL

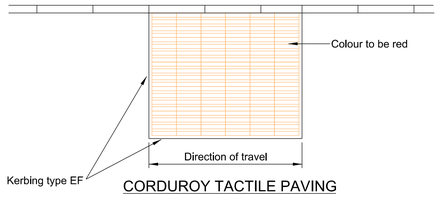


REINSTATEMENT DETAIL

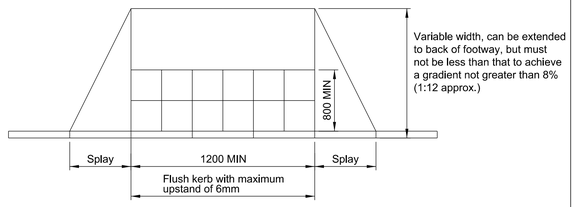
MODULE TYPE	SIZE	PITCH DIMENSION(mm)	
		A	B
A	400 x 400	66.8	33
B	450 x 450	64	33
C	200 x 133	67	33

Notes:-

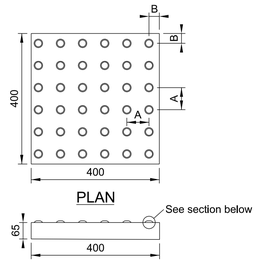
1. Textured slabs to be laid parallel to the crossing studs which may not necessarily be square to the crossing.
2. Flush kerb is type 4 dropped kerb laid flush with the carriageway surface or with a maximum upstand of 6mm.
3. Textured slabs to be coloured red at controlled crossings and buff coloured at uncontrolled crossings as detr mobility unit 'guidance on the use of tactile paving surfaces'.
4. Textured slabs to be bedded on 25mm sand bed on 100mm thick type 1 sub-base to CL 803.



CORDUROY TACTILE PAVING

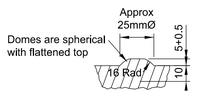


HAZARD TACTILE PAVING



PLAN

ELEVATION



BLISTER PAVING

Notes:

1. Do not scale from this drawing.

2. All dimensions are in millimetres unless noted otherwise.

Issue	Date	By	Chkd	Appd
P01	24/09/21	RL	JN	IA
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Project Title
RCT Batch Primary

Drawing Title
Construction Details

Scale at A1: NTS
Role: Civils
Suitability: S3- Suitable for Review and Comment
Job No: 281143
Rev: P01
Drawing No: RH0101-ARP-ZZ-00-DR-C-00100

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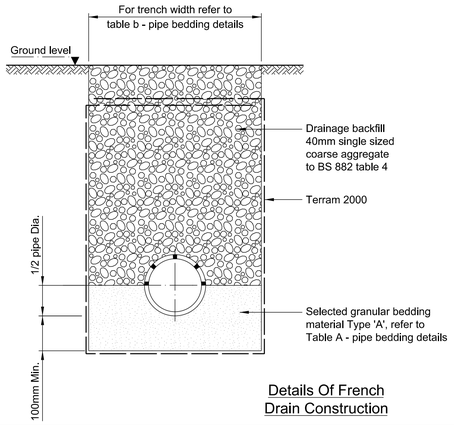
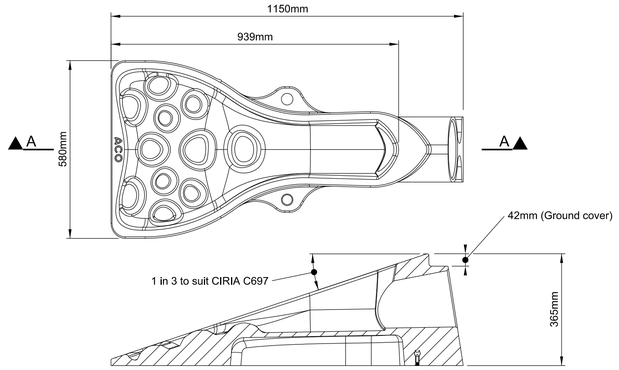


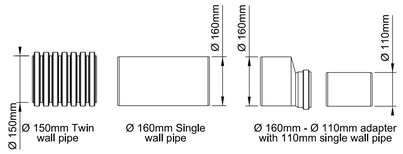
Details Of French Drain Construction

Notes

1. Top soil may be extended over the drainage stone with the engineer's approval.
2. For details of pipes refer to the layout drawings.
3. Terram 2000 to be used to surround backfill as specified by the engineer.
4. All dimensions are in mm.
5. Filter drain detail as existing. To be confirmed on site.



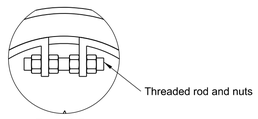
SECTION A-A



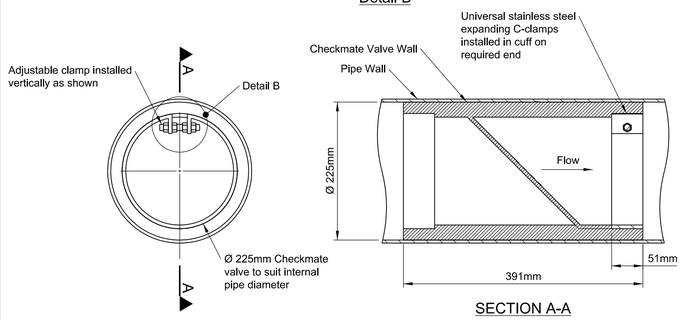
Notes

*Grating kit contains 1 x Grade 304 Stainless Steel mesh grating (mesh size is 42mm), 3 x anchors, 3 x washers and 3 x fixing screws
+ Ground Anchor kit contains 2 x ground anchors, 2 x washers and 2 x bolts

ACO Swale Inlet



Detail B



SECTION A-A

In-Line Non-Return Valve
Althon Checkmate or Similar Approved

Notes

1. Clamp installed in upstream or downstream cuff depending on installation orientation.
2. Shorter lengths available.

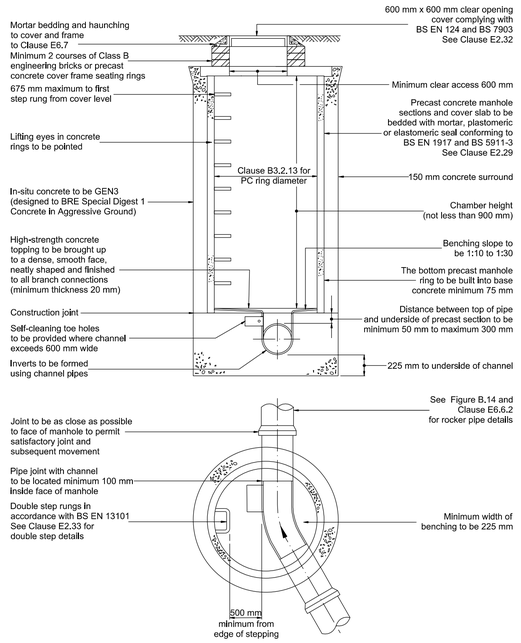


Figure B.12
Typical Manhole Detail - Type 2
Maximum depth from cover level to soffit of pipe 3.0 m

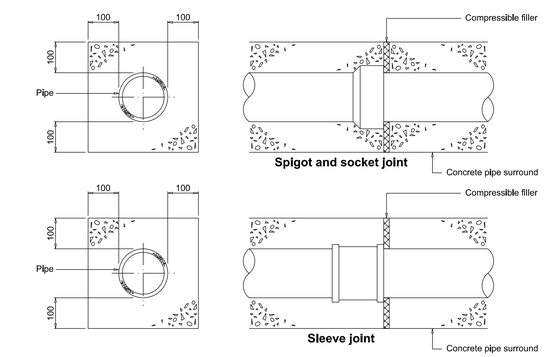
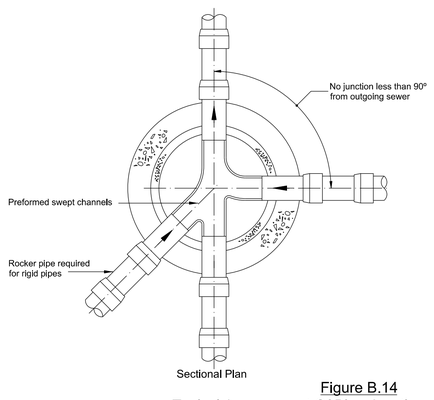


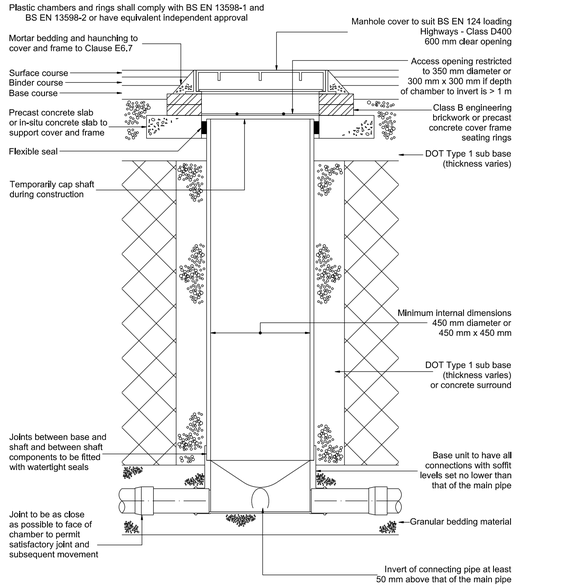
Figure B.26
Joints For Concrete Encased Pipes



Nominal diameter (mm)	Maximum effective length (m)
150 - 600	0.6
601 - 750	1.00
over 750	1.25

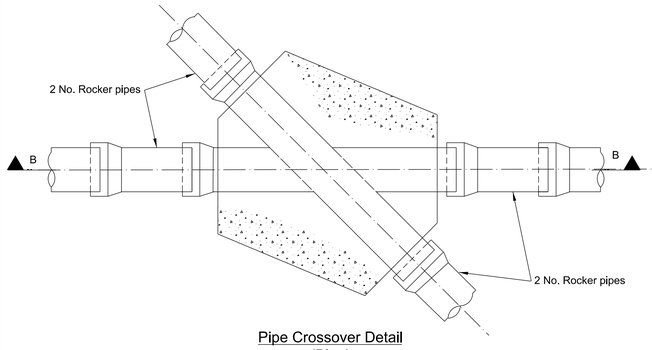
Table 1-Rocker Pipe Lengths

Figure B.14
Typical Arrangement Of Pipe Junctions Within Manholes

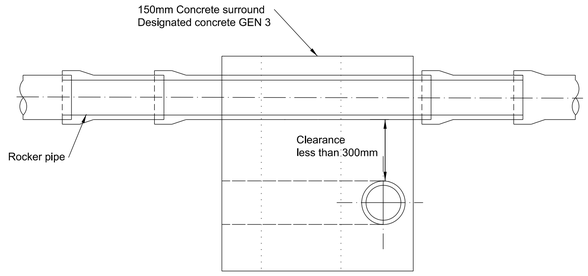


Note: Where the access chamber is in the highway the Highway Authority can have specific requirements

Figure B.16
Typical Inspection Chamber Detail - Type 3 (Flexible Material Detail)
Maximum depth from cover level to soffit of pipe
in areas subject to vehicle loading 3 m, non-entry



Pipe Crossover Detail
(Plan)



Section B-B
Pipe Crossover Detail

Notes

1. Do not scale.
2. All levels are in metres above ordnance datum unless stated otherwise.
3. All propriety products to be installed to manufacturers requirements and specifications.
4. Drainage design and construction is in accordance with Sewers for Adoption 7th Edition.
5. The details shown on this drawing are for RIBA Stage 3. The details will need to be reviewed and revised following Full SAB process.

Issue	Date	By	Chkd	Appd
P01	24/09/21	RL	JN	IA
Issued for RIBA Stage 3				

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Project Title
RCT Batch Primary

Drawing Title
Proposed Drainage Details
Sheet 1 of 2

Scale at A1 N.T.S | Role Civils
Suitability S3- Suitable for Review and Comment
Job No 281143 | Rev P01
Drawing No RH0101-ARP-ZZ-00-DR-C-00110

Appendix C

Hydrology Calculations

File Note

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Project title	RCT 3 Primary Batch	Job number	281143
cc		File reference	4-20
Prepared by	Jim Newbold (Cardiff)	Date	6th October 2021
Subject	Hydrology Calculations – Pontyclun Primary		

1 Introduction

This technical note outlines the hydrological calculations to determine the existing and proposed discharge rates for Pontyclun Primary School and estimate the storm water attenuation volume required.

Hydrological analysis has been undertaken on the existing catchments to inform the storm flows generated from the existing development. The proposed allowable discharge rate leaving the site has been investigated with two calculation methods explored:

1. Restricting the impermeable area outflow (up to the 1:100-year event plus 40% climate change) to the 1:1 year Greenfield Runoff Rate (GRR);
2. Restricting the proposed impermeable area flow (up to the 1:100-year event plus 40% climate change) to 70% of the existing 1:1 year brownfield rate (providing 30% betterment on the 1:1 year storm event and more for higher events).

Both methods offer a reduction in the flow leaving the site compared to the existing situation and therefore will reduce the risk of flooding in the receiving pipe network (network to be determined through further investigation).

The restricted water will need to be stored on site and the method used to calculate the allowable discharge will directly impact the attenuation volume.

2 Existing Storm Drainage

Topographical, drainage and utility surveys were undertaken for the site by Technics Group Ltd between August and September 2019. These surveys have been used to assess and understand the existing drainage within the site.

A significant proportion of the existing site is impermeable with the land use being either buildings or asphalt surfaces for carparking, playgrounds etc. The rainwater falling on these impermeable areas is captured either through roof gutter/downpipe, gullies or channel drainage and is then piped to a network outside of the site boundary.

Figure 1 below shows the assumed existing storm drainage scenario for the site.

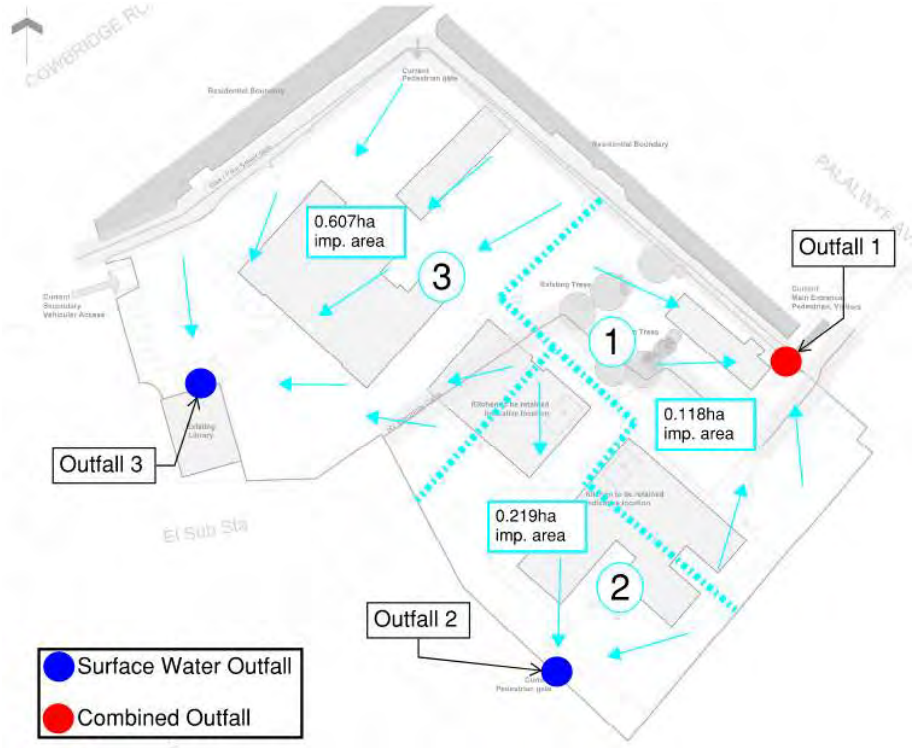


Figure 1: Pontyclun Primary School existing catchment plan – informed by topographical survey carried out by Technics Group Ltd between August and September 2019.

The site is split into three storm water catchments. Outfall 1 drains to the north eastern corner of the site via a combined network, Outfall 2 to the southern corner and Outfall 3 to the western corner of the site.

The catchment for Outfall 1 comprises of hardstanding and a number of the building downpipes that drain to the outfall point through a combined sewer, which outfalls to the 225mm DCWW combined sewer running along the northern perimeter of the site.

The western catchment exits the site boundary just west of the existing library (Outfall 3) and the south eastern catchment exits to the site in the direction of Fford Talygarn (Outfall 2). The destination of these pipes however is unknown as the DCWW sewer maps indicate no combined or

storm sewer in Heol y Felin or Fford Talygarn. Further investigation is required to determine where these pipes outfall.

There is a grassed area on the eastern part of the site and it is assumed that the rainwater either percolates into the ground locally or runs overland to the adjacent impermeable area where it is collected in the site internal drainage network. There is a small pond in this area that does not appear to connect to the drainage network. It is unknown if this is lined.

It is assumed that no significant flow enters the site overland from the surrounding areas. The general topography runs from north east to south west and although there is a narrow lane directly adjacent to the northern boundary, beyond the lane are residential property gardens.

3 Calculated discharge rates from the existing site

The greenfield runoff rate and the brownfield runoff rate have been determined for the site. The existing drainage networks have been modelled on each site to inform the brownfield runoff.

3.1 Greenfield Runoff Rate Calculation

The Greenfield Runoff Rate (GRR) is the flow rate that stormwater from the site would discharge if it was undeveloped. The GRR for the Qbar, 1:1 year, 1:30 year and 1:100-year event have been calculated for the site using the ICP SuDS method. This is an industry standard method to estimate the GRR based on the Institute of Hydrology 124 (IoH124) method. The results are given in Table 1 below.

Table 1: ICP SuDS Method Results

	Greenfield Runoff Rate (l/s/ha)
1:1-Year	3.6
1:30-Year	7.2
1:100-Year	8.9
Qbar	4.1

3.2 Brownfield Runoff Rate

Microdrainage was used to model the existing site storm drainage network for the development, based on the topographical and utilities information. The flow rates have been assessed for both the 1-year and 100-year storm events.

Table 2 shows the measured impermeable areas for each of the existing site catchments (as denoted in Figure 1 previously), as well as the 1-year and 100-year flows from the model outputs. The results showed that no flooding occurred for the 1-year event on the sites, with the 100-year flooded volume for each catchment shown in the table.

Table 2: Existing Storm Water Runoff Flows					
Catchment	**Estimated Impermeable Area (ha)**	**Indicative Estimated 1-Year Flow (l/s)**	**Indicative Estimated 100-Year Flow (l/s)**	**1-Year Flooded Volume (m3)**	**100-Year Flooded Volume (m3)**
Outfall 1	0.118	11.9	29.3	0	1
Outfall 2	0.219	24.2	43.7	0	16
Outfall 3	0.607	30.1	50.7	0	86
TOTAL	0.944	66.2	123.7	0	103

It is assumed that the green areas on the site do not enter the drainage network. It is likely therefore that these figures are an underestimate.

4 Proposed storm drainage strategy

A positive drainage network is proposed to serve the school building and the associated impermeable areas. Areas of landscaping and green spaces will not be positively drained as it is assumed that the majority of runoff will locally percolate into the ground or run over land to an area which it can percolate or into a positively drained impermeable area.

Although the site comprises of new built development, the existing school buildings and portions of the associated hardstanding will be demolished and broken out. Some of these areas will be replaced with permeable surfaces.

Figure 2 below shows the proposed drainage strategy for the site. It is proposed to discharge to, and reuse, the existing outfalls 2 and 3.

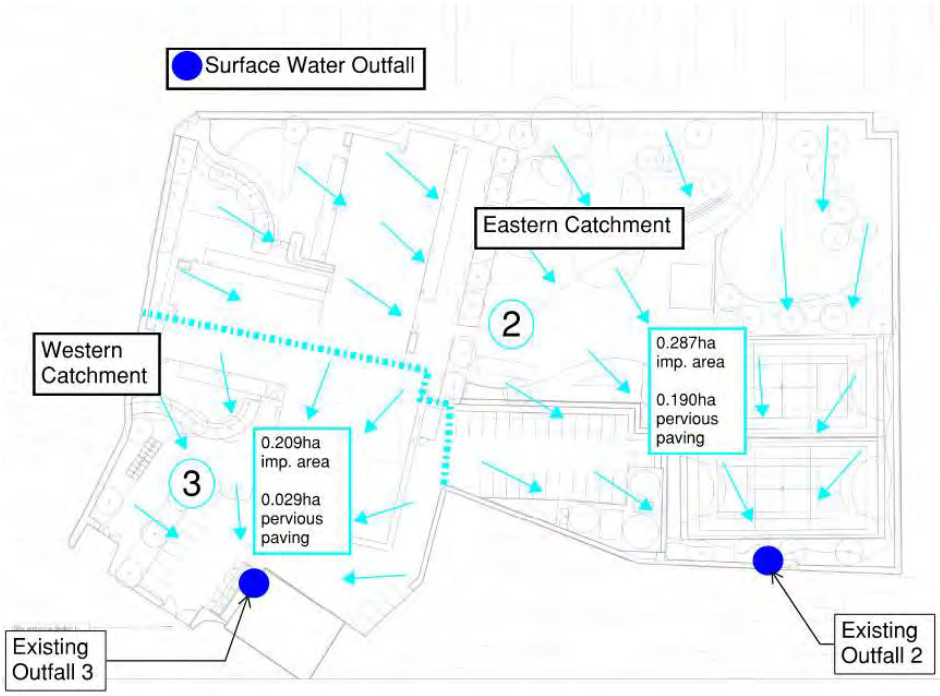


Figure 2: Pontyclun Primary School proposed drainage catchment plan

Figure 3 and table 3 below show the comparison of impermeable/permeable area in the existing case and the proposed case for each proposed catchment.

Figure 3: Pontyclun Primary School impermeable area plan

Table 3: Existing Impermeable Area versus Proposed Impermeable Area			
Site	**Existing Impermeable Area (ha)**	**Proposed Impermeable Area (ha)**	**Proposed Pervious Pavement (ha)**
Outfall 1	0.118	0	0
Outfall 2	0.219	0.209	0.029
Outfall 3	0.607	0.287	0.190
TOTAL	0.944	0.496	0.219

The proposed contributing catchment is predominantly impermeable although the total impermeable area has been reduced from the existing situation. As the existing site is assumed to be unattenuated, reducing this area will provide benefit to the receiving network.

5 Proposed Hydraulic Control

The two scenarios below have been considered to estimate the flow restrictions for the proposed sites. The two methods were discussed with the SAB.

1. Restricting the proposed impermeable area outflow (up to the 1:100 year event plus 40% climate change) to the 1:1 year Greenfield Runoff Rate (GRR);
2. Restricting the proposed impermeable area outflow (up to the 1:100 year event plus 40% climate change) to 70% of the existing 1:1 year brownfield rate (providing 30% betterment on the 1:1 year storm event and more for higher events).

It was agreed in principle that restricting the proposed outflows to 70% of the existing 1:1 year brownfield rate would be a suitable approach to ensure a reduction in the flow leaving the site compared to the existing situation and therefore a reduction in the risk of flooding in the receiving pipe network. Moreover, the following estimates for required attenuation volumes have been calculated on the basis of restricting the proposed flows to 70% of the existing 1:1 year brownfield rate.

5.1 Attenuation Estimates

Restricting the flow rate to 70% of the 1-year existing discharge rate would be achieved by throttling the flows within the drainage network and providing attenuation storage.

It is proposed to place this restriction on all flows up to and including the 1:100-year event, with suitable allowance for climate change. The National Planning Policy Framework (NPPF) sets out how the planning system should minimise vulnerability and provide resilience to the impacts of climate change. Table 2 within the guidance shows the potential peak rainfall intensity change anticipated for different time intervals. It is recommended to use the upper end allowance, which for a 100-year event is a 40% increase in the peak rainfall intensity.

The discharge restrictions for the proposed site have been calculated and an indicative estimate of required attenuation volumes has been made by modelling the proposed network in Microdrainage.

Table 4 below shows the allowable discharge rates and attenuation volume estimates, along with the impermeable area for each catchment. The areas of porous paving have been included in the impermeable area figures for the estimates to allow a conservative approach to be taken.

Table 4: Attenuation modelling estimates for restriction to 70% of 1:1-Year Flows

Site	Proposed Impermeable/Permeable Area (ha)	Proposed Discharge Rate (l/s)	Required Attenuation Volume (m^3)
Outfall 1	0	0	0
Outfall 2	0.477	16.9	290
Outfall 3	0.238	21.0	30
TOTAL	0.715	37.9	190

As shown in Tables 2 and 4, the flows to Outfall 1 from the site will be completely removed, whilst flows to Outfalls 2 and 3 will be reduced by 30% in the 1-year event and by up to 55% in the 100-year event (+ 40% climate change), therefore representing a significant reduction in total discharge rate for the site.

The figures above represent the total amount of storage volume required to be included through dedicated attenuation features such as basins and cellular storage as well as the volume provided by the porous MUGA. 130m^3 of storage volume is proposed in the MUGA and 190m^3 storage is provided by the attenuation basin and attenuation cells.

Additional storage volumes provided by the smaller areas of porous car park have not been modelled at all currently and so may further reduce the estimates for required volumes of dedicated storage in future design stages.

6 Conclusion

A positive storm drainage system is required to serve the new school building and associated impermeable hardstanding.

For the existing school site, greenfield runoff rates and brownfield rates have been calculated. The greenfield run off rate has been calculated for each site using the ICP SuDs methods for the 1-year, 30-year, 100-year and Qbar return periods. The existing school site has an existing drainage network and this has been modelled in Microdrainage to determine estimated brownfield rates.

For the proposed development, it is assumed that rainfall on the green landscaped areas will either percolate into the ground or runoff overland to a location where it can percolate to ground, to the receptor it currently reaches or into the positively drained network for the impermeable area. The desire is to retain the existing regime of the green areas where possible and for the new green areas, slope these to direct the runoff to an appropriate receptor.

When determining the appropriate discharge rate for the impermeable areas leaving the site, two runoff scenarios have been explored.

1. Restricting the impermeable area outflow (up to the 1:100 year event plus 40% climate change) to the 1:1 year Greenfield Runoff Rate (GRR);
2. Restricting the proposed impermeable area flow (up to the 1:100 year event plus 40% climate change) to 70% of the existing 1:1 year brownfield rate (providing 30% betterment on the 1:1 year storm event and more for higher events).

The site has been previously developed and the proposed impermeable area is similar to the existing impermeable area, therefore it is proposed that impermeable area flow (up to the 1:100 year event plus 40% climate change) is restricted to 70% of the existing 1:1 year brownfield rate, as per Scenario 2 above.

On this basis, a Microdrainage model of the proposed drainage network for the site was built and attenuation volumes were estimated for each catchment.

It was found that a total of 190m^3 of dedicated attenuation features, such as swales and basis, will be required in addition to the 130m^3 storage volume provided by porous surfacing features.

Appendix D

DCWW Pre-planning response and correspondence

Dŵr Cymru
Welsh Water

Developer Services
PO Box 3146
Cardiff
CF30 0EH

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

Gwasanaethau Datblygu
Blwch Post 3146
Caerdydd
CF30 0EH

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

Mr Jim Newbold
Arup
4 Pierhead Street
Cardiff
Glamorgan
CF10 4QP

Date: 24/05/2021
Our Ref: PPA0005706

Dear Mr Newbold,

Site Address: Pontyclun Primary School, Palalwyf Avenue, Pontyclun
Development: Redevelopment of existing school

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

APPRAISAL

Firstly, we note that the pre-planning enquiry proposes the redevelopment of the existing school comprising 570 pupils and 49 staff (whereas the existing currently is 498 pupils with approximately 45 staff). Whilst it does not appear an assessment has been previously undertaken of the public sewerage system; we offer the following comments as part of our appraisal of this development.

Please note, notwithstanding the following assessment, we would advise there is also a mandatory requirement to undertake pre-application consultation with all 'Specialist Consultees', including Dwr Cymru Welsh Water as the statutory water and sewerage undertaker, in accordance with Schedule 4 of Town & Country Planning (Development Management Procedure) (Wales) (Amendment) Order 2016. As a major development, amounting to more than 1000 sqm, you will be statutorily required to consult Welsh Water and a substantive response will be issued within 28 days from the date of the notice as per the requirements of Article 2E.

Public Sewerage Network

The proposed development site is located in the immediate vicinity of a foul water and combined sewerage system, which drains to Coslech Wastewater Treatment Works.

The proposed development site is crossed by a public sewer with the approximate position being marked on the attached Statutory Public Sewer Record. Under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times. No part of any building will be permitted within 3 metres either side of the centreline of the 225mm public combined sewers.

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

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

Surface Water Drainage

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

In addition, please note that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system. Please refer to further detailed advice relating to surface water management included in our attached Advice & Guidance note.

Foul Water Drainage – Sewerage Network

We have considered the impact of foul flows generated by the proposed development and concluded that the additional flows can be accommodated within the public sewerage system. We advise that the flows should be connected to either the 225mm combined sewer at or downstream of manhole ST03814102 and manhole SST03815202 located to the North West of the school or connected to the 225mm combined sewer at or downstream of manhole ST03816106 and manhole SST03815202 located along the to the North East boundary of the school.

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

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

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

SEWAGE TREATMENT

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

WATER SUPPLY

A water supply can be made available to service this proposed development. Initial indications are that a connection can be made from the 80mm diameter watermain in NGR 303581,181154. The cost of providing new on-site watermains can be calculated upon the receipt of detailed site layout plans which should be sent to the above address.

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

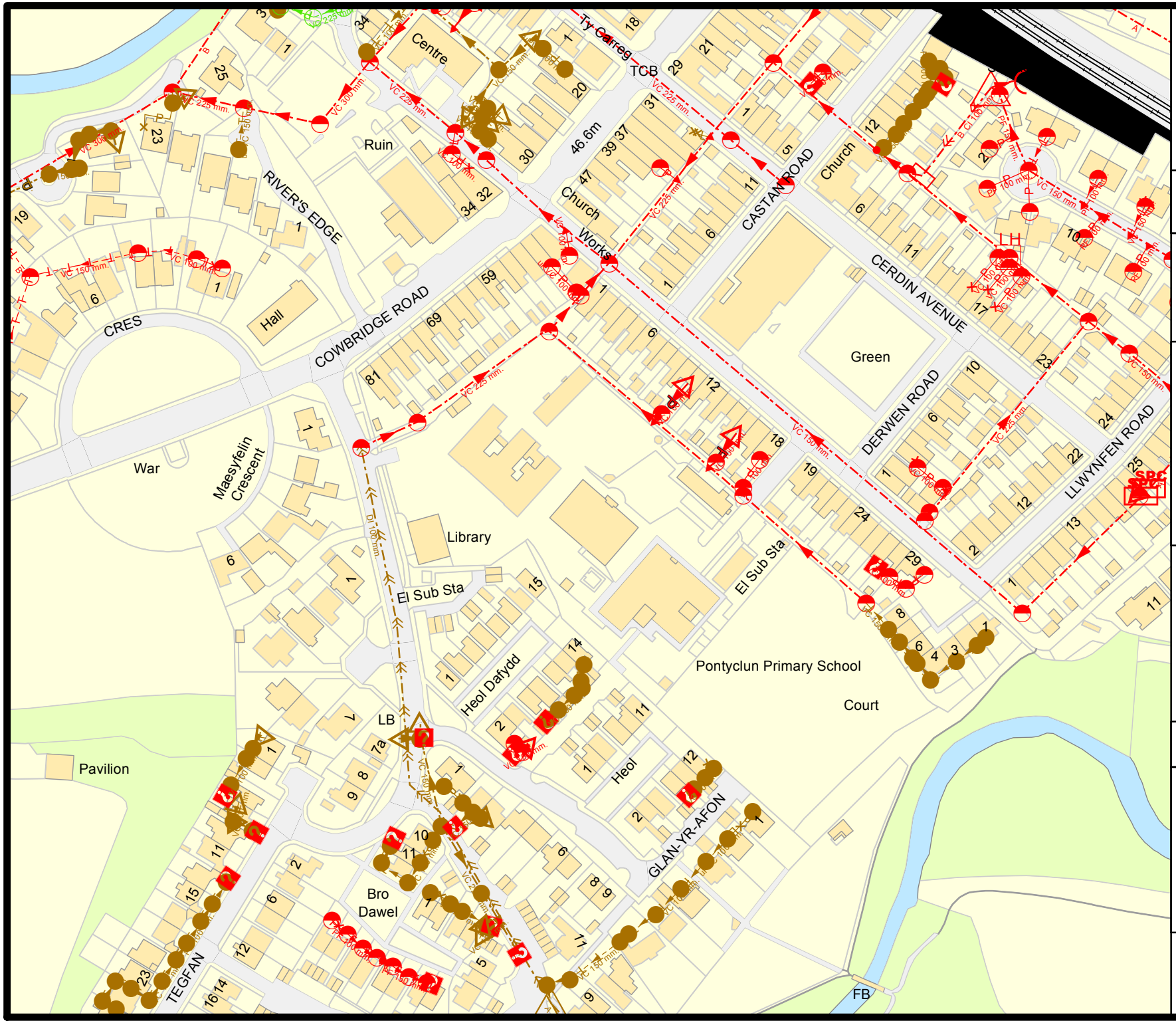
Please note that our response is based on the information provided in your enquiry and should the information change we reserve the right to make a new representation. Should you have any queries or wish to discuss any aspect of our response please do not hesitate to contact our dedicated team of planning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

Please quote our reference number in all communications and correspondence.

Yours faithfully,

Owain George
Planning Liaison Manager
Developer Services

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



[redacted]

sewer plan PPA0005706

[redacted]

LEGEND(Representative of most common features)

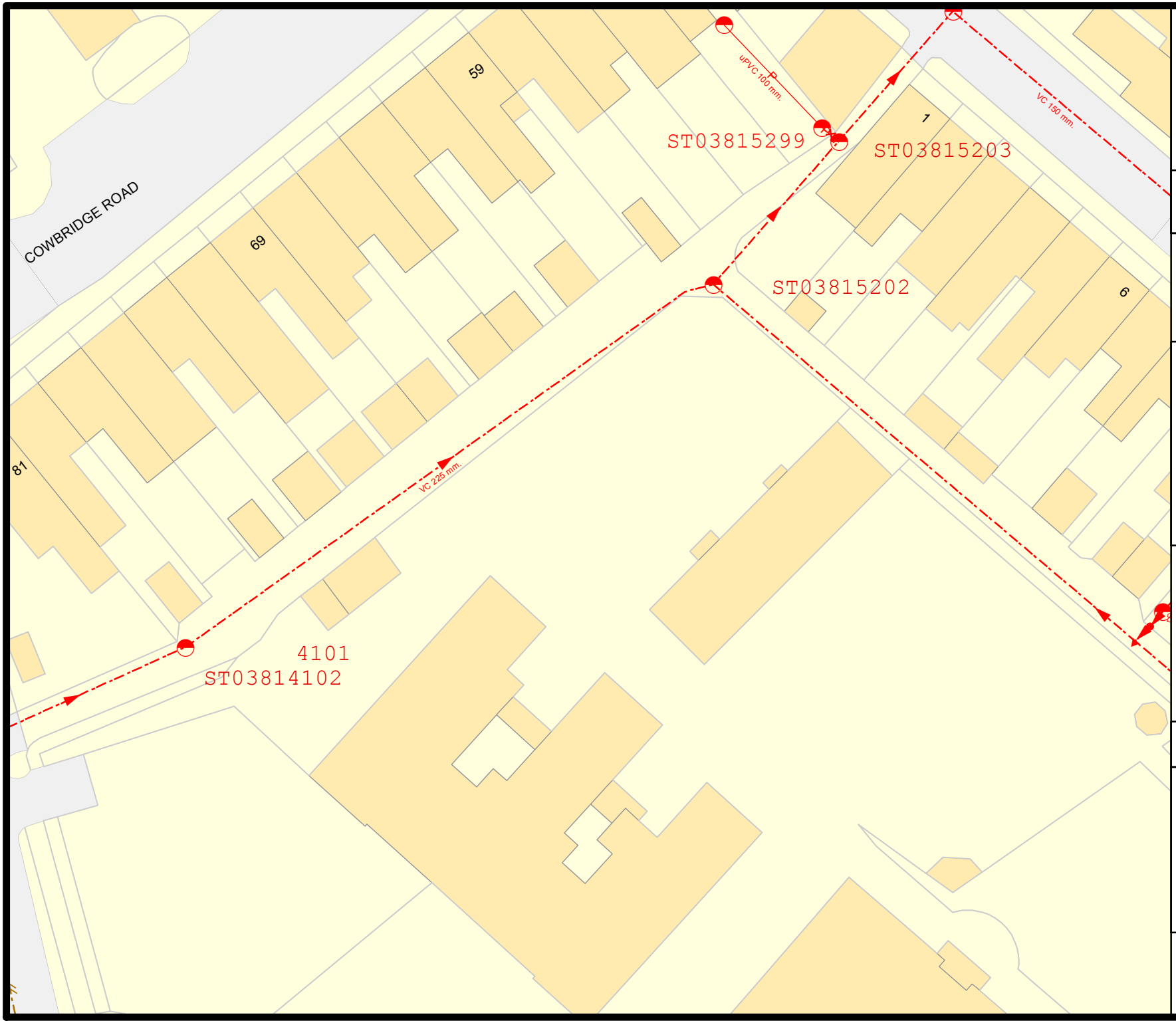
[redacted]

Notes:

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

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

Map Ref:	303518,181146
Map scale:	1:2000
Printed by:	Natalie Walmsley
Printed on:	25 May 2021



[redacted]

ST03814102 to ST03815202

[redacted]

LEGEND(Representative of most common features)

[redacted]

Notes:

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

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

Map Ref:	303490,181194
Map scale:	1:500
Printed by:	Maria Evans
Printed on:	18 Aug 2021

Appendix E

Initial SAB Consultation

RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

Sustainable Drainage Approval Body

Pontyclun Primary School

Pre-Application Strategy Review Report

August 2021

ANDREW STONE
Strategic Projects Manager
Strategic Projects, Sardis House, Sardis Road, Pontypridd, CF37 IDU

NIGEL WHEELER
Group Director
Prosperity, Development and Frontline Services, The Pavilions, Clydach Vale, CF40 2XX

RHONDDA CYNON TAF

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RHONDDA CYNON TAF

DOCUMENT VERIFICATION

Applicant	Ian Amos on behalf of Arup
Site Name	Pontyclun Primary School
Document Title	Pre-Application Strategy Review Report
Document Ref	SR – 21 – RCTSAB125-001-PA

Revision Status	FINAL
Date of Issue	August 2021
Prepared by	Liam Swanwick BSc (Hons), MSc
Checked by	Jack Price BSc (Hons)
Approved by	Owen Griffiths BSc (Hons), MSc

This report should only be used in its entirety.

This report is confidential to the Client. Strategic Projects accepts no responsibility to third parties to whom the report, or any part thereof, is made known. Any such party using any information contained within the report do so at their own risk.

RHONDDA CYNON TAF

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CONTENTS

1 INTRODUCTION

1.1 PURPOSE OF THE REPORT

The purpose of the report is to undertake an appraisal of the site and assess the overall strategy of an application 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 applicant proposes to construct a new school building with associated play areas, car parking and MUGA. The footprint of the new building and hardstanding are generally situated on the western area of the site, whilst the landscaped and MUGA pitches are to be on the eastern extent.

1.3 SUSTAINABLE DRAINAGE PROPOSAL

An unknown extent of runoff from the school building roof is to drain to a rainwater harvesting tank 80m^3 in volume, and therefore utilise rainwater as grey water for flushing toilets.

All areas of the roof that do not drain to the harvesting tank are intended to drain to a rain garden. The strategy notes where rain gardens are not possible, surface water runoff will be collected via rainwater pipes, combined kerb drainage, gullies, linear kerb drainage or permeable paving. Of note, the drainage layout is not exactly clear where runoff will exactly drain to from the roof, access road or pedestrian footpaths.

Car parking spaces and aisles are to be of permeable construction, and therefore will percolate through the pavers and either infiltrate to ground or be collected and convey to the proposed drainage system.

The Multi-Use Games area (MUGA) is to be of permeable construction, and therefore will percolate through the pavers and either infiltrate to ground or be collected and convey to the proposed drainage system.

The drainage proposal intends to utilise the two existing outfalls on the southern boundary and discharge at a restricted rate in comparison to the existing.

For the outfall on the south western boundary (Heol Yr Felin), attenuation is proposed via sub-base of the permeable paving and attenuation cells.

For the outfall on the south eastern boundary (Fford Talygarn), attenuation is proposed via a dry attenuation basin and sub-base of the MUGA pitches.

1.4 Site Location

The land to be developed lies at the existing Pontyclun primary school off Palalwyf Avenue, Pontyclun, CF72 9EG.

1.5 Submitted Documentation

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

- Pre-App Application Form
- SAB pre preapp
- Pontyclun Primary School GI
- Pontyclun drawings
- Hydrology Calculations Technical Note
- ALA679SK016 Pontyclun - Sketch plan CEM6

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 primary school, associated hardstanding and playing field.

2.3 EXISTING SITE DRAINAGE

The applicant commissioned Technics Group to asses and establish the existing drainage on site.

As stated above, the existing site comprises of the existing school buildings, hardstanding for car parking and playgrounds. Hardstanding areas are drained via roof gutters, gullies or channel drainage. Following a non-intrusive survey, it was identified that the site is split into three catchments.

Catchment 1 is the smallest of the three catchments and is 0.118ha in impermeable area, comprising of buildings and car parking. Outfall to catchment 1 is situated on the north eastern corner and conveys to a combined sewer which subsequently outfalls to a 225mm DCWW combined sewer.

Catchment 2 is 0.219ha in impermeable area and comprises of buildings and hardstanding play areas. This outfall is situated at the south eastern boundary, but the exact nature of the outfall is unknown.

Catchment 3 is the larger of the three catchments and is 0.607ha in impermeable area and comprises of buildings and car parking. This outfall is situated at the south western boundary, but the exact nature of the outfall is unknown.

There is a grassed area on the eastern extent of site, but positive drainage does not serve this area. Therefore, it is assumed runoff percolates to ground or sheds with the contours of the land. Of note a pond is located on the site, but its function is unknown. This may drain the grassed area.

2.4 Flood Risk Review

Following a review of the Development Advice Map, it was found that the site does not lie within a Tan15 C1 or C2 zone.

The risk of surface water flooding has been investigated utilising Natural Resources Wales' Flood Risk Assessment Wales maps. The results of which have identified that the entirety of the site lies outside of the flood risk extents from surface water and ordinary watercourses.

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.

A 225mm vitrified clay combined sewer conveys immediately beyond the northern perimeter of the site in a north westerly direction.

A 225mm vitrified clay combined sewer conveys immediately beyond the western perimeter of the site in a north easterly direction.

2.8 Ordinary Watercourses

No known ordinary watercourses lie within the boundary of the site.

2.9 Main River

No main river lies within the boundary of the site. A main river named River Clun lies approximately 100m south east from the site boundary.

2.10 Assets

There are no known land drainage assets situated within the boundary of 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.

Criteria	Information/ documentation	Provided (Y/N)	Required? (Y/N)
A Site Plan	Construction area extent (1:2500 scale)	Y	Y
	Extent of Drainage system	Y	Y
	Location Plan	N	Y
General documentation	EIA Statement	N	N
	Drawing Issue Sheet	N	Y

Table 1. General documentation required for the Full Application

3.2 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. However, the applicant must provide a plan illustrating the construction area, preferably in AutoCAD form in which the SAB can determine an exact construction area and associated cost.

Criteria	Estimated construction area (m^2)	Required Fee (£)	Comments
Application fee	11,500	990	Applicant needs to define construction area.

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

5 COMPLIANCE WITH NATIONAL STANDARDS

5.1 STANDARD S1 - SURFACE WATER RUNOFF DESTINATION

Priority 1 – The drainage proposal includes water re-use on the site via a rainwater harvesting tank. Although the extent of roof to drain to the rainwater harvesting tank has not been provided, preliminary size of the tank is to be 80m^3 which would serve the school building and provide grey water for the toilet. It is considered that the implementation of this tank would maximise priority level 1, but discharge at a lower priority level will be required.

Priority 2 – The current drainage proposal does not include for runoff to be discharged wholly via infiltration. Whilst infiltration testing has not been undertaken, various constraints on the site including close proximity to buildings, a HV cable that crosses the site and shallow groundwater levels result in difficulty to drain all runoff from site via infiltration.

A ground investigation was undertaken by HSP. Ground conditions were varying across the site but generally found hardstanding underlain by made ground to a thickness of 0.8mbgl overlying glacial till. Groundwater strikes were encountered within majority of holes in the glacial till at a depth of between 2.10 and 3.0mbgl. Groundwater monitoring over a period of time found varying levels of between 1.4m and 2.15mbgl.

Whilst the above would indicate infiltration is not a viable route to discharge all runoff, it is considered that there is potential for losses via infiltration i.e. dry basin, bioretention areas or permeable surfaces and would recommend infiltration testing to be undertaken to establish the potential of this. HSP also state in their GI that infiltration drainage may be possible on site.

Priority 3 – There are no surface water bodies on or in close proximity to the site, and therefore priority level 3 cannot be achieved.

Priority 4/5 – The drainage proposal is to discharge to existing connections on the southern boundary as it does currently, but at a restricted rate in comparison to the existing which is stated to be unattenuated. This is currently regarded as priority level 4 or 5 as whilst outfall 1 has been confirmed to be a DCWW combined sewer, outfall 2 and 3 remain unknown. As stated above, whilst the SAB would look for partial

infiltration where possible to allow for losses to ground, it is considered the proposed destination is suitable.

Whilst it is noted existing connections are to be utilised and a significant betterment provided, it is recommended that should the Heol Yr Felin or Fford Talygarn outfalls convey or be identified as a DCWW system, then DCWW are contacted prior to the submission of the full application to ensure confidence of DCWW accepting such flows.

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

Table 3. Primary and secondary destination of surface water runoff

It should be noted that SAB approval does not provide the right to connect into DCWW apparatus. The right to connect must be secured from DCWW.

In summary, the proposed design **does not include sufficient information to ascertain compliance** with Standard S1.

A likely compliance with Standard S1 can be achieved through the inclusion of the 'further information required' outlined below. However, **compliance is dependent on the quality of the information that is provided** and cannot be guaranteed without appropriate evaluation of the additional documentation.

Further information required

Please see Table 4 which summarises the documentation required to satisfy standard S1. As a result of the sites previous use, evidence will have to be provided to demonstrate that infiltration is not feasible via BRE365 testing and must demonstrate that if infiltration is proposed, that it will not a pollution risk to groundwater.

Criteria	Information/ documentation	Provided (Y/N)	Required? (Y/N)
Standard S1	Detailed whole Site SuDS Drainage Design Proposals	Y	Y
	Detailed Geotechnical factual and interpretive report	N	Y
	Unstable and Contaminated Land Reports	N	Y

Table 4. Documentation required to satisfy Standard S1 for the Full Application

5.2 STANDARD S2 – SURFACE WATER RUNOFF HYDRAULIC CONTROL

Interception of runoff

The drainage proposal includes for numerous SuDS that provide interception such as permeable surfacing, bioretention areas and a dry basin which provide interception regardless of whether the features will allow for infiltration or not. Currently, the proposal does not currently state as to whether the rain gardens, permeable surfacing or dry basin are to be lined. Should they not be lined with an impermeable geomembrane, they will provide additional interception losses via infiltration to ground as well as evaporation, evapotranspiration and uptake by plants in the bioretention areas.

Of note, the proposal will reduce the extent of hardstanding area from 0.944ha to 0.497ha. This will be replaced by landscaping or pervious paving (0.219ha), and therefore will increase significantly the extent of interception of runoff in comparison to the existing regime. Furthermore, the existing drainage regime via traditional methods such as gullies, channel drainage and pipe network would offer no interception. As such, the proposal would provide significant interception benefits in comparison to the existing.

Although the extent of roof to drain to the rainwater harvesting tank has not been provided, this tank will provide interception for the area it drains if designed to BS 8515.

As stated, the SuDS proposed such as rain gardens, permeable paving and dry basin will provide interception, but to confirm as to whether the interception criteria is met, the contributing areas to each and size and construction of systems will determine acceptability. Overall, it is considered that it is likely that the proposal will satisfy the interception criteria should all impermeable areas drain to the proposed SuDS.

Morphological protection of receiving surface water bodies

The drainage proposal does not propose to discharge runoff to a watercourse. As such, this has not formed a consideration.

Flood Risk mitigation for receiving surface water bodies

As previously detailed in chapter 2, the site currently outfalls at three separate locations.

Based on the impermeable area currently on site of 0.944ha, the existing Q1 rate has been calculated as 66.2l/s. Whilst the SAB does not technically object to the method used to obtain the rate via microdrainage, the microdrainage simulation that evidences this flow must be provided at the full application stage.

Total outfall from the site is proposed to be 46.5l/s which offers a 30% betterment in comparison to the existing Q1 flow rates of 66.2l/s, and a larger significant betterment in comparison to the Q100 of 123.7l/s. Of note, the Q100 rate is conservative given the system floods.

However, without knowing the exact nature of the outfall (outfall 2 and 3), then the applicant must demonstrate that flows have been reduced to an acceptable rate at each outfall. Given they could be separate drainage systems, the applicant must provide existing and proposed flows to each of the outfalls. The SAB would not raise an objection to the proposed solution of 30% betterment to existing Q1 rates at each outfall in line with paragraph G2.24 of the Statutory Standards.

Flood Protection for the site

At the drainage strategy review stage, hydraulic models are not reviewed. Although, it is noted the applicant has calculated likely storage requirement to discharge at the above detailed rate. Storage is to be provided via a dry basin, attenuation cells and the void space within the sub-base of the permeable paving and MUGA pitches. The preliminary drainage layout outlines three locations of storage, assumed to be the required storage to limit flows at each outfall point. This includes 70m^3 at both the access road to the school and road linking the two car parking areas and 230m^3 at the pedestrian area. This amounts to the 370m^3 required maximum attenuation volume detailed in the hydraulic technical note.

As specified above, the flow rates to the existing connections will likely require restriction at each outfall, and therefore storage requirements may vary once this is applied.

Within the technical note, an appropriate allowance of 40% is stated to be incorporated into the proposed hydraulic model.

At the full application stage, the applicant must demonstrate that the drainage system can successfully restrict the runoff to an appropriate discharge rate as detailed previously, whilst also accommodating the Q100 plus CC event in line with the principle criteria detailed in paragraph G2.34 of the Statutory Standards.

Extreme event exceedance management of surface water runoff

The drainage strategy does not consider this element at this early stage. At the full application stage, the applicant must demonstrate via a flow exceedance plan the flow routes of runoff during an exceedance event.

Evaluation of impact of potential failure of a drainage system

The drainage strategy does not consider this element at this early stage. At the full application stage, the applicant must assess the potential failure of the drainage system such as blockage of a flow control and incorporate mechanisms to alleviate the impact of such event.

In summary, the proposed design **does not include sufficient information to ascertain compliance** with Standard S2.

A likely compliance with Standard S2 can be achieved through the inclusion of the 'further information required' outlined below. However, **compliance is dependent on the quality of the information that is provided** and cannot be guaranteed without appropriate evaluation of the additional documentation.

Further information required

Please see table 5 which summarises the documentation required to satisfy standard S2. At the full application stage, an engineering layout which includes levels, gradients, locality and storage is required. Furthermore, detailed hydraulic calculations will be required to demonstrate the hydraulic suitability of the proposed drainage system. The hydraulic calculations will have to demonstrate that the proposed drainage system can accommodate the Q100 plus climate change event, whilst successfully restricting runoff to the proposed rates. This will need to be accompanied by a contributing area plan that will depict the contributing areas inputted into the hydraulic calculations at each manhole. Detailed cross sections and construction drawings will be required to demonstrate suitable design.

Criteria	Information/ documentation	Provided (Y/N)	Required? (Y/N)
Standard S2	Detailed whole Site SuDS Drainage Design Proposals	N	Y
	Flood Consequence Assessment	N	N
	Detailed hydraulic calculations	N	Y
	Cross section drawings and standard detail drawings	N	Y
	Longitudinal section coloured drawings	N	Y
	Natural and artificial drainage catchment and sub-catchment plan	N	Y
	Concept drawings	Y	Y
	Contributing area plan	N	Y
	General engineering layout coloured drawings	N	Y

Table 5. Documentation required to satisfy Standard S2 for the Full Application

5.3 STANDARD S3 – WATER QUALITY

The proposed development of a new school building with associated road, parking and MUGA pitches results in pollutant loadings to the surface water runoff (table 6). Whilst a number of outfalls are proposed, this assessment will consider the proposed land use and associated treatment from the proposed SuDS. Given the lack of feasibility for infiltration and in particular concentrated infiltration via soakaway, this review of S3 has predominantly focussed on water quality of discharge to the piped outfalls.

Area	Proposed Land Use	Pollution Hazard Level	Total suspended Solids (TSS)	Metals	Hydrocarbons
1	School Roof	Low	0.3	0.2	0.05
2	Access Road	Low	0.5	0.4	0.4
3	Car Park	Low	0.5	0.4	0.4
4	Pedestrian areas	Low	0.5	0.4	0.4
5	MUGA pitch	Low	0.5	0.4	0.4

Table 6. Pollution hazard level and pollution indices for each of the proposed land uses Proposed based on Ciria SuDS Manual C753, table 26.2

Area	Contaminant	Risk Indices	Permeable Paving	Bioretention system	Total Mitigation indices	Compliant
1	TSS	0.3	-	0.8	0.8	Yes
	Metals	0.2	-	0.8	0.8	Yes
	Hydrocarbons	0.05	-	0.8	0.8	Yes
2	TSS	0.5	NC	NC	NC	NC
	Metals	0.4	NC	NC	NC	NC
	Hydrocarbons	0.4	NC	NC	NC	NC
3	TSS	0.5	0.7	-	0.7	Yes
	Metals	0.4	0.6	-	0.6	Yes
	Hydrocarbons	0.4	0.7	-	0.7	Yes
4	TSS	0.5	NC	NC	NC	NC
	Metals	0.4	NC	NC	NC	NC
	Hydrocarbons	0.4	NC	NC	NC	NC
5	TSS	0.5	0.7	-	0.7	Yes
	Metals	0.4	0.6	-	0.6	Yes
	Hydrocarbons	0.4	0.7	-	0.7	Yes

Table 7. Mitigation indices for proposed SuDS on site

*NC denotes not clear.

A risk indices approach as per the Ciria SuDs Manual has been undertaken with the proposal at concept stage. Due to the uncertainty of conveyance and collection of runoff, the dry detention basin has been discounted from the assessment, but it is noted that this can provide treatment of runoff if designed appropriately.

As per paragraph G3.6 of the Statutory Standards, water quality requirements are limited to preventing discharge of oil and sediments to the combined sewer system where it is via a direction connection. It has been demonstrated via survey that outfall one is to a combined sewer downstream. However, outfall 2 and outfall 3 have not been confirmed, and until such time they are regarded as surface water systems that may outfall to an ordinary watercourse, as a conservative measure.

As stated in chapter 1, the strategy notes where rain gardens are not possible, surface water runoff will be collected via rainwater pipes, combined kerb drainage, gullies, linear kerb drainage or permeable paving. However, it is not clear from the current layout as to where exactly all the runoff will drain. Therefore, areas 2 and 4 could not be reviewed and suitability of water quality established.

Regarding area 1, where runoff from the roof does not drain to the rainwater harvesting tank, it is assumed it will drain to bioretention areas. Whilst specific drawings have not been provided, should the runoff drain directly to the surface of the bioretention areas then this will provide sufficient treatment.

Areas 3 and 5 are to comprise of permeable construction, and therefore treatment provided at source. The car park aisles and parking spaces are proposed to comprise of permeable paving which provide sufficient treatment. MUGA areas are proposed to be of permeable asphalt construction, and therefore these areas will undergo sufficient treatment.

Regarding area 2 and 4, it is currently unclear from the drawings or sketch as to the exact nature of how runoff from the tarmac road and asphalt footpath will drain. Should the access road drain to the permeable paving, rain garden or detention basin then it is likely to be sufficiently treated. However, this will be dependent on sufficient size rain gardens when in comparison to the contributing area. It is stated within the strategy that SuDS will be sized for the Q1 runoff event. For events that are greater than the Q1, the dilution effect will take place, and therefore the SAB accepts this proposal.

Whilst the asphalt footpath has been regarded as a low pollution, this is a conservative assessment due to its absence from the Ciria SuDS Manual. Should runoff from this

area convey to the surface of any of the SuDS proposed, then runoff would undergo sufficient treatment.

Please note that gullies and linear kerb drainage do not offer treatment benefits, and therefore if collection is via this method, conveyance to a downstream SuDS will be required.

The following was detailed in S1 “Groundwater strikes were encountered within majority of holes in the glacial till at a depth of between 2.10 and 3.0mbgl. Groundwater monitoring over a period of time found varying levels of between 1.4m and 2.15mbgl”. Whilst infiltration from the proposed systems has not been suggested or confirmed, it is worth noting that in line with paragraph G3.32 of the Statutory Standards, there should be 1m of unsaturated ground between base of infiltration system and groundwater level.

The site is an existing school which has been found to be underlain by shallow made ground with elevated concentrations of benzo(a)pyrene and hydrocarbons. Should infiltration be proposed, then the applicant must ensure that infiltration will not pose a pollution risk. Of note that ARUP have recommended for a detailed risk assessment be undertaken. It is requested that this is submitted with the full application.

In summary, the proposed design **does not include sufficient information to ascertain compliance** with Standard S3.

A likely compliance with Standard S3 can be achieved through the inclusion of the ‘further information required’ outlined below. However, **compliance is dependent on the quality of the information that is provided** and cannot be guaranteed without appropriate evaluation of the additional documentation.

Further information required

Please see Table 8 which summarises the documentation required to satisfy standard S3.

Criteria	Information/ documentation	Provided (Y/N)	Required? (Y/N)
Standard S3	Water quality treatment and pollution prevention strategy and Plan	N	Y
	Contaminated Land Report	N	N

Table 8. Documentation required to satisfy Standard S3 for the Full Application

5.4 STANDARD S4 – AMENITY

The drainage proposal includes for bioretention areas across the site to drain hardstanding areas including building roofs. The bioretention areas are proposed in close proximity to the building, and therefore provide valuable amenity benefits to staff and site users. The close proximity of the vegetation and trees will provide shading and thus cooling of the classrooms and play areas which will be beneficial during hot spring and summer days.

Whilst the exact planting arrangement has not been provided given the early stage of the design, it is noted in the application form that the intention is to plant trees within the bioretention areas which will provide significant amenity benefits. It is noted that by instruction from education that there should be no standing water SuDS on site. It is preferable that the drainage proposal includes water at the surface as this provides amenity, biodiversity and maintenance benefits. However, the masterplan incorporates the potential for a dry basin which will provide amenity benefits itself which is proposed adjacent the asphalt footpath, which can therefore be enjoyed by all site users.

It is considered that the inclusion of rain gardens across the site and a dry basin will likely satisfy the amenity standard. Importantly, in comparison to the existing site layout which is predominately hard surfacing and limited landscaping, the proposal provides a significant betterment whilst also integrating the drainage with the landscaped areas.

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

Further information required

At the full application stage, a landscape plan and layout will be provided to demonstrate the locality and composition of the landscaped areas. Please see Table 9 which summarises the documentation required to satisfy standard S4.

Criteria	Information/ documentation	Provided (Y/N)	Required? (Y/N)
Standard S4	Amenity Plan	N	Y
	Landscape Plan	N	Y
	Landscape Layout drawings	N	Y

Table 9. Documentation required to satisfy Standard S4 for the Full Application

5.5 STANDARD S5 – BIODIVERSITY

The drainage proposal includes for bioretention areas across the site to drain hardstanding areas including building roofs.

Whilst the exact planting arrangement has not been provided given the early stage of the design, it is noted in the application form that the intention is to plant trees within the bioretention areas which will provide significant amenity benefits including cooling classroom and play areas.

The proposal of bioretention areas and a dry basin would suggest that biodiversity is maximised and therefore satisfy the biodiversity standard. However, the submission will need to demonstrate appropriate planting of the bioretention areas and dry basins. In particular, whilst trees provide significant hydraulic and biodiversity benefits, they must be incorporated suitably such as sufficient soil volume, appropriate tree species etc. All other vegetation such as shrubs must be suitable for its purpose as a SuDS system. Furthermore, it must be designed appropriately to ensure that the tree roots will not have any adverse impact on the building i.e. root protection barrier.

In summary, the proposed design **does not include sufficient information to ascertain compliance** with Standard S5.

A likely compliance with Standard S5 can be achieved through the inclusion of the 'further information required' outlined below. However, **compliance is dependent on the quality of the information that is provided** and cannot be guaranteed without appropriate evaluation of the additional documentation.

Further information required

At the full application stage, a landscape plan and layout will be provided to demonstrate the locality and composition of the landscaped areas. Please see table 10 which summarises the documentation required to satisfy standard S5.

Criteria	Information/ documentation	Provided (Y/N)	Required? (Y/N)
Standard S5	Biodiversity Plan	N	Y
	Landscape Plan	N	Y
	Landscape Layout drawings	N	Y

Table 10. Documentation required to satisfy Standard S5 for the Full Application

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

At this stage, the applicant has provided very little information relative to standard S6 given design is only at early stages. Therefore, this standard cannot be properly reviewed by the SAB.

A small note is included within the pre-app report regarding the phasing of the construction. The new school building is proposed on the western extent and therefore all school operations will need to be moved to all buildings on the eastern extent. An important consideration is the drainage of the existing school site and the newly formed building. In particular, to ensure that runoff from the site is not exacerbated at any times during the works with sufficient measures in place to reduce the rate and ensure the quality of the runoff does not pose a pollution risk.

At the full application stage, the applicant must provide a suitable maintenance plan that details appropriate schedules and demonstrates ease of access to all elements of the drainage system. Furthermore, the design life of all elements of the drainage system must be considered, and should it be less than the design life of the development, a replacement must be incorporated into the maintenance schedule as per paragraph G6.17 of the Statutory Standards.

The applicant has highlighted that all drainage features will have hard paved routes in order for the appropriate person and associated plant to have access to undertake maintenance. Furthermore, the proposed dry basin is proposed to be situated north of the car park and can be easily accessed. Access will need to be particularly evidenced to the flow control chamber.

It is noted that there is no requirement for pumping as the entirety of the drainage system drains via gravity.

At the full application stage, full construction details will be required of all drainage elements including the flow control chambers. SuDS should be designed in accordance with best practice such as Ciria SuDS Manual and suitable specification of material.

Of particular note is the proposal for permeable surfacing. Given the traffic loads on the car parking area, a suitable depth of sub-base and capping layer should be proposed depending on the Californian Bearing Ratio (CBR). An important further consideration to the SAB is the amount of runoff that will drain to the permeable parking spaces from the hardstanding area if any. It is recommended that the ratio of

impermeable to permeable should not be greater than 2:1 due to the increased risk of clogging. The SAB is currently unable to provide advice regarding this as the specific area of permeable surfacing and hardstanding that may drain to it has not been provided.

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.

In summary, the proposed design **does not include sufficient information to ascertain compliance** with Standard S6.

A likely compliance with Standard S6 can be achieved through the inclusion of the ‘further information required’ outlined below. However, **compliance is dependent on the quality of the information that is provided** and cannot be guaranteed without appropriate evaluation of the additional documentation.

Further information required

Please see table 11 which summarises the documentation required to satisfy standard S6. Further construction details will be required such as specification of all materials in the design. Further details are required regarding the construction in terms of management and phasing to ensure a structured approach is utilised.

A Maintenance plan must be provided to ensure the SuDS will be properly maintained and can function across its entire design life. A maintenance plan must include the schedules including activity and frequency, access arrangements for each drainage feature including the flow control chamber and the responsible person to undertake the tasks for each drainage feature.

Criteria	Information/ documentation	Provided (Y/N)	Required? (Y/N)
Standard S6	Construction details (to calculate non-performance bond)	N	N
	Construction Management Plan	N	Y*
	Construction Phasing Plan	N	Y*
	Information and communications plan	N	Y
	Detailed SuDS Assets Maintenance Plan	N	Y
	Specialist drawings	N	Y
	General engineering layout coloured drawings	N	Y

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

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

6 FURTHER INFORMATION

6.1 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/epg/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 Planning 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.