



Y BOBLEN, 24 BRYN ROAD, CWMLLYNFELL

DRAINAGE STRATEGY REPORT - Rev 02

NOVEMBER 2021

	CLIENT	Mr M H Nasser	Sheet No.	1	Rev	A02
			Job No.	AVO21088		
	PROJECT	Y Boblen, 24 Bryn Road, Cwmllynfell	Date	November 2021		
			Prepared	J. Wall		
			Checked	V. Walker		

Client Name: Mr M H Nasser
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Quality Assurance - Approval Status

Issue	Date	Prepared by	Checked by	Approved by
A01	November 2021	Joel Wall	Victoria Walker	James Mahoney
A02	January 2022	Joel Wall	Victoria Walker	James Mahoney

Comments

A01	First Issue
A02	Updated to suit SAB comments

Limitations

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1. Introduction

Avocet Group Ltd (“Avocet”) has been instructed by Mr Mohammad H Nasser (the “Developer”), to undertake a Drainage Strategy Report to support the planning application for the redevelopment of Y Boblen, 24 Bryn Road, Cwmllynfell, Swansea, SA9 2FJ.

The aim of this report is to demonstrate that a robust surface and foul water drainage strategy can be implemented to facilitate the proposed development.

1.1 Existing Site

The site (0.129 ha) is located at the former public house “Y Boblen”, 24 Bryn Road, Cwmllynfell, Swansea, SA9 2FJ. The existing public house is a detached 2-storey property with vehicular access and parking to the side and rear of the property. The building has been left vacant for a number of years and was severely damaged by a fire in 2020.

The site is bound to the south by Bryn Road; to the east by a public footpath and Cwmllynfell Primary School; 24 Bryn Road to the west and further residential dwellings to the north. The site location and existing site layout/topographical survey is contained in Appendix A.

Figure 1 below shows the aerial image of the site.

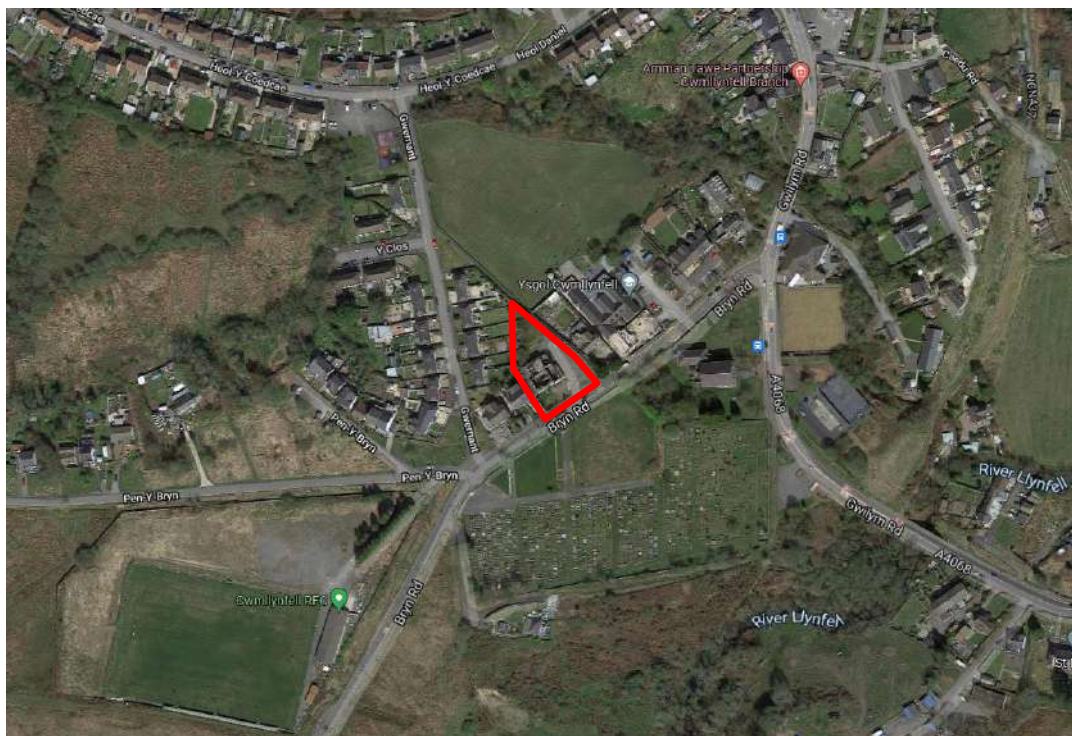


Figure 1 - Aerial image of the Site Location

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1.2 Development Proposals

The proposed development comprises the demolition of the existing building and construction of 5 no. 3-bedroom, 3storey residential dwellings. Four of the 5 units will be semi-detached, with the remaining property being detached. Parking bays will be located off Bryn Road to the front of the properties.

All the properties will have a side access leading to rear landscaped gardens.

The existing site entrance will be stopped-up, with two new vehicular accesses provided along Bryn Road.

The proposed site plans are included in Appendix B.

1.3 Ground Conditions

A ground investigation has yet to be undertaken; however, based on publicly available information it is understood that the site may be in an area of clays overlain with mudstone.

1.4 Infiltration Testing

Infiltration tests were undertaken by Gibb Geotechnical on 21st October 2021. The results found clay superficial soils with poor infiltration rate of 4.93×10^{-6} m/s.

Groundwater was encountered during the test, following heavy overnight rainfall, the excavations contained standing water in all the pits to an approximate depth of 300mm, which suggests that groundwater is approximately 1m below ground level.

Due to the high groundwater and low permeability rates, infiltration techniques are not considered to be a feasible solution for the disposal of surface water flows from the development and an alternation solution will need to be sought.

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2. Surface Water Strategy

2.1 Existing Drainage Regime

There are a series of road gullies in existence along Bryn Road, which join a highway culvert running within Bryn Road which outfall to a local ordinary water course approximately 160m east of the site. A site inspection observed these gullies and 225mm diameter culvert to be approximately 450mm below ground level at each gully. This culvert shown in the local highway records. Refer to Appendix C.

Currently surface water on the site is assumed to join a private combined network which outfalls to the north of the site in the direction of the existing DCWW drainage.

2.2 Existing Greenfield Run-Off Rates

The greenfield run-off rate for the site has been calculated using the Wallingford Procedure 'Modified Rational Method'. The calculated greenfield runoff rate is 2.28 l/s (Q_{BAR}). A proposed discharge rate of 1.6 l/s will be offered, subject to approval of the Highway Authority. The new surface water connection should seek to offer a 30% betterment to the Q_{bar} run off rate.

The greenfield runoff calculations are contained within Appendix D.

2.3 Proposed Surface Water Strategy

The proposed drainage system will seek to incorporate the methodology set out within CIRIA 753 wherever possible. Current guidance indicates that the following surface water disposal options should be considered (listed in order of preference):

- i. Surface water collection for reuse.
 - ii. Disposal via on-site infiltration systems.
 - iii. Disposal to a watercourse.
 - iv. Disposal to surface water sewer.
 - v. Disposal to a combined sewer
-
- i. **Surface water collection for reuse:** The level of occupation of the individual residential dwellings in relation to the roof area and the likely volume of runoff associated with this is deemed too low to make the harvesting of rainwater a viable option for non-potable supply. There is also a potential risk that these systems could fall into a state of disrepair and subsequently present a potential health hazard for future residents. As a consequence, the use of rainwater harvesting has been discounted as a viable option.
 - ii. **Disposal via on-site infiltration systems:** As discussed earlier in this report, due to a groundwater level less than 1m below ground level, infiltration is not considered to be a suitable means of discharge for impermeable surfaces.
 - iii. **Disposal to watercourse/surface water body:** The River Llynfell is located approximately 170m from the south-eastern boundary of the site. As a

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consequence, an outfall to watercourse is not considered to be a feasible option for surface water disposal.

- iv. **Disposal to surface water sewer:** As mentioned in 2.1 above, a highway culvert exists within Bryn Road, which offers a point of connection which discharges to a watercourse 160m away.
- v. **Disposal to combined sewer:** A 150mm dia. public combined sewer is located approximately 60m to the north of the site; however, due to the presence of a highway drain in Bryn Road, a connection to the combined sewer is considered a last resort.

It is proposed that surface water runoff from roofs and hard paved areas, including the shared accesses and parking bays, will be conveyed via filter drains, raised rain gardens, permeable paving and pipework into a geocellular attenuation tank, with a restricted outfall to the existing highway drain mentioned in 2.1 above.

A flow control device will limit the discharge into the drain, at a rate of 1.6 l/s (to be confirmed). The surface water storage estimate calculations are included in Appendix E. It is proposed to use a drainage blanket joining the permeable paving as part of the proposed onsite attenuation (subject to detailed design). This higher-level attenuation will be restricted to 2.5 l/s via a vortex flow control. This will then discharge into the lower attenuation tank. All flows exceeding 1.6 l/s will be attenuated for up to the 100 years + 50% (40% climate change + 10% urban creep). The proposed drainage layout is contained within Appendix F.

2.4 Future Maintenance Strategy

It is proposed that the attenuation tanks are installed within an accessible area and that maintenance will be undertaken throughout the lifetime of the development by the client (Mr Mohammed Humayun Nasser humayunnasser@gmail.com), unless sold or legally passed over to a 3rd party. Each dwelling will receive a list of responsibilities which they are required to undertake and those which will be covered by the maintenance plan.

2.4.1 Management

Surface water drainage has been designed for easy maintenance to comprise:

Regular day to day care	Litter collection, regular maintenance to control vegetation growth and checking inlets where water enters the system.
Occasional tasks	Checking the system and removing any silt that builds up.
Remedial work	Repairing damage where necessary.

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2.4.2 Checklist

The following lists the components and extra features which are found on site:

- **Attenuation** will accept surface water runoff from roofs, access road and hard paved areas.
- **Permeable Paving (tanked)** have a surface that is formed of material that is itself impervious to water. The materials are laid to provide void space through the surface to the sub-base to allow rainwater falling onto the surface or runoff discharged over the surface to infiltrate through the joints or voids between the blocks into the underlying pavement structure. Runoff is temporarily stored within the pavement and discharge slowed. Outlet pipes are constructed through the impermeable membrane to transmit the water to other drainage devices, such as attenuation tanks, ponds, watercourses or sewers.
- **Below ground drainage** pipes convey water and should be free from obstruction at all times to allow free flow.
- **Manholes and inspection chambers** are provided on pipe bends or junctions and will allow access and cleaning of the system as necessary.
- **Inlet structures** such as gullies, rainwater downpipes and drainage channels should be free from obstruction at all times.
- **Catchpits** will provide surface water treatment by allowing silt and other particles to settle in their bases, limiting ingress into the system.

2.4.3 General Maintenance Requirements

All drainage, whether piped or SuDs systems require regular maintenance. The table below provides an overview of typical maintenance tasks and frequency of which they need to be undertaken.

The required maintenance for each component making up the drainage system is scheduled below. (Based on CIRIA report C753 - *The SuDS manual*).

Activity	Indicative frequency	Typical tasks
Routine / Regular Maintenance	Inspection	Quarterly or as required
	Litter. debris removal	Monthly or as required
Occasional Maintenance	Sediment removal	6 Monthly or as required
Remedial Maintenance	Repair (damage or vandalism)	As required

- Avoid used of weedkillers and pesticides to prevent chemical pollution.

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- Avoid de-icing agents wherever possible.
- Protect all below ground drainage through careful selection and placement of hard paving.
- Avoid disposal of hydrocarbons, chemicals (including cleaning chemicals) etc. into the drainage system.

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2.4.4 Surface Water Drainage Systems

Maintenance Schedule	Required Action	Typical frequency
Regular Maintenance	Inspect for sediment and debris in catchpit manholes and gullies. Clean out as required	Twice Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris in catchpits, gullies, attenuation devices and inside concrete manhole rings.	As required, based on inspections.
Remedial actions	Reconstruct and/or replace components, if performance deteriorates or failure/blockage occurs.	As required
	Replacement of clogged components (flow restriction)	As required
Monitoring	Inspect silt traps/gullies/catchpits and note rate of sediment accumulation.	Monthly in the first year and then annually
	Check attenuation devices	Annually

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2.4.5 Permeable Paving

Activity	Required Action	Typical frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Annually, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations - pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this is likely to collect the most sediment
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required - once per year on less frequently used pavements
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm or the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action	Three-monthly, 48 hours after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually

Many of the specific maintenance activities for pervious pavements can be undertaken as part of a general site cleaning contract (many car parks or roads are swept to remove litter and for visual reasons to keep them tidy) and therefore, if litter management is already required at site, this should have marginal cost implications.

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2.4.6 Cellular attenuation tank

Maintenance Schedule	Required Action	Typical frequency
Regular Maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings.	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings.	As required, based on inspections.
Remedial actions	Reconstruct tank and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of tank)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation.	Monthly in the first year and then annually
	Check tank to ensure emptying is occurring	Annually

Maintenance will usually be carried out manually, although a suction tanker can be used for sediment/debris removal for large systems. If maintenance is not undertaken for long periods, deposits can become hard packed and require considerable effort to remove.

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2.4.7 Rain Garden

Maintenance Schedule	Required Action	Typical frequency
Regular Inspections	Inspect infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of underdrains by inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc. and replace as necessary.	Quarterly
	Inspect inlets and outlets for blockage	Quarterly
Regular Maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or forebays	Quarterly to biannually
Occasional Maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required.	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial actions	Remove and replace filter medium and vegetation above	As required but likely to be > 20 years

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2.4.8 Filter Drain

Maintenance Schedule	Required Action	Typical frequency
Regular Maintenance	Remove Litter and debris from filter drain surface, access chambers and pre-treatment devices.	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage.	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly or as required
Occasional Maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlaying filter medium.	Five yearly, or as required
	Clear perforated pipework of blockages	As required

Maintenance should be undertaken whenever required. Removal of Sediment and other pollutants must be in accordance with

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3. Pollution Prevention & Water Quality Management

CIRIA 753 The SuDS Manual Chapter 26, provides design advice to meet water quality standards by adopting the SuDS train treatment mechanism and thereby reduce the risk of pollution by evaluating potential pollution hazards at the outset.

Runoff from residential developments roofs and associated highway is generally viewed as low to very low risk (Table 26.2). The proposed site layout provides the opportunity to introduce SuDS into the scheme to reduce potential contaminant risk still further.

Residential Roof (Very Low)	Total Suspended Solids (0.2)	Metals (0.2)	Hydrocarbons (H/C) (0.05)
Residential car parks & non- residential car parking with infrequent change <300 (Low)	Total Suspended Solids (0.5)	Metals (0.4)	Hydrocarbons (0.4)

Comparing against the mitigation indices shown below in **bold** (Refer to Table 26.3):

Permeable Paving (Parking Areas - Tanked)

TSS	0.7	»»»»	0.50	OK
Metals	0.6	»»»»	0.40	OK
H/C	0.7	»»»»	0.40	OK

Filter Drain

TSS	0.4	»»»»	0.20	OK
Metals	0.4	»»»»	0.20	OK
H/C	0.4	»»»»	0.05	OK

Surface water runoff from roofs will discharge to gravel filter drains within paths, which will provide water quality treatment. Runoff from parking bays will filter through tanked permeable paving into gravel sub-base.

As evidenced above, the proposed SuDS components are appropriate for the treatment of contaminants and pollutants and will have an improvement in water quality when compared to the existing scenario.

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4. Amenity & Biodiversity

The site has been divided into separate dwellings each with rear gardens. These gardens will be replacing the existing car parking area with new planting to provide improved amenity spaces. Raised rain gardens bed will be provided to the front of the properties for aesthetical improvements.

Surface water in the rear gardens will infiltrate naturally. Soft landscaping measures, including tree pits, are proposed, which will improve infiltration and biodiversity.

Only native local species will be planted in the rain gardens in line with the Welsh Wildlife Trust Rain Garden recommendations, refer to <https://www.welshwildlife.org/wp-content/uploads/2011/10/Rain-Garden-Fact-Sheet-for-the-Royal-Welsh.pdf>. See below:

- Yellow Flag Iris (*Iris pseudocorus*)
- Purple Loosestrife (*Lythrum salicaria*)
- Water Mint (*Mentha aquatica*)
- Ragged Robin (*Lychnis flos-cuculi*)
- Soft Rush (*Juncus effusus*)
- Royal Fern (*Osmunda regalis*)
- Bugle (*Ajuga reptans*)
- Chives (*Allium schoenoprasum*)

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5. Foul Water Strategy

5.1 Existing Regime

DCWW records indicate a 150mm (6") dia. public foul sewer running along the north-western boundary of the site within neighbouring land and the adjacent Cwmllynfell Primary School. DCWW sewer records are contained in Appendix C.

It is understood that the existing private foul drainage from the site communicates with this public foul sewer; however, it is recommended that further investigations, including a CCTV survey, are undertaken to establish the sewer condition, type and connections.

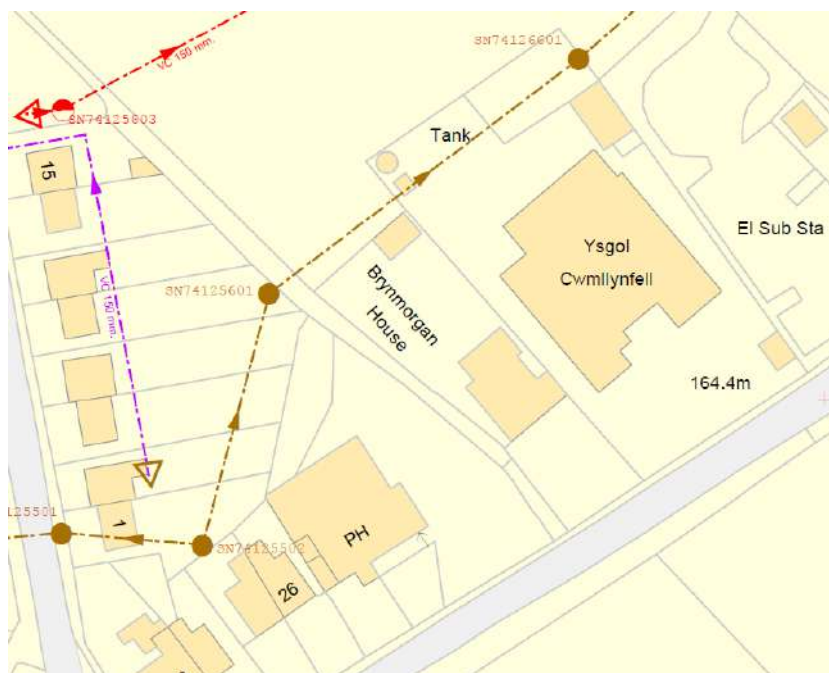


Figure 5.11 - Extract of DCWW Sewer Map

5.2 Proposed Strategy

It is proposed that foul flows from the development will utilise the existing private foul sewer, which in turn has a connection into the existing public foul sewer, subject to DCWW approval.

The proposed development comprises 5 no. 3-bedroom dwellings, with estimations of the resultant peak flows (6 x DWF).

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N° of Dwellings	Type		P (200 l/p/day)
5	3 Bed Dwelling	Occupancy 5	5,000 l/day
		DWF	0.058 l/s
		6DWF	0.35 l/s

The peak flow of 0.35 l/s will preferably be discharged via gravity to the existing private foul sewer system.

All details will be subject to detailed design and DCWW technical approval. All private foul drainage for the development will be designed in accordance with the Building Regulations Part H. The proposed drainage layout is included in Appendix F.

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6. Flood Risk

6.1 Flood Zone Classification

The National Resources Wales (NRW) Flood Risk maps have been reviewed for potential drainage risks. The Development Advice Maps indicate that the site is in a Zone A with no risk of fluvial flooding in the area.

NRW long term flood risk maps show very low risks of rivers, sea or reservoir flooding within the vicinity of the site. Furthermore, there are no records of historical flooding.

Urban locations with a high-density of impermeable areas can be susceptible to other forms of rapid flooding, such as surface water runoff or sewer flooding, which can occur during heavy storm events or as a result of blockages or lack of maintenance. NRW long term flood maps show no pluvial flooding in the vicinity of the site.

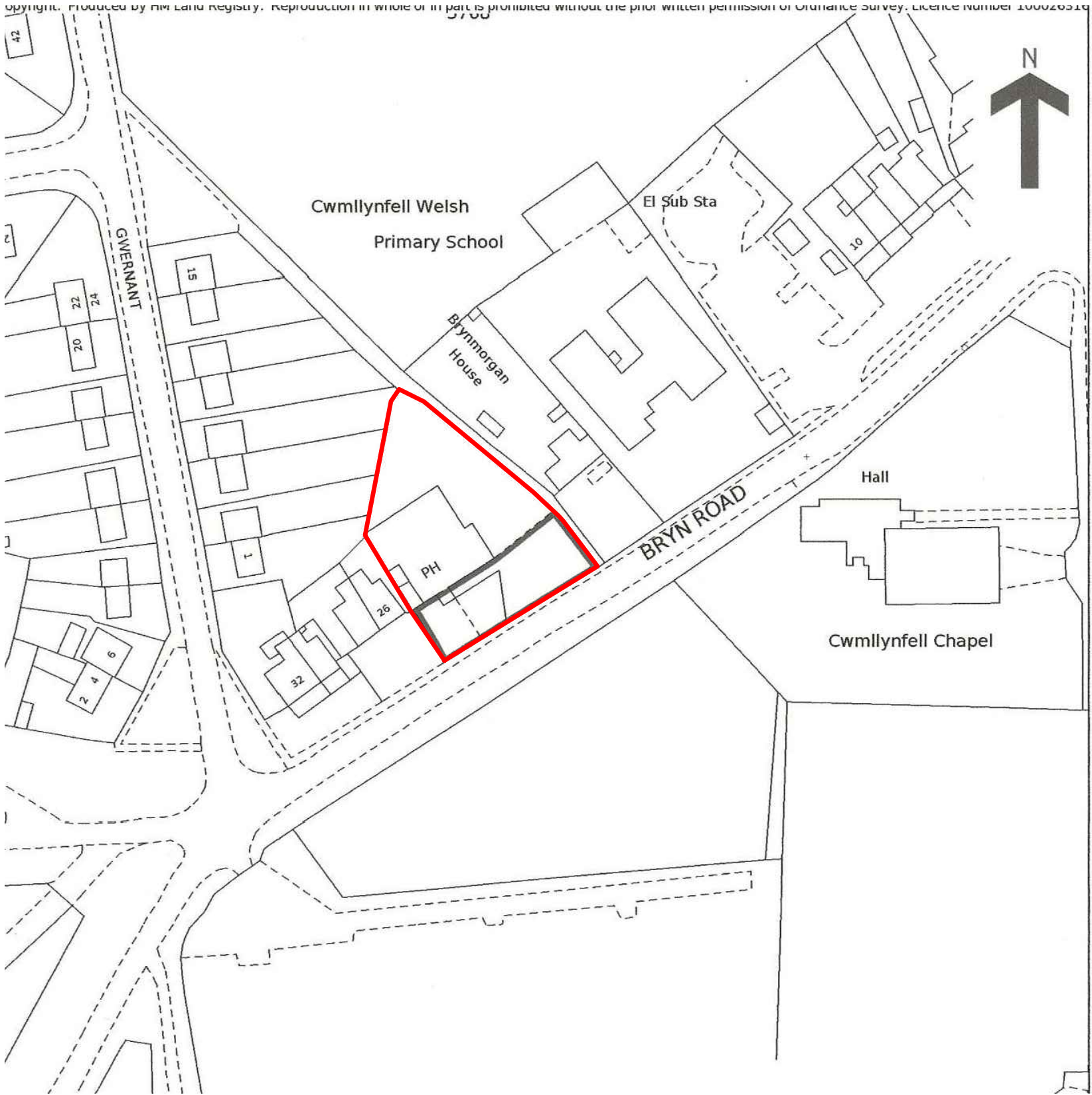
As such, flood risk within the site is considered to be very low and therefore no further consideration has been given within the drainage strategy. Refer to Appendix D for NRW flood maps.



Figure 3 - Natural Resources Wales Flood Risk Development Assessment Mapping

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APPENDIX A - Site Location & Existing Site Plan /Topographical Survey



PROPOSED LOCATION
PLAN
SCALE-1:1000

© This drawing is copyright Scale. Contractor to check all dimensions on site and to report any discrepancies directly to the SD.			 SK DESIGNS 359, Gwernant Way, Llanidloes, Cardiff CF23 6BJ Tel: 029 20 761 950 Fax: 029 20 761 950 Email: info@skdesigns.org.uk
Date: OCT 2021			
Project: PROPOSED HOUSES AT SWANSEA			
Client:			
Description: PROPOSED LOCATION PLAN	Job No:	Scale: 1:1000 ON A3	
	Dwg No: 208	Drawn By: KG	

Station
A1
A2
A3

Easting
274567.543
274590.397
274572.257

Northing
212548.067
212562.666
212588.654

Level
171.297
168.938
169.101

Y BOBLEN

BRYN ROAD

EXISTING SITE PLAN

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Date: OCT 2021

Project: PROPOSED HOUSES AT SWANSEA

Client:

Description: PLANS

Job No:

Scale: 1:200 ON A3

Dwg No: 207

Drawn By: KG

SK DESIGNS
309, Cleverton Way, Lakeside, Cardiff CF23 6JY
Tel: 029 20 761 950
Fax: 029 20 761 950
Email: info@skdesigns.org.uk



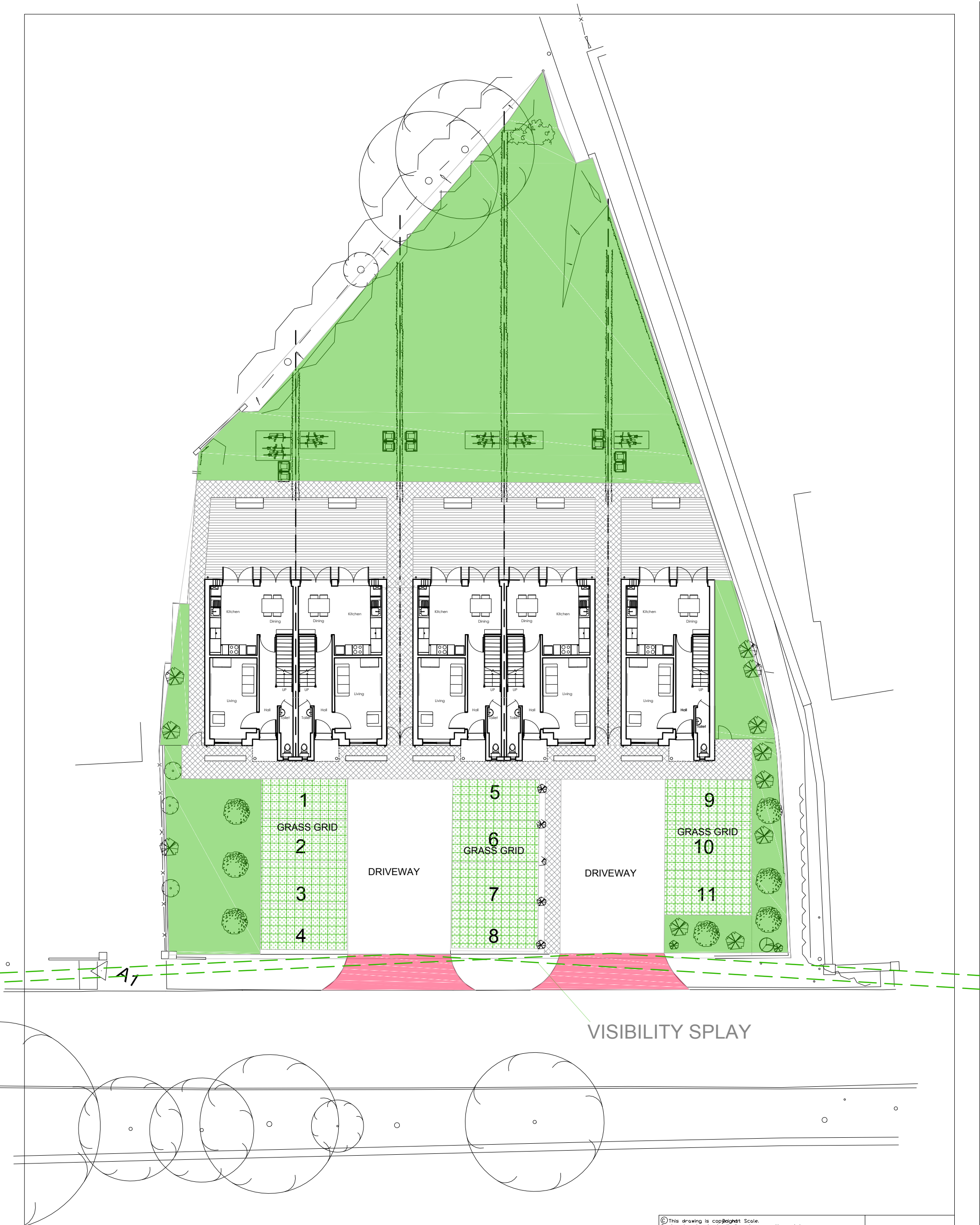
SK
DESIGNS

SK DESIGNS
398, Clewerway Way, Lakeside, Cardiff
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			Checked	V. Walker		

APPENDIX B - Proposed Site Plans



PROPOSED SITE PLAN

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Date: MARCH 2022		
Project: PROPOSED HOUSES AT SWANSEA		
Client:		
Description: PROPOSED PLANS	Job No:	Scale: 1:200 ON A3
	Dwg No: 201 R2	Drawn By: KG
 SK DESIGNS 353, Clearester Way, Llanidloes, Cardiff CF23 6BJ Tel: 029 20 761 950 Fax: 029 20 761 950 Email: info@skdesigns.org.uk		

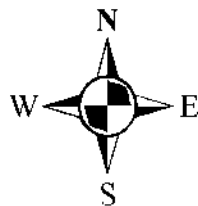


PROPOSED STREET ELEVATION

© This drawing is copyright SK Designs. Contractor to check all dimensions on site and to report any discrepancies directly to the SD.			 SK DESIGNS SK DESIGNS 389, Cleverton Way, Laleston, Cardiff CF23 6BJ Tel: 029 20 761 950 Fax: 029 20 761 950 Email: info@skdesigns.org.uk
Date: OCT 2021			
Project: PROPOSED HOUSES AT SWANSEA			
Client:			
Description: PROPOSED STREET ELEVATION	Job No:	Scale: 1:200 ON A3	
	Dwg No: 209	Drawn By: KG	

	CLIENT	Mr M H Nasser	Sheet No.	23	Rev	A02
			Job No.	AVO21088		
	PROJECT	Y Boblen, 24 Bryn Road, Cwmllynfell	Date	November 2021		
			Prepared	J. Wall		
			Checked	V. Walker		

APPENDIX C - Sewer Records



LEGEND(Representative of most common features)

 Waste network:	 Foul chamber	 Surface water chamber	 Combined chamber	 Combined sewer overflow	 Special purpose chamber	 Treatment works	 Pumping station	 NB: Sewer symbol colour indicates the type: RED - Combined GREEN - Surface Water BROWN - Foul Purple - Former S24 sewers (for indicative purposes only)	 Outfall	 Lamphole	 Storm Overflow	 Rising main	 Gravity sewer	 Private sewer	 Private sewer subject to Sect. 104 adoption agreement	 Private Sewer Transfer	 Lateral Drain	 Inspection Chamber
--	--	---	--	---	---	---	---	---	---	--	--	---	---	---	---	--	---	--

Notes:

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

Dŵr Cymru Cyfyngedig ('the Company') gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus. The onus of locating apparatus before carrying out any excavations rests entirely on you. The information which is supplied by the Company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 which is based upon the best information available and, in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a water main, service pipe, sewer, lateral drain or disposal main and any associated apparatus laid before 1 September 1989, or, if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the Company's right to be compensated for any damage to its apparatus.

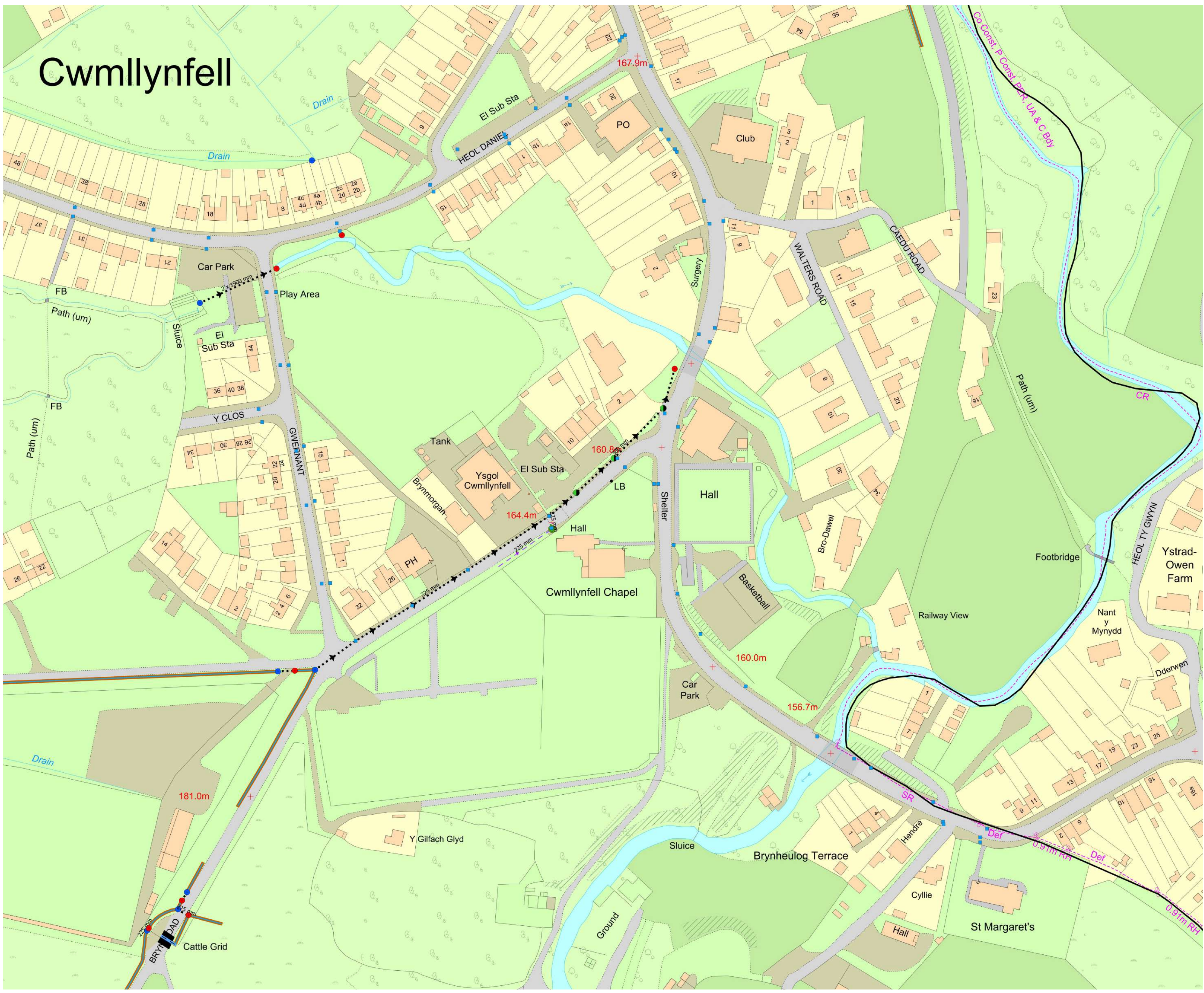
Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS
TO BE DETERMINED ON SITE.

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Map Ref: 274573,212570
Map scale: 1:1000
Printed by: Zara Howells
Printed on: 29 Oct 2021

Cwmllynfell



- MasterGully [32438]
- MasterPoint [9375]
- Inlet [1491]
- Outlet [2015]
- Surface Water Chamber [4556]
- Catchpit Chamber [436]
- Storm Overflow Chamber [24]
- Soakaway [94]
- Pollution Control Valve [14]
- Hydrobrake Chamber [24]
- Sluice [1]
- Access Cover [6]
- Beany Kerb Access Cover [299]
- Beany Kerb Outfall [404]
- Klargester Separator [3]
- Oil Interceptor [3]
- SW Harvesting Tank [2]
- MasterLine [16462]
- Aco Drain [324]
- Beany Kerb [375]
- Culvert [1992]
- Earth Ditch [405]
- Fluted Channel [4]
- Gully Line [9227]
- Land Drain [226]
- Storm Overflow [59]
- Surface Water Channel [136]
- Surface Water Lines [3545]
- Rising Main [8]
- French Drain [116]
- Abandoned Pipe [28]
- Sluice Pipe [1]
- Grip [4]
- MasterPolygon
- Cattle Grid
- Pond
- Swale
- Attenuation
- Balancing Pond
- Cellular Soakaway
- Spillway
- Permeable Paving

NETWORK MANAGEMENT
Neath Port Talbot County Borough Council
Cyngor Bwrdddeistref Sirol Castell-nedd Port Talbot
Nicola Pearce
Director of Environment
The Quays, Brunel Way, Baglan Energy Park,
Neath, SA112GG
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100033362



QGIS

24/01/2021

SW Drainage
Bryn Road, Cwmllynfell

A2	Sheet 1
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1:1250	M Rees
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	CLIENT	Mr M H Nasser	Sheet No.	24	Rev	A02
			Job No.	AVO21088		
	PROJECT	Y Boblen, 24 Bryn Road, Cwmllynfell	Date	November 2021		
			Prepared	J. Wall		
			Checked	V. Walker		

APPENDIX D -Existing Greenfield Runoff Calculations

Calculated by:

Site name:

Site location:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:

Longitude:

Reference:

Date:

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

Default

Edited

SOIL type:

HOST class:

SPR/SPRHOST:

Hydrological characteristics

Default

Edited

SAAR (mm):

Hydrological region:

Growth curve factor 1 year:

Growth curve factor 30 years:

Growth curve factor 100 years:

Growth curve factor 200 years:

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

Default

Edited

Q_{BAR} (l/s):

1 in 1 year (l/s):

1 in 30 years (l/s):

1 in 100 year (l/s):

1 in 200 years (l/s):

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

	CLIENT	Mr M H Nasser	Sheet No.	25	Rev	A02
			Job No.	AVO21088		
	PROJECT	Y Boblen, 24 Bryn Road, Cwmllynfell	Date	November 2021		
			Prepared	J. Wall		
			Checked	V. Walker		

APPENDIX E - Proposed Surface Water Calculations



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.200	Preferred Cover Depth (m)	0.750
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
12	0.003	5.00	169.200	600	274585.606	212586.576	0.850
13	0.019	5.00	169.000	600	274591.374	212577.527	0.831
15			168.800	1200	274596.549	212569.351	1.099
1	0.008	5.00	170.000	600	274559.928	212570.740	0.850
2	0.007	5.00	169.900	600	274565.610	212561.454	0.933
11			169.200	1200	274585.856	212568.443	1.050
16-Outfall			168.090	600	274597.829	212565.552	0.429
10			169.400	600	274583.881	212571.147	1.087
9	0.005	5.00	169.400	600	274585.490	212573.517	1.038
8	0.003	5.00	169.400	600	274579.643	212582.991	0.850
7-Attenuation Blanket	0.014	5.00	169.400	600	274578.198	212563.785	0.759
4	0.005	5.00	169.700	600	274575.302	212567.123	0.814
3	0.003	5.00	169.700	600	274569.306	212576.830	0.700
6	0.005	5.00	169.700	600	274576.088	212567.595	0.814
5	0.003	5.00	169.700	600	274570.022	212577.263	0.700
14 - Attenuation Tank			169.000		274593.808	212573.350	1.250

Links

Name	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.003	14 - Attenuation Tank	9.344	0.600	168.150	167.800	0.350	26.7	100	5.65	50.0
1.002	11	8.963	0.600	168.641	168.150	0.491	18.3	100	5.54	50.0
4.002	11	3.348	0.600	168.313	168.250	0.063	53.2	100	5.29	50.0
4.001	10	2.865	0.600	168.362	168.313	0.049	58.5	100	5.23	50.0
4.000	9	11.133	0.600	168.550	168.362	0.188	59.2	100	5.19	50.0
1.001	7-Attenuation Blanket	12.802	0.600	168.967	168.839	0.128	100.0	100	5.46	50.0
3.001	7-Attenuation Blanket	4.355	0.600	168.886	168.842	0.044	100.0	100	5.34	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.003	1.499	11.8	7.0	0.950	1.100	0.052	0.0	56	1.567
1.002	1.816	14.3	6.0	0.659	0.950	0.044	0.0	45	1.732
4.002	1.059	8.3	1.1	0.987	0.850	0.008	0.0	25	0.733
4.001	1.009	7.9	1.1	0.938	0.987	0.008	0.0	25	0.698
4.000	1.003	7.9	0.4	0.750	0.938	0.003	0.0	14	0.499
1.001	0.769	6.0	2.0	0.833	0.461	0.015	0.0	39	0.689
3.001	0.769	6.0	1.1	0.714	0.458	0.008	0.0	29	0.579

Links

Name	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
2.001	7-Attenuation Blanket	4.419	0.600	168.886	168.842	0.044	100.0	100	5.34	50.0
2.000	4	11.409	0.600	169.000	168.886	0.114	100.0	100	5.25	50.0
3.000	6	11.413	0.600	169.000	168.886	0.114	100.0	100	5.25	50.0
1.000	2	10.886	0.600	169.150	168.967	0.183	59.5	100	5.18	50.0
5.001	14 - Attenuation Tank	4.834	0.600	168.169	167.950	0.219	22.1	100	5.23	50.0
5.000	13	10.731	0.600	168.350	168.169	0.181	59.3	100	5.18	50.0
1.004	15	4.848	0.600	167.750	167.701	0.049	98.9	150	5.73	50.0
1.005	16-Outfall	4.009	0.600	167.701	167.661	0.040	100.2	150	5.79	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
2.001	0.769	6.0	1.1	0.714	0.458	0.008	0.0	29	0.579
2.000	0.769	6.0	0.4	0.600	0.714	0.003	0.0	17	0.420
3.000	0.769	6.0	0.4	0.600	0.714	0.003	0.0	17	0.420
1.000	1.000	7.9	1.1	0.750	0.833	0.008	0.0	25	0.705
5.001	1.650	13.0	3.0	0.731	0.950	0.022	0.0	32	1.336
5.000	1.002	7.9	0.4	0.750	0.731	0.003	0.0	16	0.533
1.004	1.010	17.8	10.0	1.100	0.949	0.074	0.0	81	1.040
1.005	1.003	17.7	10.0	0.949	0.279	0.074	0.0	81	1.033

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.003	9.344	26.7	100	Circular	169.200	168.150	0.950	169.000	167.800	1.100
1.002	8.963	18.3	100	Circular	169.400	168.641	0.659	169.200	168.150	0.950
4.002	3.348	53.2	100	Circular	169.400	168.313	0.987	169.200	168.250	0.850
4.001	2.865	58.5	100	Circular	169.400	168.362	0.938	169.400	168.313	0.987
4.000	11.133	59.2	100	Circular	169.400	168.550	0.750	169.400	168.362	0.938
1.001	12.802	100.0	100	Circular	169.900	168.967	0.833	169.400	168.839	0.461
3.001	4.355	100.0	100	Circular	169.700	168.886	0.714	169.400	168.842	0.458
2.001	4.419	100.0	100	Circular	169.700	168.886	0.714	169.400	168.842	0.458
2.000	11.409	100.0	100	Circular	169.700	169.000	0.600	169.700	168.886	0.714
3.000	11.413	100.0	100	Circular	169.700	169.000	0.600	169.700	168.886	0.714
1.000	10.886	59.5	100	Circular	170.000	169.150	0.750	169.900	168.967	0.833
5.001	4.834	22.1	100	Circular	169.000	168.169	0.731	169.000	167.950	0.950

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.003	11	1200	Manhole	Adoptable	14 - Attenuation Tank		Junction	
1.002	7-Attenuation Blanket	600	Manhole	Adoptable	11	1200	Manhole	Adoptable
4.002	10	600	Manhole	Adoptable	11	1200	Manhole	Adoptable
4.001	9	600	Manhole	Adoptable	10	600	Manhole	Adoptable
4.000	8	600	Manhole	Adoptable	9	600	Manhole	Adoptable
1.001	2	600	Manhole	Adoptable	7-Attenuation Blanket	600	Manhole	Adoptable
3.001	6	600	Manhole	Adoptable	7-Attenuation Blanket	600	Manhole	Adoptable
2.001	4	600	Manhole	Adoptable	7-Attenuation Blanket	600	Manhole	Adoptable
2.000	3	600	Manhole	Adoptable	4	600	Manhole	Adoptable
3.000	5	600	Manhole	Adoptable	6	600	Manhole	Adoptable
1.000	1	600	Manhole	Adoptable	2	600	Manhole	Adoptable
5.001	13	600	Manhole	Adoptable	14 - Attenuation Tank		Junction	

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
5.000	10.731	59.3	100	Circular	169.200	168.350	0.750	169.000	168.169	0.731
1.004	4.848	98.9	150	Circular	169.000	167.750	1.100	168.800	167.701	0.949
1.005	4.009	100.2	150	Circular	168.800	167.701	0.949	168.090	167.661	0.279

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
5.000	12	600	Manhole	Adoptable	13	600	Manhole	Adoptable
1.004	14 - Attenuation Tank		Junction		15	1200	Manhole	Adoptable
1.005	15	1200	Manhole	Adoptable	16-Outfall	600	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
12	274585.606	212586.576	169.200	0.850	600		0	5.000	168.350	100
13	274591.374	212577.527	169.000	0.831	600		1	5.000	168.169	100
15	274596.549	212569.351	168.800	1.099	1200		0	5.001	168.169	100
1	274559.928	212570.740	170.000	0.850	600		1	1.004	167.701	150
2	274565.610	212561.454	169.900	0.933	600		0	1.005	167.701	150
11	274585.856	212568.443	169.200	1.050	1200		1	4.002	168.250	100
							2	1.002	168.150	100
							0	1.003	168.150	100
16-Outfall	274597.829	212565.552	168.090	0.429	600		1	1.005	167.661	150
10	274583.881	212571.147	169.400	1.087	600		1	4.001	168.313	100
							0	4.002	168.313	100
9	274585.490	212573.517	169.400	1.038	600		1	4.000	168.362	100
							0	4.001	168.362	100



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
8	274579.643	212582.991	169.400	0.850	600		0	4.000	168.550	100
7-Attenuation Blanket	274578.198	212563.785	169.400	0.759	600		1	3.001	168.842	100
							2	2.001	168.842	100
							3	1.001	168.839	100
							0	1.002	168.641	100
4	274575.302	212567.123	169.700	0.814	600		1	2.000	168.886	100
						0	2.001	168.886	100	
3	274569.306	212576.830	169.700	0.700	600		0	2.000	169.000	100
6	274576.088	212567.595	169.700	0.814	600		1	3.000	168.886	100
							0	3.001	168.886	100
5	274570.022	212577.263	169.700	0.700	600		0	3.000	169.000	100
14 - Attenuation Tank	274593.808	212573.350	169.000	1.250			1	5.001	167.950	100
							2	1.003	167.800	100
							0	1.004	167.750	150

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.200	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Normal		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
30	40	0	0
100	40	10	0

Node 11 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	168.150	Product Number	CTL-SHE-0077-2500-0900-2500
Design Depth (m)	0.900	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.5	Min Node Diameter (mm)	1200

Node 15 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.005	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0063-1600-0800-1600
Invert Level (m)	167.701	Min Outlet Diameter (m)	0.075
Design Depth (m)	0.800	Min Node Diameter (mm)	1200
Design Flow (l/s)	1.6		

Node 7-Attenuation Blanket Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	168.650	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	100	Depth (m)	
Safety Factor	2.0	Width (m)	7.200	Inf Depth (m)	
Porosity	0.30	Length (m)	15.600		

Node 14 - Attenuation Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	167.750
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	360

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	70.0	0.0	0.400	70.0	0.0	0.401	10.0	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year +40% CC 15 minute summer	297.620	84.216
30 year +40% CC 30 minute summer	217.014	61.407
30 year +40% CC 60 minute summer	163.225	43.136
30 year +40% CC 120 minute summer	110.524	29.208
30 year +40% CC 180 minute summer	88.870	22.869
30 year +40% CC 240 minute summer	72.658	19.201
30 year +40% CC 360 minute summer	58.131	14.959
30 year +40% CC 480 minute summer	47.312	12.503
30 year +40% CC 600 minute summer	39.727	10.866
30 year +40% CC 720 minute summer	36.125	9.682
30 year +40% CC 960 minute summer	30.604	8.059
30 year +40% CC 1440 minute summer	23.180	6.212
100 year +40% CC +10% A 15 minute summer	383.043	108.388
100 year +40% CC +10% A 30 minute summer	283.016	80.084
100 year +40% CC +10% A 60 minute summer	214.603	56.713
100 year +40% CC +10% A 120 minute summer	144.655	38.228
100 year +40% CC +10% A 180 minute summer	115.119	29.624
100 year +40% CC +10% A 240 minute summer	93.436	24.692
100 year +40% CC +10% A 360 minute summer	73.898	19.016
100 year +40% CC +10% A 480 minute summer	59.596	15.750
100 year +40% CC +10% A 600 minute summer	49.658	13.583
100 year +40% CC +10% A 720 minute summer	44.855	12.022
100 year +40% CC +10% A 960 minute summer	37.573	9.894
100 year +40% CC +10% A 1440 minute summer	27.987	7.501



Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.81%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	12	18	168.376	0.026	1.2	0.0095	0.0000	OK
30 minute summer	13	18	168.229	0.060	8.0	0.0443	0.0000	OK
960 minute summer	15	645	168.086	0.385	2.6	0.4355	0.0000	SURCHARGED
30 minute summer	1	18	169.192	0.042	2.9	0.0199	0.0000	OK
30 minute summer	2	18	169.044	0.076	5.3	0.0323	0.0000	OK
180 minute summer	11	120	168.933	0.783	4.0	0.8853	0.0000	FLOOD RISK
15 minute summer	16-Outfall	1	167.661	0.000	1.5	0.0000	0.0000	OK
180 minute summer	10	120	168.933	0.620	1.3	0.1755	0.0000	SURCHARGED
180 minute summer	9	120	168.933	0.571	1.2	0.2193	0.0000	SURCHARGED
180 minute summer	8	120	168.933	0.383	0.7	0.1326	0.0000	SURCHARGED
180 minute summer	7-Attenuation Blanket	120	168.945	0.304	7.6	7.5053	0.0000	SURCHARGED
180 minute summer	4	120	168.945	0.059	1.4	0.0243	0.0000	OK
30 minute summer	3	18	169.028	0.027	1.0	0.0099	0.0000	OK
180 minute summer	6	120	168.945	0.059	1.4	0.0243	0.0000	OK
30 minute summer	5	18	169.028	0.027	1.0	0.0099	0.0000	OK
960 minute summer	14 - Attenuation Tank	645	168.087	0.337	4.9	23.5561	0.0000	SURCHARGED

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	12	5.000	13	1.2	0.368	0.152	0.0354	66.3
30 minute summer	13	5.001	14 - Attenuation Tank	8.0	1.674	0.617	0.0231	
960 minute summer	15	Hydro-Brake®	16-Outfall	1.6				
15 minute summer	1	1.000	2	2.9	0.620	0.366	0.0511	
30 minute summer	2	1.001	7-Attenuation Blanket	5.3	0.844	0.871	0.0798	
180 minute summer	11	Hydro-Brake®	14 - Attenuation Tank	2.5				
15 minute summer	10	4.002	11	-2.4	0.542	-0.289	0.0262	
15 minute summer	9	4.001	10	1.3	0.628	0.163	0.0224	
15 minute summer	8	4.000	9	-1.1	0.337	-0.145	0.0871	
15 minute summer	7-Attenuation Blanket	1.002	11	7.5	0.987	0.524	0.0701	
30 minute summer	4	2.001	7-Attenuation Blanket	2.9	0.724	0.478	0.0176	
30 minute summer	3	2.000	4	1.0	0.340	0.165	0.0338	
30 minute summer	6	3.001	7-Attenuation Blanket	2.9	0.728	0.478	0.0173	
30 minute summer	5	3.000	6	1.0	0.341	0.165	0.0338	
30 minute summer	14 - Attenuation Tank	1.004	15	5.4	0.475	0.303	0.0820	



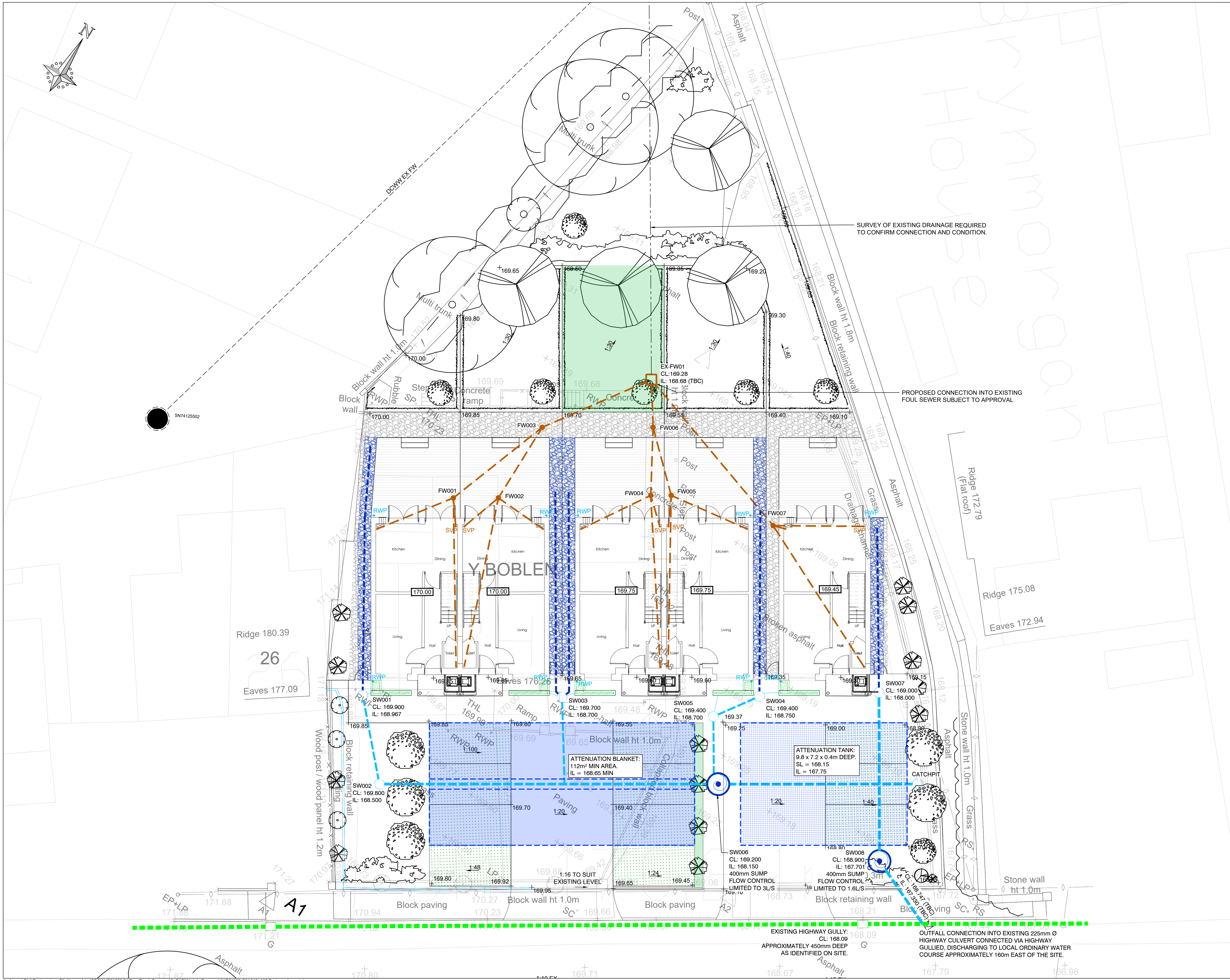
Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.81%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute summer	12	690	168.707	0.357	0.3	0.1311	0.0000	SURCHARGED
960 minute summer	13	690	168.707	0.538	1.9	0.4188	0.0000	FLOOD RISK
960 minute summer	15	690	168.707	1.006	3.2	1.1373	0.0000	FLOOD RISK
30 minute summer	1	18	169.202	0.052	4.2	0.0256	0.0000	OK
180 minute summer	2	128	169.131	0.164	3.6	0.0714	0.0000	SURCHARGED
180 minute summer	11	128	169.114	0.964	4.0	1.0905	0.0000	FLOOD RISK
15 minute summer	16-Outfall	1	167.661	0.000	1.6	0.0000	0.0000	OK
180 minute summer	10	128	169.114	0.801	1.5	0.2268	0.0000	FLOOD RISK
180 minute summer	9	128	169.115	0.753	1.8	0.2965	0.0000	FLOOD RISK
180 minute summer	8	128	169.115	0.565	0.7	0.1987	0.0000	FLOOD RISK
180 minute summer	7-Attenuation Blanket	128	169.129	0.488	10.7	13.8414	0.0000	FLOOD RISK
180 minute summer	4	128	169.129	0.243	2.0	0.1030	0.0000	SURCHARGED
180 minute summer	3	128	169.129	0.129	0.7	0.0473	0.0000	SURCHARGED
180 minute summer	6	128	169.129	0.243	2.0	0.1030	0.0000	SURCHARGED
180 minute summer	5	128	169.129	0.129	0.7	0.0473	0.0000	SURCHARGED
960 minute summer	14 - Attenuation Tank	690	168.707	0.957	4.4	33.6019	0.0000	FLOOD RISK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	12	5.000	13	1.7	0.386	0.216	0.0475	91.7
30 minute summer	13	5.001	14 - Attenuation Tank	11.5	1.779	0.887	0.0312	
960 minute summer	15	Hydro-Brake®	16-Outfall	1.8				
15 minute summer	1	1.000	2	4.2	0.665	0.530	0.0649	
30 minute summer	2	1.001	7-Attenuation Blanket	7.2	0.928	1.196	0.0959	
180 minute summer	11	Hydro-Brake®	14 - Attenuation Tank	2.6				
30 minute summer	10	4.002	11	2.2	0.558	0.265	0.0262	91.7
15 minute summer	9	4.001	10	2.3	0.623	0.284	0.0224	
15 minute summer	8	4.000	9	-1.7	0.308	-0.220	0.0871	
15 minute summer	7-Attenuation Blanket	1.002	11	7.6	1.072	0.534	0.0701	
30 minute summer	4	2.001	7-Attenuation Blanket	4.1	0.783	0.677	0.0346	
30 minute summer	3	2.000	4	1.4	0.363	0.232	0.0489	
30 minute summer	6	3.001	7-Attenuation Blanket	4.1	0.787	0.677	0.0341	
30 minute summer	5	3.000	6	1.4	0.364	0.232	0.0489	
60 minute summer	14 - Attenuation Tank	1.004	15	5.1	0.478	0.285	0.0853	

	CLIENT	Mr M H Nasser	Sheet No.	26	Rev	A02
			Job No.	AVO21088		
	PROJECT	Y Boblen, 24 Bryn Road, Cwmllynfell	Date	November 2021		
			Prepared	J. Wall		
			Checked	V. Walker		

APPENDIX F - Proposed Drainage Plans



DO NOT SCALE this drawing. Use figured dimensions only.
The Contractor must check & verify all dimensions on site.
Any discrepancies must be reported immediately to the Engineer for clarification before proceeding.
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It is assumed that all works on this drawing will be carried out by a competent contractor, working where appropriate to an approved method statement.

LEGEND

- SITE BOUNDARY
- FOUL WATER SEWER
- SVP SOIL VENT PIPE
- SURFACE WATER SEWER
- GEOCELLULAR ATTENUATION TANK
- GRANULAR ATTENUATION BLANKET
- FILTER DRAIN
- EXISTING PRIVATE COMBINED SEWER
- EXISTING DCWW COMBINED DRAIN
- EXISTING HIGHWAY SEWER (TBC)
- SW HYDROBRAKE CHAMBER
- RAISED RAIN GARDEN
- PARKING BAY - GRASS PAVING SYSTEM
- FOOTPATH - BITUMINOUS
- DRIVEWAY/PARKING - BITUMINOUS
- FOOTPATH - GRAVEL

ISSUED FOR SAB

A02	24.01.21	UPDATED TO SUIT SAB COMMENTS	JW
A01	08.11.21	ISSUED FOR SAB APPROVAL	JW
Rev	Date	Description	By

Client
MR HUMAYUN NASSER

Project
24 BRYN ROAD, CWNLLYNFELL

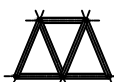
Title
DRAINAGE LAYOUT

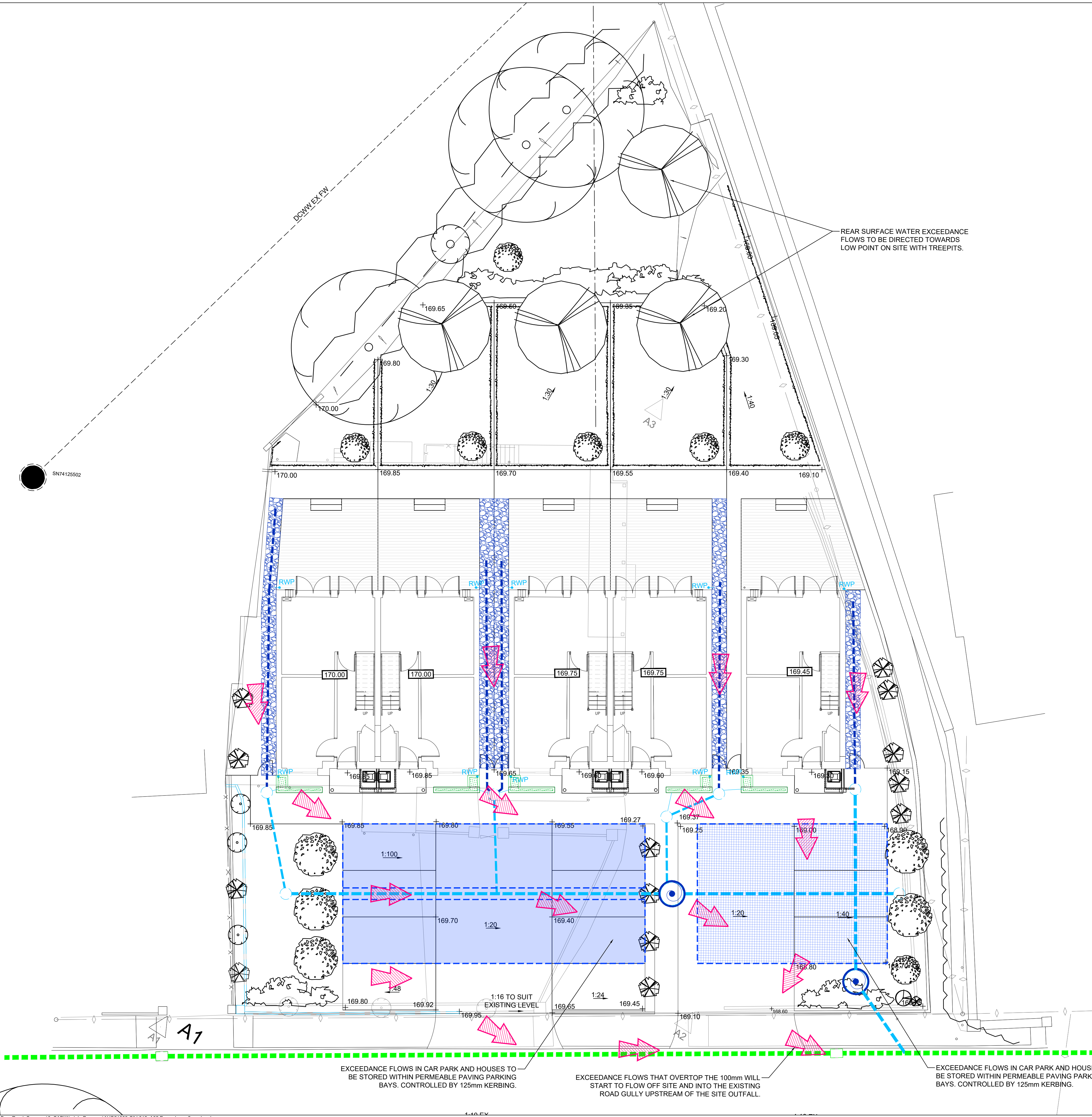
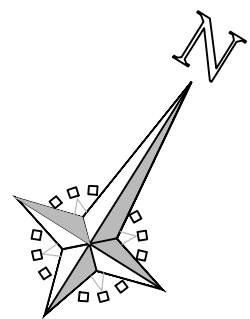
Drawing Status SAB APPROVAL				
Drawn	Checked	Approved	Date	Scale @ A1
JW	VW	JM	NOV 21	1:100
Project No.	Drawing No.	Revision		
AVO-21088	CIV-010	A02		



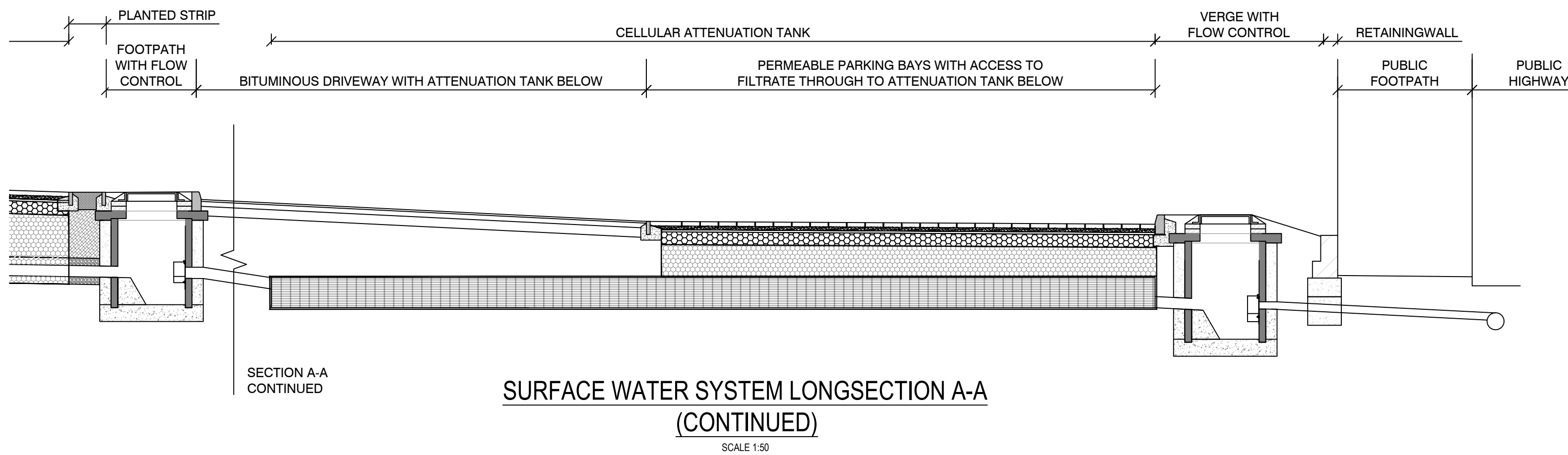
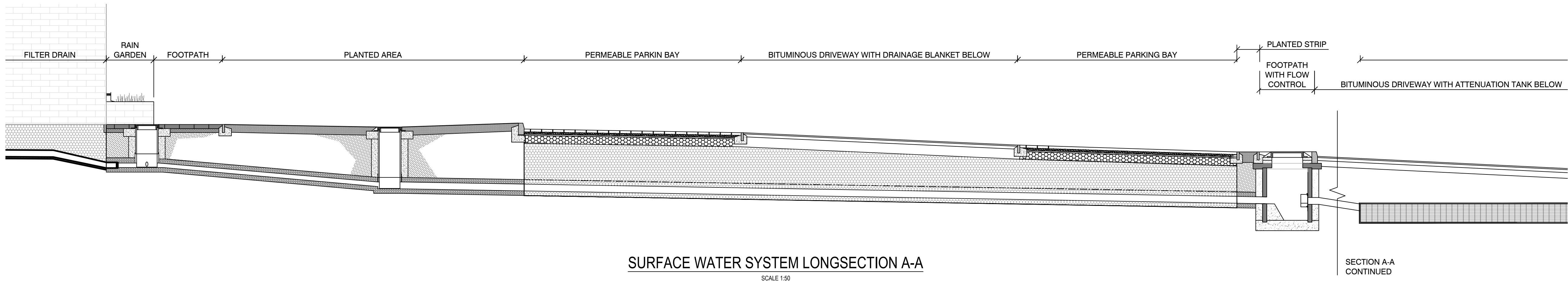
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It is assumed that all works on this drawing will be carried out by a competent contractor, working where appropriate to an approved method statement.

SAB APPROVAL ISSUE

A01 05/11/21 ISSUED FOR SAB APPROVAL JW

Rev Date Description By

Client

MR HUMAYUN NASSER

Project

24 BRYN ROAD, CWMLLYNFELL

Title

PROPOSED DRAINAGE DETAILS
SHEET 2

Drawing Status

PLANNING

Drawn Checked Approved Date Scale @ A1

JW VW JM NOV 2021 1:10 & 1:20

Project No. Drawing No. Revision

AVO-21088 CIV-012 A01



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Technical Specification

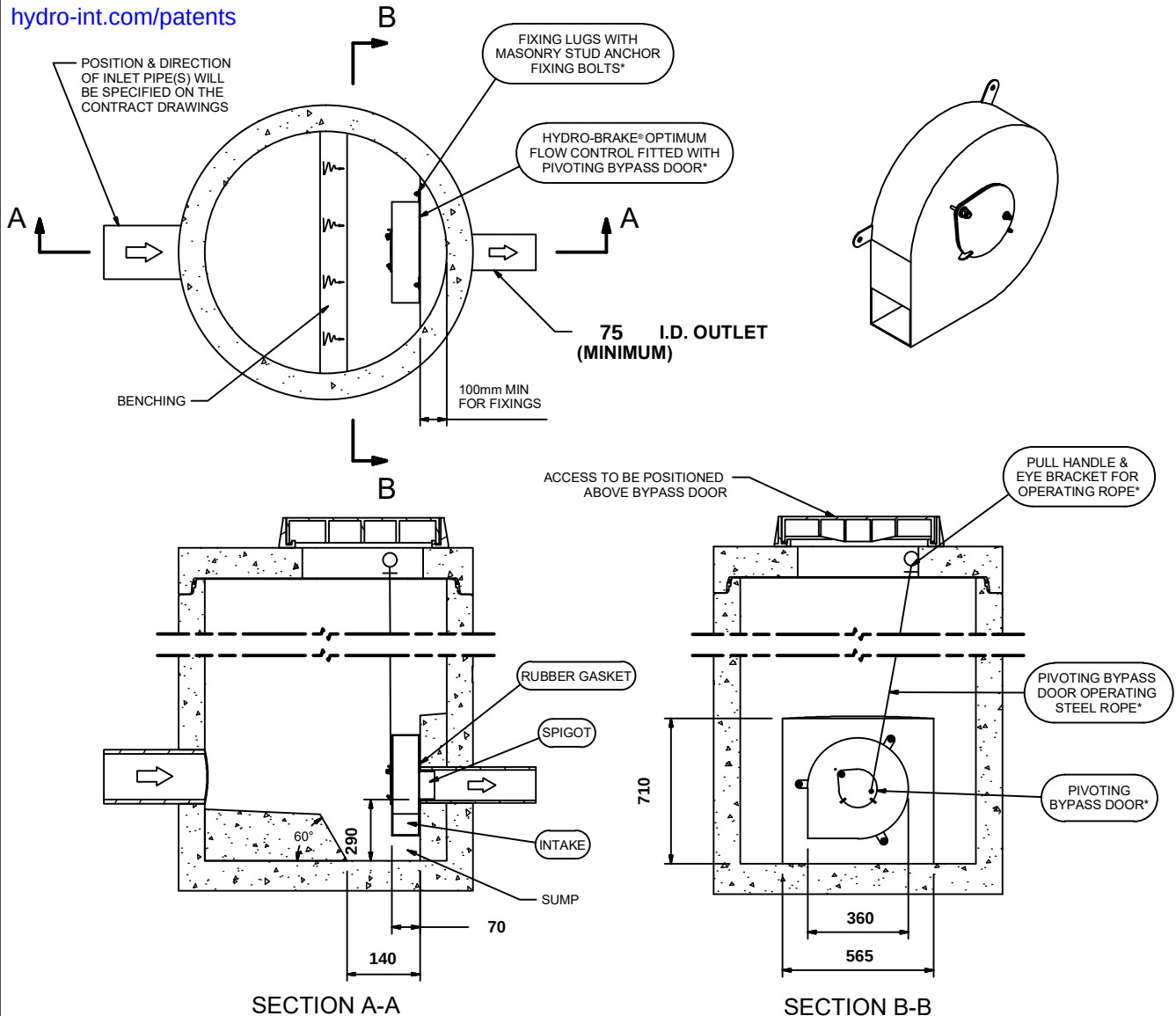
Control Point	Head (m)	Flow (l/s)
Primary Design	0.800	1.600
Flush-Flo™	0.246	1.600
Kick-Flo®	0.508	1.306
Mean Flow		1.405

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet



hydro-int.com/patents



IMPORTANT:

○ LIMIT OF HYDRO INTERNATIONAL SUPPLY

THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS

* WHERE SUPPLIED

HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW
CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE



The head/flow characteristics of this SHE-0063-1600-0800-1600 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
International®

DATE 1/26/2022 12:21 PM

SITE 24 Bryn Road

DESIGNER Joel Wall

REF Y Boblen

SHE-0063-1600-0800-1600

Hydro-Brake® Optimum

Technical Specification

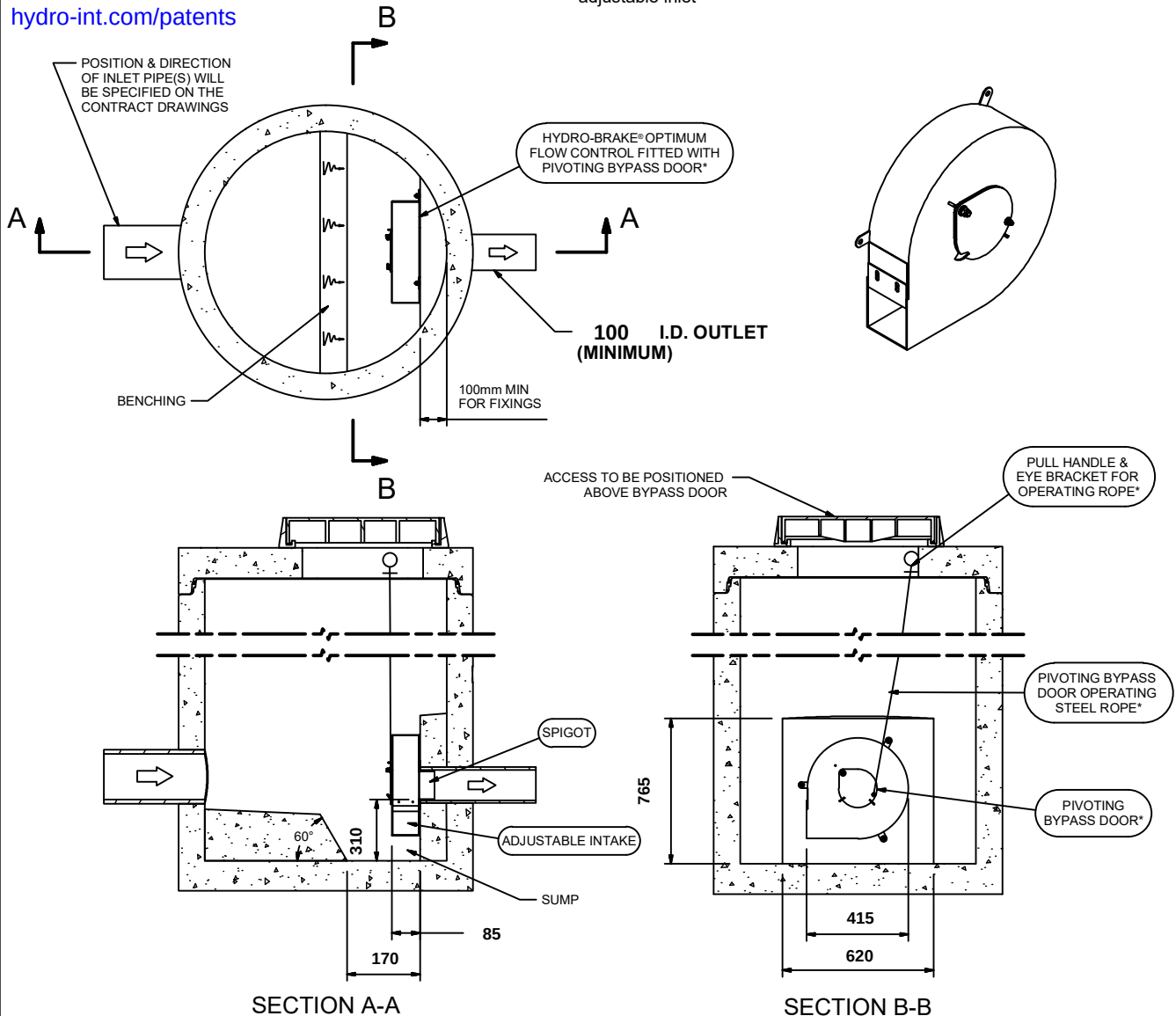
Control Point	Head (m)	Flow (l/s)
Primary Design	0.900	2.500
Flush-Flo™	0.271	2.500
Kick-Flo®	0.568	2.030
Mean Flow		2.189

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Variable flow rate post installation via adjustable inlet



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 FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
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 CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

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DESIGN ADVICE



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The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
International

DATE 1/26/2022 12:19 PM

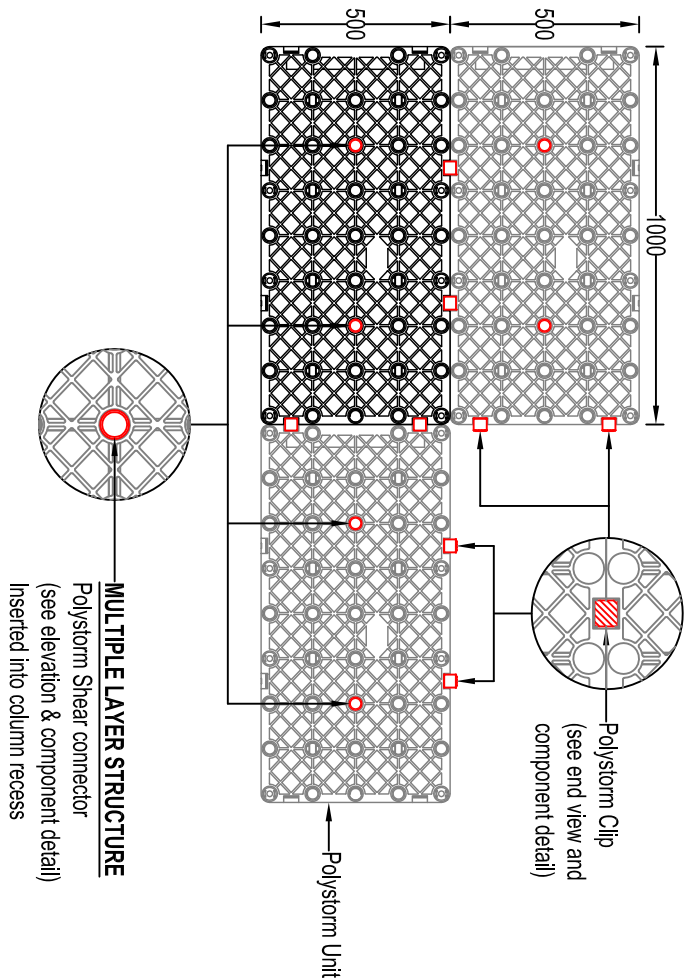
SITE 24 Bryn Road

DESIGNER Joel Wall

REF Y Boblen

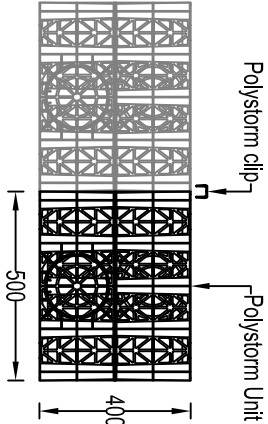
SHE-0077-2500-0900-2500

Hydro-Brake® Optimum



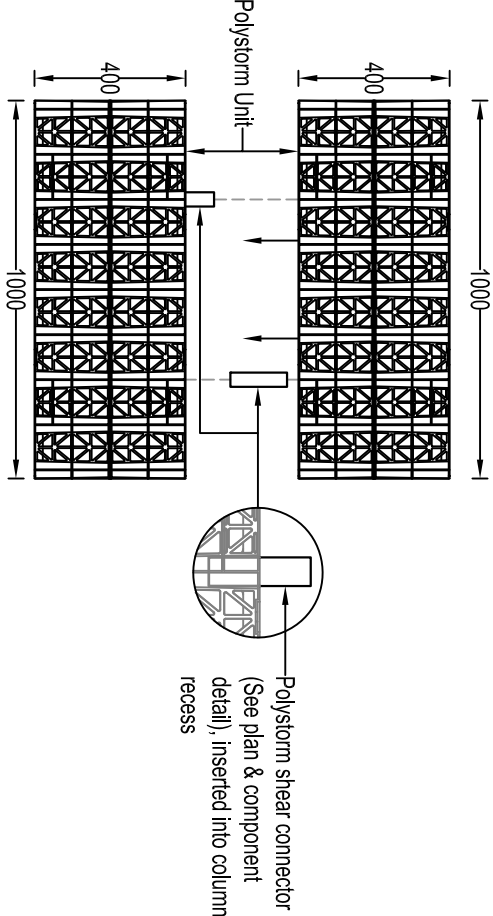
POLYSTORM CONNECTORS - PLAN VIEW

Scale 1:20



POLYSTORM LATERAL CONNECTIONS - END VIEW

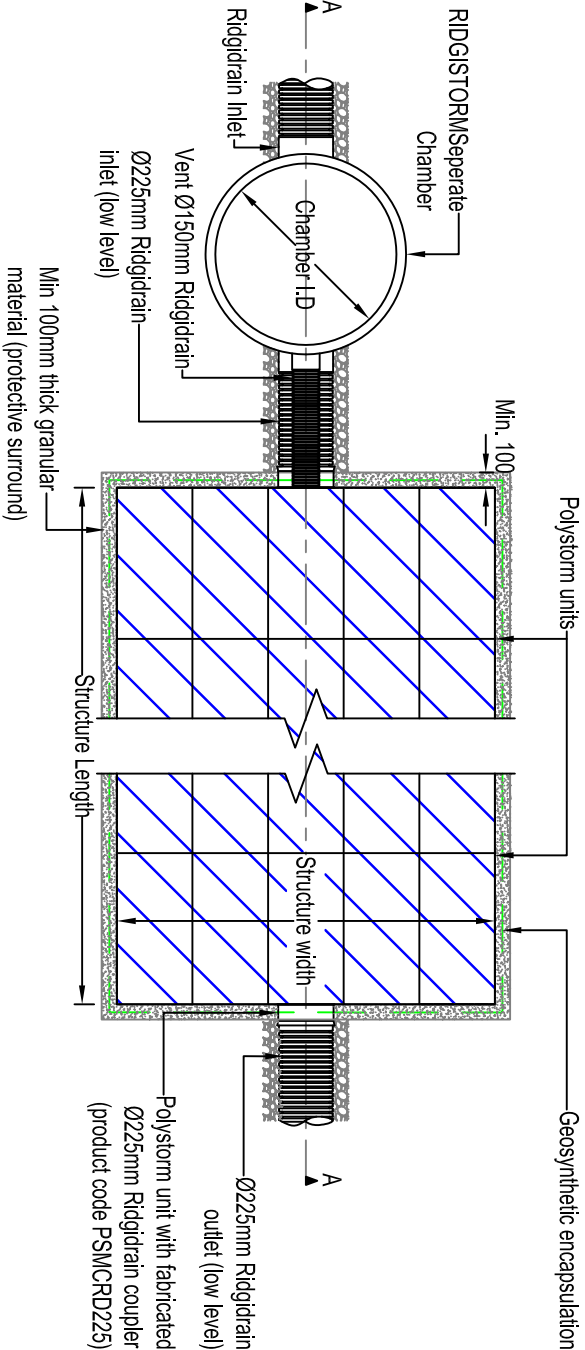
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POLYSTORM

SHEAR CONNECTIONS ELEVATION

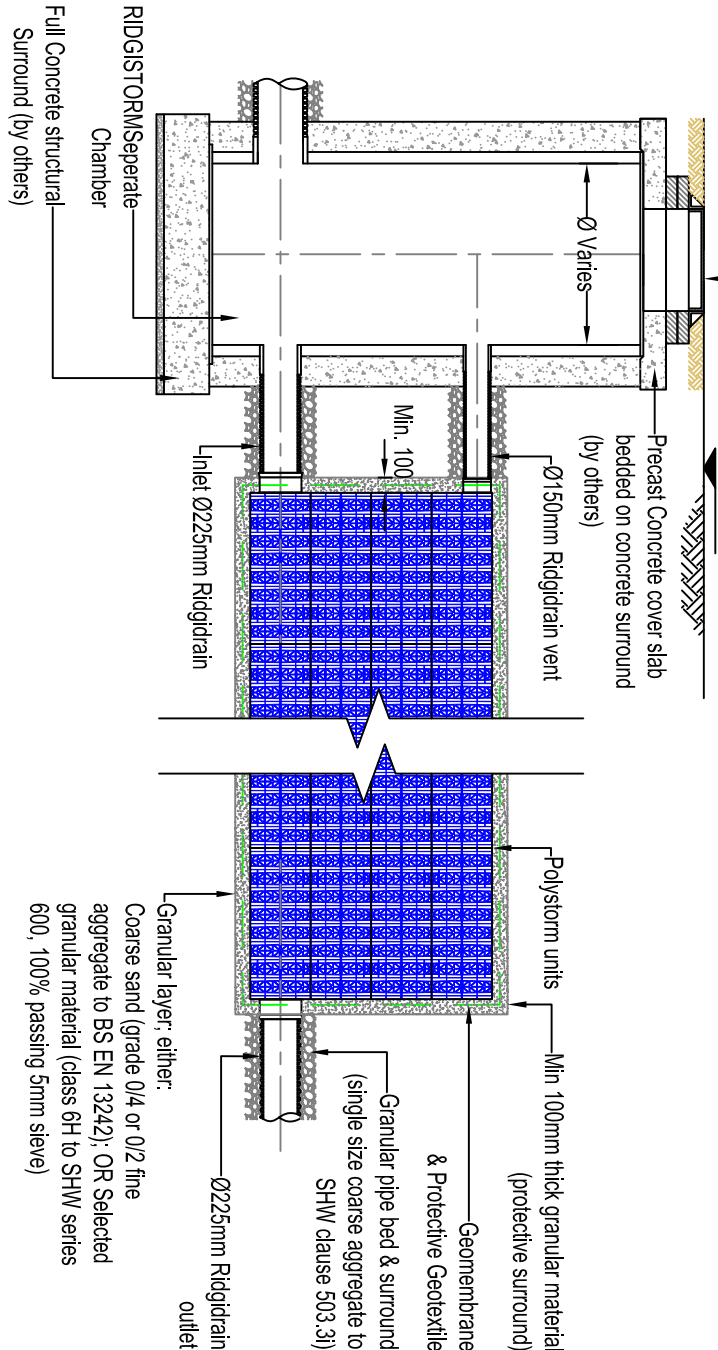
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POLYSTORM CONSTRUCTION DETAIL

TYPICAL PLAN

Scale 1:50



POLYSTORM CONSTRUCTION DETAIL

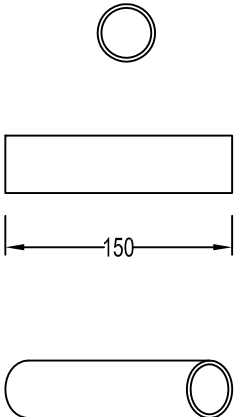
TYPICAL SECTION

Scale 1:50



POLYSTORM CLIP

Scale 1:5



POLYSTORM

SHEAR CONNECTOR

Scale 1:5

POLYSTORM SYSTEM NOTES

- Standard Polystorm units have a Ø160mm BS EN 1407-1 connection. Polystorm units can be fabricated with either a Ø225mm or Ø300mm Ridgidrain connection please refer to relevant details.

NOTES

- All dimensions in millimetres, unless otherwise stated.
- All dimensions are nominal and may vary within manufacturing or construction tolerances.
- All site temporary and enabling works by others.
- Polypipe products to be installed in accordance with technical guidance for further information), giving due consideration to the requirements of the organisation who will be taking ultimate owner ship of the installation.
- This drawing is intended for guidance only. Confirmation of the information contained within this document should be sought from the consulting engineers before final design or construction activities commence.

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www.polypipe.com/wms

PROJECT

POLYSTORM STANDARD DETAILS

DATE	DRAWN BY
17/03/16	JL

TITLE

POLYSTORM TANK ASSEMBLY DETAIL

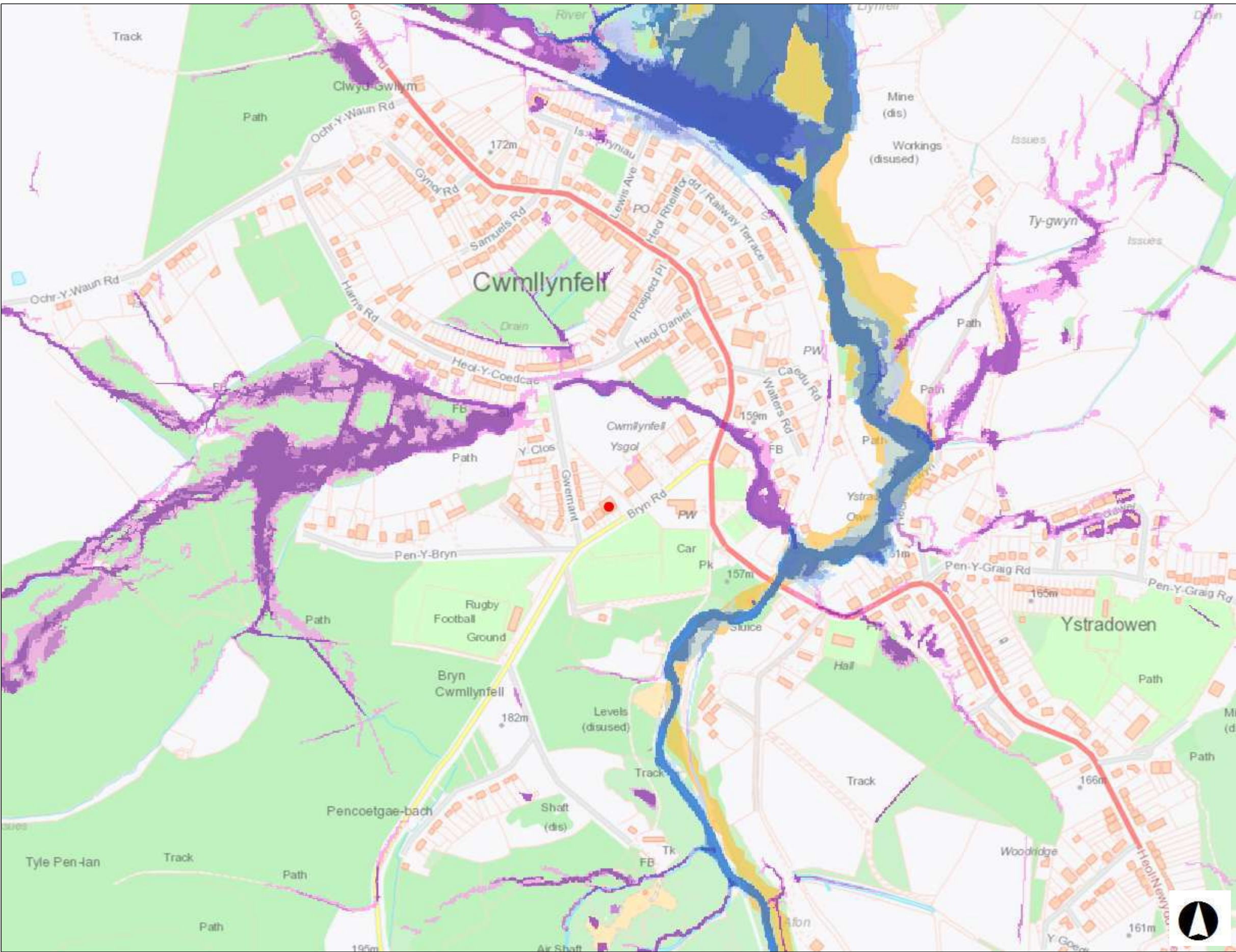
ORIGINAL SIZE	SCALE
A3	AS SHOWN

DRAWING NO. PSM_SD_009

REV.

	CLIENT	Mr M H Nasser	Sheet No.	27	Rev	A02
			Job No.	AVO21088		
	PROJECT	Y Boblen, 24 Bryn Road, Cwmllynfell	Date	November 2021		
			Prepared	J. Wall		
			Checked	V. Walker		

APPENDIX G - NRW Flood Maps



Map Perygl Llifogydd / Flood Risk Map -

Allwedd / Map Key

Main Rivers

Shoreline Management Plan & Coastal Erosion

Flood Storage Areas

Risk Level Under Review

Flood Risk from Rivers - Extent

High

Medium

Low

Flood Risk from the Sea

High

Medium

Low

Flood Risk from Surface Water & Small Watercourses - Extent

High

Medium

Low

Recorded Flood Extents

Flood Risk from Reservoirs

Flood Warning Area

Flood Alert Area

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date

04/11/2021



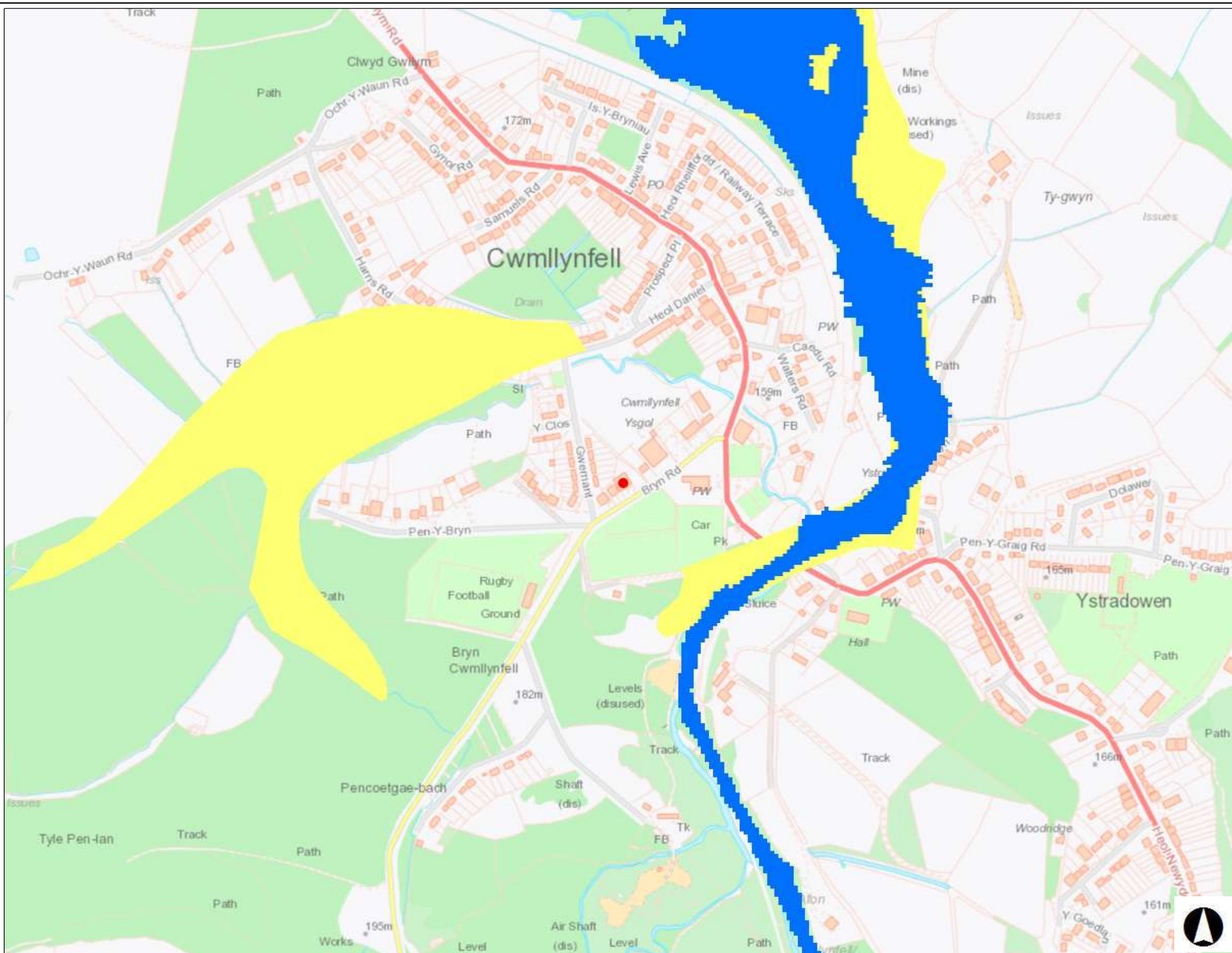
Map Perygl Llifogydd / Flood Risk Map -

Allwedd / Map Key

-  Zone C1
-  Zone C2
-  Zone B
-  Zone A

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
04/11/2021



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