



Development off J37 M4, Bridgend

Drainage Strategy Report

Client: Draycott Group

Project Ref: CC2507

Report status: S1 Rev P01

CAMBRIA

Report Control Sheet

Client	Draycott Group
Project	Development off J37 M4, Bridgend
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Document title	Drainage Strategy Report
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Prepared by	D Coles BEng (Hons) GMICE
Reviewed and authorised by	B Whyman MEng (Hons) GMICE MCIHT

Document naming protocol

Project Ref.	Originator	Vol.	Level	Type	Role	Number
CC2507	CAM	ZZ	XX	RP	C	0001

Current issue

Status	Date	Description	Prepared by	Authorised by
S2 Rev P01	15/02/24	Issued for PAC	D Coles	B Whyman

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1 Introduction

- 1.1.1 Cambria Consulting Ltd have been appointed by Draycott Group to develop a Drainage Strategy Report in support of a planning and SAB application for the development off Junction 37, M4, in Bridgend. The development includes a Petrol Filling Station, Greggs, Starbucks and McDonalds.
- 1.1.2 As a result of the enactment of Schedule 3 of the Flood Management Act 2010 by the Welsh Government, the development will require Sustainable Drainage (SuDS) approval, as well as planning approval, in order to be constructed.
- 1.1.3 The objectives of this report are:
- ▶ Identify suitable outfall locations for the Surface Water and Foul Water from the proposed development.
 - ▶ Undertake hydraulic calculations to identify peak design flows or restrictions to the development and any subsequent attenuation requirements.
 - ▶ Consult with SAB and Dwr Cymru Welsh Water regarding the proposals.
 - ▶ Provide a schematic layout of the proposed foul and surface water drainage proposals.
 - ▶ Demonstrate compliance with the National SuDS standards.

2 Site Description

2.1 Site Location

2.1.1 The development site is located on a parcel of land directly of Junction 37, M4 in Bridgend. The nearest postcode being CF33 4SA and is located around the Ordnance Survey Grid Reference 282402E, 181023N. The site is approximately 2.4ha in area.

2.1.2 The site is currently used as agricultural land. To the north of the site is the M4 motorway and to the south and east is the A4229.

2.1.3 The site location is shown in Figure 2-1 below.

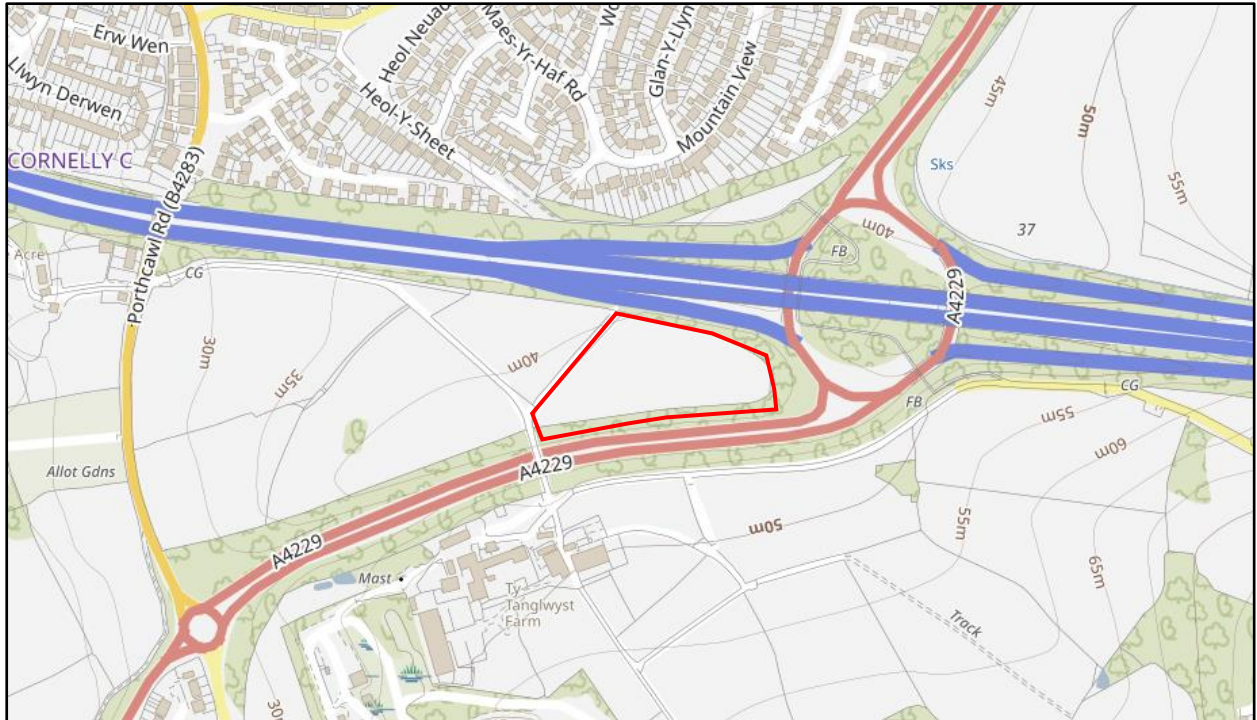


Figure 2-1 - Site Location (Data Map Wales)

2.2 Topography

- 2.2.1 A topographical survey of the site has been undertaken by Zenith Land Surveys Ltd on the 30th of January 2023. A copy of the topographical survey is included in *Appendix A*.
- 2.2.2 The survey shows the majority of the site to be relatively flat with the site grading south to north, with levels changing from approximately 44.0mAOD to 40.24mAOD. The site is bound by the A4229 to the south of the site via a large embankment with a level difference of 4m+. The site is a majority green landscape with a track running adjacent to the north-eastern boundary.

2.3 Ground Conditions

- 2.3.1 A site investigation is yet to be undertaken on the site. A site investigation is being planned on the site to get a full appreciation of ground conditions underneath the site. The site investigation will include BRE 365 Digest soakaway tests, contamination testing, identify depth of groundwater etc. to inform the surface water drainage strategy.
- 2.3.2 A historic borehole log (SS88SW90) is shown on BGS Geology Viewer present on the site. From the borehole log is suggested that the ground strata are made up of a mixture of sand, gravel, silt, and clay and with the no nearby watercourses it suggests that surface water percolates into the ground. An intrusive site investigation will need to be completed to prove this.
- 2.3.3 A copy of the BGS borehole logs is shown within *Appendix B*.

2.4 Proposed Development

- 2.4.1 Full planning permission is sought for the proposed construction of a petrol filling station, Greggs, McDonalds and Starbucks, along with the drainage and associated works required. A 500m+ cycle path is proposed adjacent to the A4229 to allow for pedestrian connectivity to the site.
- 2.4.2 The proposed masterplan has been produced by Lawrays Architects, an extract of the layout is shown in Figure 2-2 below and included in *Appendix C*.

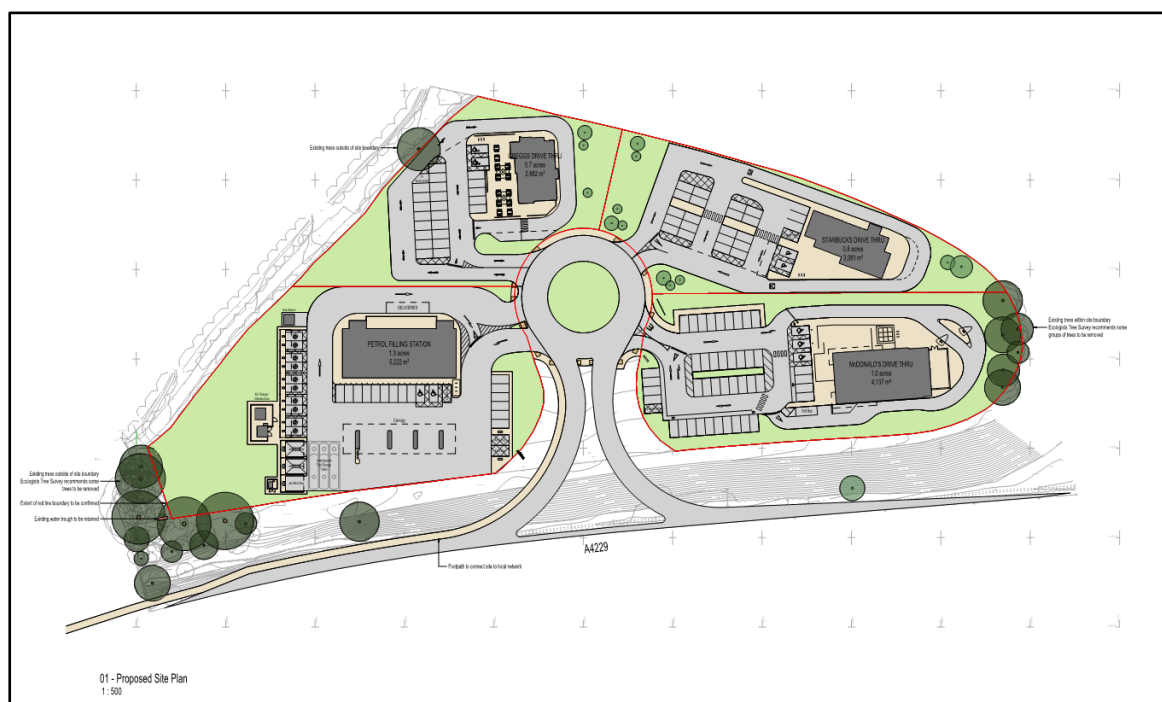


Figure 2-2 – Proposed Site Plan (Lawray's Architect)

3 Flood Risk

- 3.1.1 The new development is sited within Flood Zone A of the Development Advice Maps and Flood Zone 1 of the NRW flood map for planning and at little risk of flooding from rivers & sea (less than 1 in 1000 +CC chance of flooding in a given year). NRW detailed Flood Risk maps show there are no areas of the site within Flood Risk Zone 2 and 3 for surface water and small watercourses. North of the site within the M4 junction access road there are areas within Flood Zone 2 and 3 for surface water and small watercourses.
- 3.1.2 The levels design will need to consider potential overland flows from adjacent areas to ensure the proposed development is protected in extreme storm events.

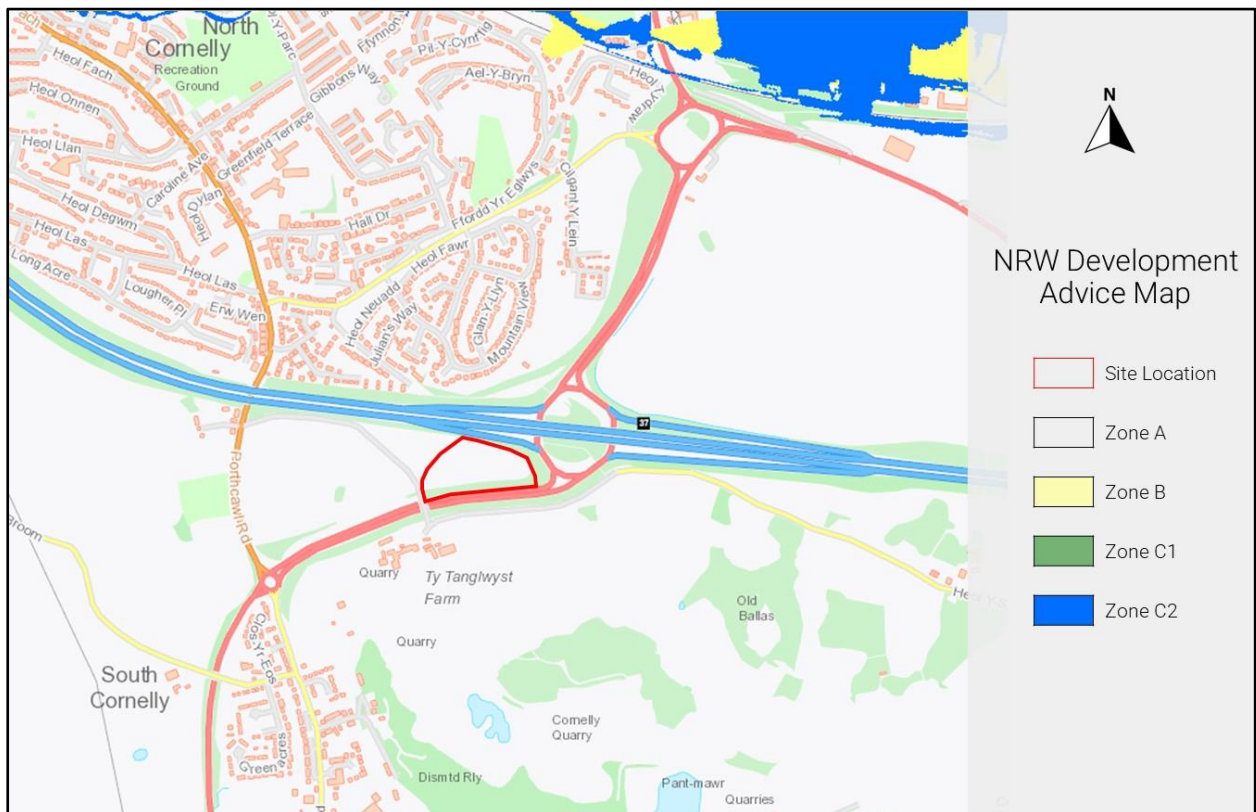


Figure 3-1 – Extract from NRW Development Advice Map

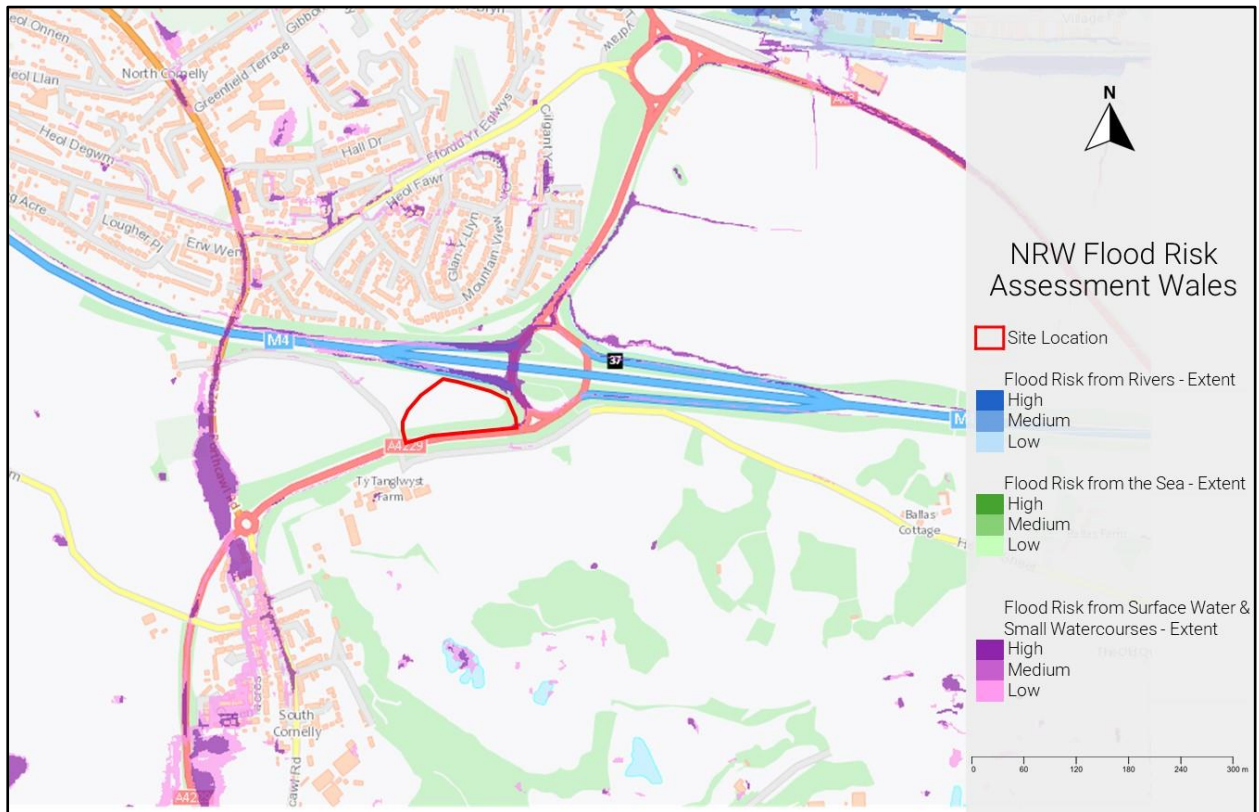


Figure 3-2 – Extract from NRW Flood Map for Planning

5 Foul Drainage

- 5.1.1 Welsh Water records show there are no public foul water sewers within the site. The nearest public foul water sewer is a 100mm alkathene rising main sewer with a connection pump, approximately 200m+ west of the proposed development and runs north to south on the B4283. There is no record of any other foul water sewer within the vicinity of the site.
- 5.1.2 A predevelopment enquiry was made to Welsh Water regarding the foul drainage network system to agree a solution.
- 5.1.3 The pre-development enquiry response confirmed there are no public foul sewer connections within the vicinity of the site. The nearest is 230m away. The possibility of onsite treatment works needs to be explored as a connection to the existing is deemed not feasible for the size of the development.
- 5.1.4 A copy of the pre-development enquiry response is in *Appendix D*.
- 5.1.5 The drainage strategy drawing included in *Appendix E* shows a sewage packaged treatment plan with a treated effluent discharge into the watercourse to the south of the site. This would be subject to a discharge license from NRW.

6 Surface Water Drainage

6.1.1 In October 2018, the Welsh Government published the 'Statutory standards for sustainable drainage systems – designing, constructing, operating, and maintaining Surface Water Drainage Systems'. This standard is now mandatory for new developments with either a construction area greater than 100m² or more than 1 dwelling.

6.1.2 The principles that underpin the design of surface water management schemes to meet the standards area as follows:

- ▶ Manage water on or close to the surface and as close to the source of the runoff as possible:
- ▶ Treat rainfall as a valuable natural resource:
- ▶ Ensure pollution is prevented at source, rather than relying on the drainage system to treat or intercept it:
- ▶ Manage rainfall to help protect people from increased flood risk, and the environment from morphological and associated ecological damage resulting from changes in flow rates, patterns and sediment movement caused by the development:
- ▶ Take account of likely future pressures on flood risk, the environment and water resources such as climate change and urban creep:
- ▶ Use the SuDS Management Train, using drainage components in series across a site to achieve a robust surface water management system (rather than using a single "end of pipe" feature, such as a pond, the serve the whole development):
- ▶ Maximise the delivery of benefits for amenity and biodiversity:
- ▶ Seek to make the best use of available land through multifunctional usage of public spaces and the public realm:
- ▶ Perform safely, reliably and effectively over the design life of the development taking into account the need for reasonable levels of maintenance:
- ▶ Avoid the need for pumping where possible:
- ▶ Be affordable, taking into account both construction and long-term maintenance costs and the additional environmental and social benefits afforded by the system:

6.2 Standard S1 – Surface Water Runoff Destination

6.2.1 This standard reviews the disposal routes for surface water run-off. The destinations are split into 5 levels with level 1 being the most preferential and level 5 being the least preferred and only used in exceptional circumstances.

Priority Level 1: Surface water runoff is collected for use:

- 6.2.2 There are no known issues or stresses on the local Mains Water supply network within the vicinity of the site.
- 6.2.3 The feasibility of a rainwater harvesting system will be reviewed. The introduction of a small rainwater harvesting tank will be utilised in the petrol filling station would assist in meeting the 5mm interception criteria and will form part of an activated attenuation feature for the larger design storm events.
- 6.2.4 All rainwater harvesting systems are provided with emergency overflows and therefore lower priority levels will need to be considered for surface water disposal from the site.

Priority Level 2: Surface water runoff is infiltrated to ground:

- 6.2.5 As discussed in Section 2.3, an intrusive investigation has not yet been undertaken. Therefore, BRE 365 soakaway testing has not been completed on site, so infiltration is unknown.
- 6.2.6 The feasibility of a soakaway is therefore unknown and will need to be reviewed once a Site Investigation has been completed.

Priority Level 3: Surface water runoff is discharged to a surface water body:

- 6.2.7 There is a small watercourse south of the site that takes drains the A4229. Due to the site topography only the access road and footpath will be drained via the watercourse.
- 6.2.8 The remaining site will need to be feasible, and a higher priority will need to be explored.

Priority Level 4: Surface water runoff is discharged to a surface water sewer, highway drain or other drainage:

- 6.2.9 As the site is an undeveloped greenfield site, there are no public sewers within the vicinity of the site.
- 6.2.10 The nearest surface water sewer is approximately 200m+ west of the site made of concrete construction with a diameter of 1570mm.
- 6.2.11 A connection into this surface water sewer will be driven by invert levels and costing. The feasibility of this connection will need to be further investigated.

Priority Level 5: Discharge to a Combined Sewer

- 6.2.12 Not considered, a higher priority level is feasible.

6.3 Standard S2 – Surface Water Hydraulic Control

- 6.3.1 A Proposed Drainage catchment plan CC2507-CAM-CX-XX-DR-C-1500, included in *Appendix E*, shows a total impermeable catchment area of 133337m² or 1.334ha.
- 6.3.2 The Proposed Drainage Catchment plan has also split the site into its 5 separate developments and given a total impermeable catchment for each development.

- 6.3.3 It is proposed to restrict runoff of the development site to greenfield runoff rates, which have been calculated using the new ReFH2 data, using ReFH 2 software and summarized in Table 5 below;

Table 1: Greenfield Runoff Rates (ReFH2)		
Storm Event	Greenfield Runoff Rate (l/s/ha)	Restricted Greenfield Runoff Rates (l/s)
QBar	3.50	4.67
1 in 1 year	2.95	3.93
1 in 30 year	7.59	10.13
1 in 100 year	9.83	13.12

- 6.3.4 The surface water drainage strategy proposes a discharge restriction of QBar 3.50 l/s/ha which equates to **4.67 l/s** for the proposed development.
- 6.3.5 A copy of the greenfield runoff and storage calculations has been included in *Appendix F*.
- 6.3.6 Outline attenuation storage volumes have been assessed using the Quick Storage Estimate tool in WinDes Source Control. The total attenuation requirements for the site and the individual attenuation requirements for each development parcel. The calculations are based on FEH rainfall and CV values of 1.

Table 6: Attenuation Storage Volume Range (1 in 100 year + 40%CC)		
Storm Event	Minimum Storage Volume (m³)	Maximum Storage Volume (m³)
Whole Site (1.334ha)	1182	2228
Petrol Filling Station (0.366ha)	323	610
Gregg's (0.192ha)	168	317
Starbucks (0.230ha)	205	386
McDonald's (0.296ha)	258	485
Access Road (0.249ha)	219	412

- 6.3.7 The attenuation storage will be delivered through both above and below ground storage. Attenuation storage will be maximised within the swale / bio-retention / raingarden features, permeable paving and cellular storage throughout the site.
- 6.3.8 A preliminary drainage strategy drawing, CC2507-CAM-XX-XX-DR-C-0500 included in *Appendix E* shows the principal SUDs areas.

6.4 Standard S3 – Water Quality

- 6.4.1 A suitable outfall would need to be agreed with the SAB. Sufficient levels of treatment within a SUDs treatment train will be needed prior to surface water runoff being discharged from site.
- 6.4.2 The Simple Index Approach method should be adopted to ensure sufficient treatment measures are in place. Due to the site's usage it's likely some areas of the site would be deemed as having a medium-high pollution potential. This would likely need multiple levels of SUDs treatment for some areas.
- 6.4.3 A mix of SuDS features are proposed as part of a SuDS treatment train. This includes the use of permeable paving, rain gardens, swales, and filter drains.

6.5 Standard S4 – Amenity

6.5.1 The proposed drainage strategy includes above ground SuDS features which will be used to develop amenity on site. Shallow rain gardens / swales will be constructed throughout the site. These will be planted & attractive features, accessible to staff and visitors. The area will also be visible from the site access road.

6.6 Standard S5 – Biodiversity

6.6.1 The drainage design maximises the use of above ground, soft, SuDS features which will create habitats that are self-sustaining and resilient to climate change and link with the local natural and semi-natural species and habitats.

6.6.2 Water collected in the rain gardens will provide the necessary conditions for the new habitats to develop on site. By developing the habitat on site, the connectivity to the habitats presents in and near the connecting waterways can be enhanced.

6.6.3 Planting in and around the SuDS features will also benefit the existing vegetation regime. These additional plantings create a more resilient ecosystem which allows natural re-colonisation of the feature should damage due to pollution occur.

6.6.4 Plants for pollinators will be prioritised, along with native species.

6.7 Standard S6 - Design of drainage for Construction, Operation and Maintenance and Structural Integrity

6.7.1 The SuDS solution has been designed in accordance with the SuDS manual and the site is generally served by shallow SuDS features, reducing the capital cost and long-term maintenance costs of the scheme.

6.7.2 It is anticipated the client will maintain and own the site and therefore all SuDS features will be privately maintained and not offered for adoption by the SAB.

6.7.3 There are no inherent safety issues with the proposed scheme. Generally, the above ground SuDS features will be dry during normal conditions and very limited in terms of water depths during extreme events. All SuDS features are in areas with good surveillance. Any residual risks associated with the SuDS features will be highlighted within the designer's risk assessment submitted as part of the SuDS application.

7 Conclusions

- 7.1.1 Welsh Water has confirmed there is no public surface water or foul water drainage within the vicinity or near the site. Potential treatment works on site will be investigated for the foul. As for the surface water, further investigation will take place to locate a potential outfall.
- 7.1.2 A site investigation is yet to be undertaken on the site. An infiltration solution will be fully explored in accordance with the National SuDS standards.
- 7.1.3 The peak discharge will for the site will be restricted to **4.67 l/s** and will require attenuation storage in the range of **1182 – 2228m³** for the 1 in 100 year +40% climate change storm event.
- 7.1.4 The proposed drainage strategy includes rain gardens, swales and permeable paving throughout the site, providing amenity and biodiversity benefits.
- 7.1.5 The surface water strategy will be subject to SAB approval and further detailed design.

Recommendations

- ▶ The site investigation must explore the feasibility of a soakaway / infiltration solution.
- ▶ Pre-app meeting discussions with the SAB will need to be commenced once receipt of the site investigation report.

Appendix A: Topographical Survey

Appendix B: BGS Borehole Logs





GLAMORGAN COUNTY COUNCIL - ROADS AND BRIDGES DEPARTMENT

MATERIALS LABORATORY

SS 88 SW / 90

BOREHOLE LOG

N.G.R 8241 8070

1" : 262

Name of Job M.4. Stormy Down to Groes Section. Contract 2

Borehole No. 1 Ground Level 44.173 m Chainage -

Location of Hole See attached plan

Date Started 16th August, 1973 Date Finished 18th August, 1973

Depth m		Thickness m	Description of Strata	Depth Below Surface m	NMC	LL	PL	PI
From	To							
0.00	0.45	0.45	FIRM, friable brown clayey silty TOPSOIL					
0.45	2.00	1.55	FIRM, friable reddish-brown clayey SILT and SAND with a little gravel (CL - SF)	0.45 to 1.20	19			
				1.20 to 2.00	15			
				1.65 to 1.95				
2.00	3.50	1.50	LOOSE, sub-rounded to sub-angular GRAVEL, with some sand and some firm friable red and grey mottled clayey silt. Occasional cobbles. Clean sand and gravel band about 2.7 - 2.8 m (GP)	2.00 to 3.50	15	32	19	24
				3.15 to 3.45				
3.50	4.50	1.00	STIFF red clayey SILT with some sand and a little gravel (CL)	3.50 to 4.50	11	31	16	20
				3.90 to 4.20				
4.50	6.00	1.50	MODERATELY COMPACT angular to sub-angular GRAVEL, with some sand and some stiff red silty clay (GP - GF)	4.65 to 4.95				
				5.40 to 5.70				20

NMC - Natural Moisture Content % by weight

SPT - Standard Penetration Test B.S.1377

N - Blows for 12 in. Penetration

LL - Liquid Limit

PL - Plastic Limit

PI - Plasticity Index



SS 88 SW 90

Name of Job M.4. Stormy Down to Cross Section, Contract 2

Borehole No. 1

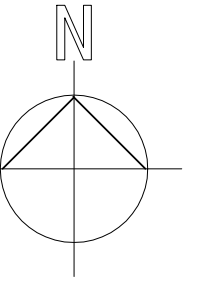
Continuation Sheet No. 1

Depth m		Thickness m	Description of Strata	Depth Below Surface m	NMC	LL	PL	PI
From	To							
6.00	7.50	1.50	Moderately hard, highly weathered, reddish-brown calcareous SILTSTONE. (Recovered as angular gravel)	6.15 to 6.45				51
				6.90 to 7.20				68
7.50	9.70	2.20 pene- trated	Hard, faintly to slightly weathered, light to medium grey, fine grain LIMESTONE. Irregular narrow fissures, and calcite veins throughout. Some haematite in places	7.50 to 7.55				60 ^a
			gravel size fragments, lengths 40 - 115 mm	7.60 to 8.00	93			7.50 to 8.00
			lengths up to 450 mm, mainly 40 - 180 mm	8.00 to 9.70	100			8.00 to 9.70
			No ground water was encountered.					
			a. This was for initial 2 inch penetration only.					

2 1/2" dia. core from 7.50 m recovery 100%

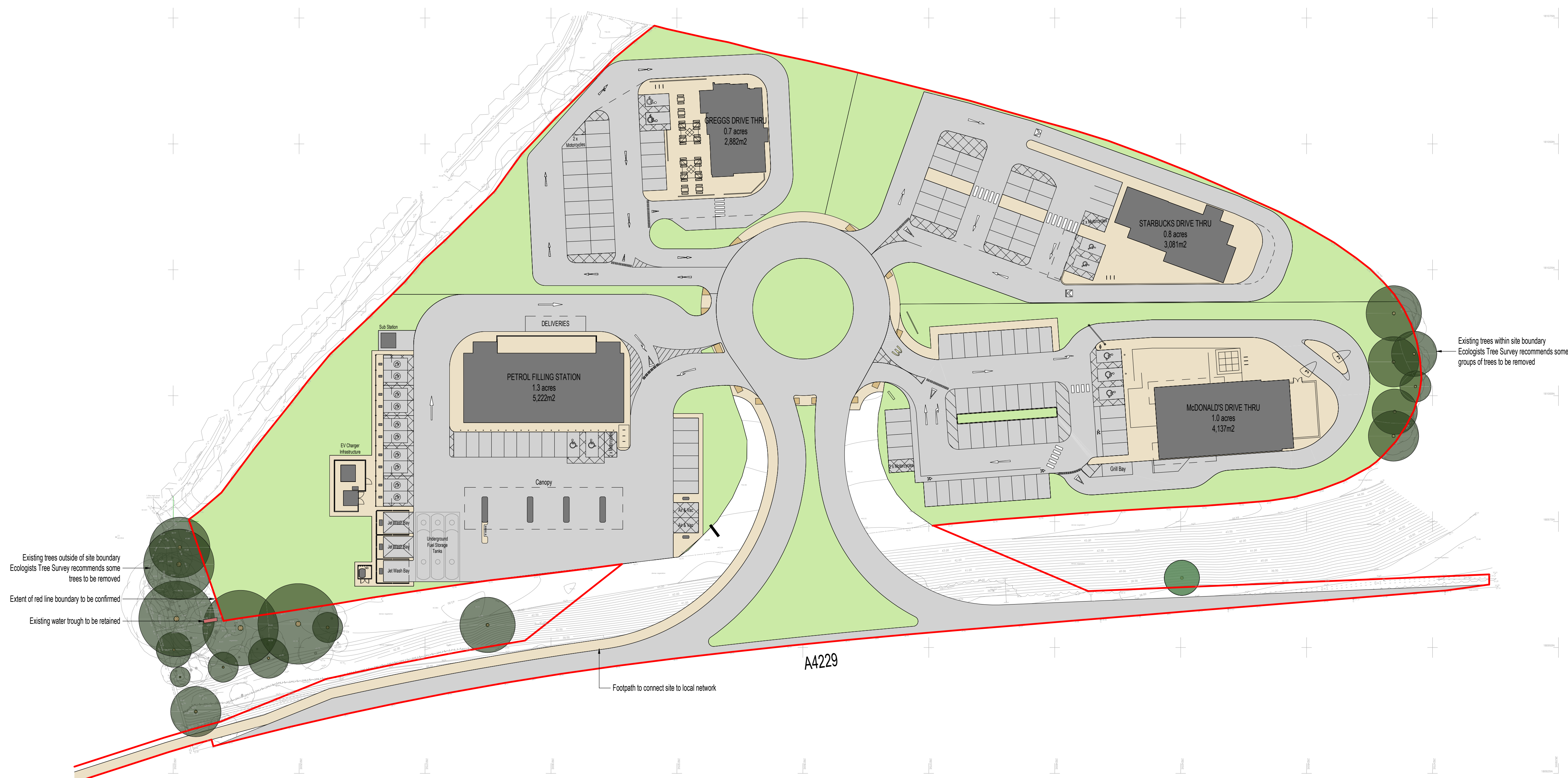
Appendix C: Proposed Site Layout





LEGEND:

- Site boundary
- Proposed building
- Hardstanding - Pedestrian route
- Hardstanding - Vehicle route
- Soft landscaping - refer to Landscape Designers info for further details
- Pedestrian crossing - blister paving



Existing trees outside of site boundary
 Ecologists Tree Survey recommends some trees to be removed
 Extent of red line boundary to be confirmed
 Existing water trough to be retained

Existing trees within site boundary
 Ecologists Tree Survey recommends some groups of trees to be removed

Footpath to connect site to local network

A4229

- P9 Red line boundary amended. Landscaped area added as per Landscape Designers proposal | RE | MWR | MWR 27/03/2024
- P8 Sub Station added | RE | MWR | MWR 24/01/2024
- P7 Kerb lines and footway to McDonalds site entrance amended as Transport Planners comments | RE | MWR | MWR 27/11/2023
- P6 Merge and diverge lanes added | RE | MWR | MWR 13/11/2023
- P5 Parking provision for Greggs and Starbucks amended in line with Transport Planners comments. Footway width reduced to 2 meters | RE | MWR | MWR 10/11/2023
- P4 Footpath / Cycleway added. Footpath added around roundabout. Footpath between McDonalds and Starbucks omitted | RE | MWR | MWR 06/11/2023
- P3 Site amendments to suit Highway Engineers comments. Revisions Clouded | RE | MWR | MWR 28/09/2023
- P2 Filling Station Layout updated | LF | RE | MWR 24/07/2023
- P1 Issue of coordination | LF | RE | MWR 12/07/2023
- P0 First Issue. Issued for Client and Design Team review | RE | MWR | MWR 13/04/2023

REV	DESCRIPTION DRAWN BY CHECKED BY APPROVED BY	DATE
RIBA PLAN OF WORK WORKSTAGE	LEVEL OF MODEL DEFINITION (LOD)	
Stage 3 - Spatial Coordination	LOD 3 - Approximate Model	

PURPOSE OF ISSUE - SUITABLE FOR... STATUS or SUITABILITY
 Planning Submission Status S1 - Delivery Team Coordination

Proposed Site Plan
 1 : 500



CARDIFF 029 2052 8140
 LONDON 0207 138 3560
 WREXHAM 01978 357 887
 www.lawray.co.uk
 CLIENT
 Draycott Group

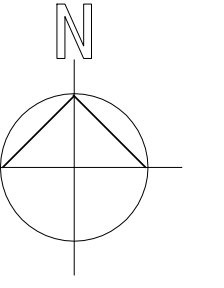
PROJECT TITLE
 Junction 37 Motorway Services

DRAWING TITLE
 Proposed Site Plan

PROJECT No 19804 SCALE @ A1 1 : 500

DRAWING No	1100	Project	Originator	Volume	Level	Type	Revision	Number
1803	Project	Originator	Functional	Spatial	Form	Discipline	Number	
1803	Project	Originator	Functional	Spatial	Form	Discipline	Number	

DO NOT SCALE Any discrepancy or query concerning this drawing should be referred to the Architect
 Registered Office: Greenmeadow Springs, 1, Cae Gwynn, Tongwynlais, CARDIFF CF15 7AB
 Reg. Co. No. 2724118, VAT Reg No. 134 2146 06



LEGEND:

- Site boundary
- Proposed building
- Hardstanding - Pedestrian route
- Hardstanding - Vehicle route
- Soft landscaping



P6	Tact amended RE MWR MWR	02/04/2024
P5	Red line boundary amended. Landscaped area added as per Landscape Designers proposal RE MWR MWR	27/03/2024
P4	Sub Station added RE MWR MWR	24/01/2024
P3	Kerb lines and footway to McDonalds site entrance amended as per Transport Planners comments RE MWR MWR	27/11/2023
P2	Merge and diverge lanes added RE MWR MWR	13/11/2023
P1	Parking provision for Greggs and Starbucks amended in line with Transport Planners comments. Footway width reduced to 2 meters RE MWR MWR	10/11/2023
P0	First Issue. Issued for Design Team coordination RE MWR MWR	06/11/2023

REV.	DESCRIPTION DRAWN BY CHECKED BY APPROVED BY	DATE
RIBA PLAN OF WORK WORKSTAGE	LEVEL OF MODEL DEFINITION (LOD)	
Stage 3 - Spatial Coordination	LOD 3 - Approximate Model	

PURPOSE OF ISSUE - SUITABLE FOR...	STATUS or SUITABILITY
Planning Submission	Status S1 - Delivery Team Coordination

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Proposed Site Plan and Footpath Connection
 1: 1500



CARDIFF 029 2052 8140
 LONDON 0207 138 3560
 WREXHAM 01978 357 887
 www.lawray.co.uk
 CLIENT
 Draycott Group

PROJECT TITLE
 Junction 37 Motorway Services

DRAWING TITLE
 Proposed Site Plan and Footpath Connection

PROJECT No 19804 SCALE @ A1 1: 1500

DRAWING No 1192	Project Originator	Volume	Level	Type	Revision	Number
18178/2007	19804	Project Originator	Functional	Spatial	Form	Discipline
18178/2007	19804	19804	19804	19804	19804	19804

DO NOT SCALE Any discrepancy or query concerning this drawing should be referred to the Architect. Registered Office: Greenmeadow Springs, 1, Cae Gwynedd, Tongwynlais, CARDIFF CF15 7AB Reg. Co. No. 2724178, VAT Reg. No. 134 2146 06

Appendix D: Welsh Water Pre Planning Enquiry Response





Dŵr Cymru
Welsh Water

Developer Services
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CF30 0EH

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

Gwasanaethau Datblygu
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Mr Matthew Cocks
Draycott Group
Harlech Court
Bute Street
Cardiff
CF10 2FE

Date: 12/09/2023
Our Ref: PPA0008194

Dear Mr Cocks,

Grid Ref: 282187 181008
Site Address: A4229 Bridgend
Development: Services, J37 M4

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.

Firstly, we note that the proposal relates to a proposed motorway service station at Junction 37 of the M4 and acknowledge that the site comprises of a potential windfall development with no allocated status in the Local Development Plan (LDP). Accordingly, 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.

PUBLIC SEWERAGE NETWORK

There is no public sewerage system in this immediate locality and therefore any new development will require provision of satisfactory alternative facilities for sewage disposal. Alternatively, the site is located approximately 230 metres to the west of a public sewerage system that drains to Afan WwTW, and it may be possible for the Developer to requisition sewers from Dwr Cymru Welsh Water under Sections 98 - 101 of the Water Industry Act 1991.

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.



Welsh Water is owned by Glas Cymru – a 'not-for-profit' company.
Mae Dŵr Cymru yn eiddo i Glas Cymru – cwmni 'nid-er-elw'.

We welcome correspondence in
Welsh and English

Dŵr Cymru Cyf, a limited company registered in
Wales no 2366777. Registered office: Pentwyn Road,
Nelson, Treharris, Mid Glamorgan CF46 6LY

Rydym yn croesawu gohebiaeth yn y
Gymraeg neu yn Saesneg

Dŵr Cymru Cyf, cwmni cyfyngedig wedi'i gofrestru yng
Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn
Nelson, Treharris, Morgannwg Ganol CF46 6LY.

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.

It is therefore recommended that the developer consult with Bridgend Council, as the determining SuDS Approval Body (SAB), in relation to their proposals for SuDS features. Please note, DCWW is a statutory consultee to the SAB application process and will provide comments to any SuDS proposals by response to SAB consultation. Please refer to further detailed advice relating to surface water management included in our attached Advice & Guidance note.

In addition, please note that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system.

FOUL WATER DRAINAGE – SEWERAGE NETWORK

There is no public sewerage system in this immediate locality and therefore any new development will require provision of satisfactory alternative facilities for sewage disposal. Alternatively, the site is located approximately 230 metres to the west of a public sewerage system that drains to Afan WWTW, and it may be possible for the Developer to requisition sewers from Dwr Cymru Welsh Water under Sections 98 - 101 of the Water Industry Act 1991.



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.

SEWAGE TREATMENT

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

POTABLE WATER SUPPLY

The water supply system in the immediate vicinity has insufficient capacity to serve the development and will also cause detriment to existing customers' water supply. A hydraulic modelling assessment is required to establish the scope of any reinforcement works to be completed in advance of making the connection. As part of the formal planning consultation process, we will seek to ensure that the assessment (and any associated reinforcement works) is completed in advance of the determination of the application or controlled by way of planning condition.

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.



Welsh Water is owned by Glas Cymru – a 'not-for-profit' company.
Mae Dŵr Cymru yn eiddo i Glas Cymru – cwmni 'nid-er-elw'.

We welcome correspondence in
Welsh and English

Dŵr Cymru Cyf, a limited company registered in
Wales no 2366777. Registered office: Pentwyn Road,
Nelson, Treharris, Mid Glamorgan CF46 6LY

Rydym yn croesawu gohebiaeth yn y
Gymraeg neu yn Saesneg

Dŵr Cymru Cyf, cwmni cyfyngedig wedi'i gofrestru yng
Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn
Nelson, Treharris, Morgannwg Ganol CF46 6LY.



LEGEND(Representative of most common features)

Waste networks:	
	Foul chamber
	Surface water chamber
	Combined chamber
	Special purpose chamber
	Treatment works
	Pumping station
	Outfall
	Lamp hole
	Storm Overflow
	Rising main
	Gravity sewer
	Private sewer
	Private sewer subject to Sect. 104 adoption agreement
	Private Sewer Transfer
	Lateral Drain
	Inspection Chamber

NB: Sewer symbol colour indicates the type:
 RED - Combined
 GREEN - Surface Water
 BROWN - Foul
 Purple - Former S24 sewers (for indicative purposes only)

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.

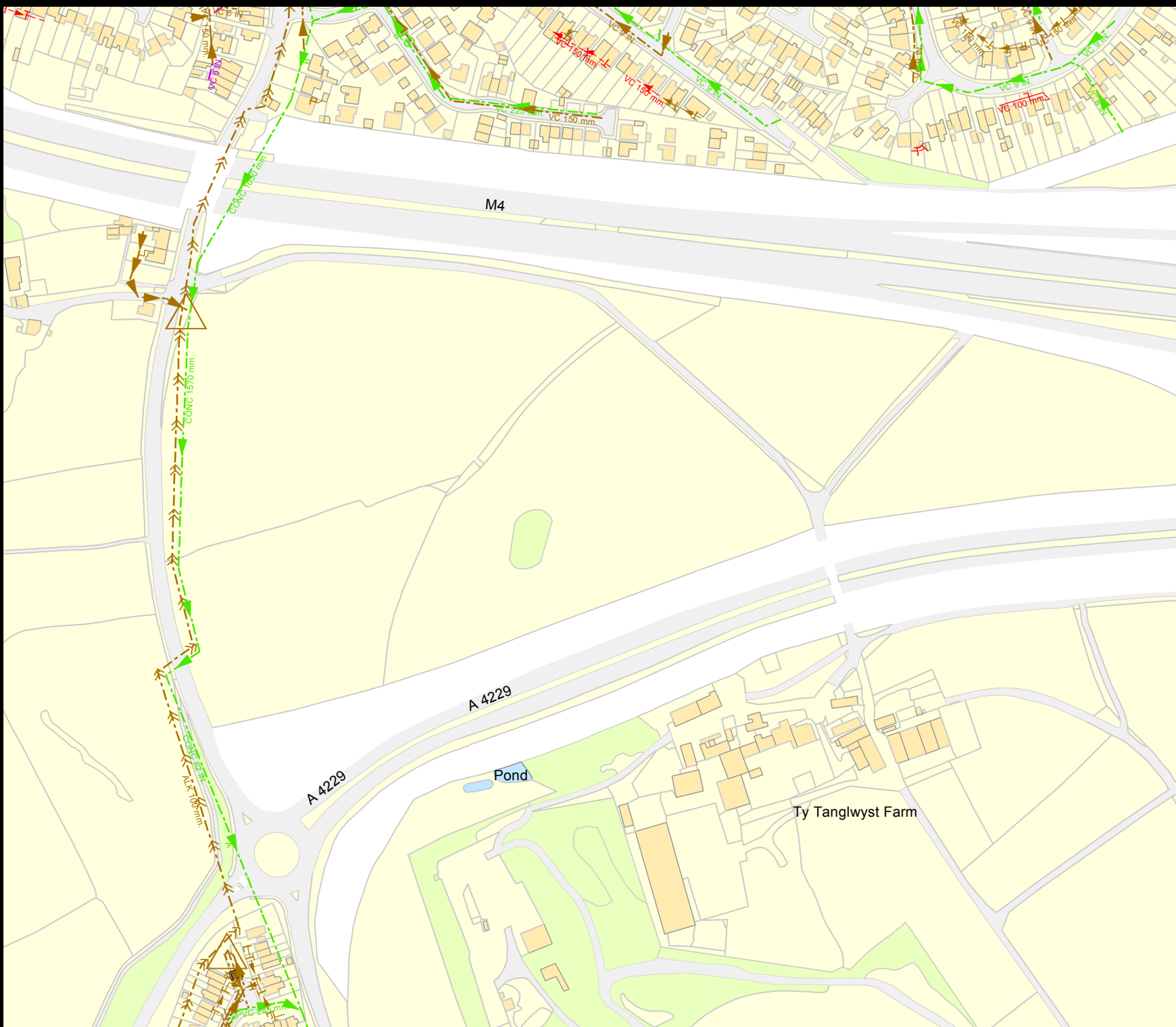
Dŵr Cymru Cŵr (Welsh Water) (the Company) agrees this information as to the position of its underground apparatus by way of general guidance only and on the understanding that it is based on the best information available and is not to be relied upon in the event of excavations or other works made in the vicinity of the Company's apparatus. The error of locating apparatus before carrying out any excavations may be anticipated. The information which is supplied by the Company is done so in accordance with statutory requirements of sections 103 and 109 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 water mains, electric cables, lateral drains or disposal mains and any other underground apparatus laid before 1 September 1958, or if they do, the location of such apparatus may not be as accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provisions of the New Roads and Street Works Act 1991 and the Company's liability is limited to the best of its knowledge.

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: 282077,180961
 Map scale: 1:3200
 Printed by: Jeremy Hackman
 Printed on: 12 Sep 2023





Dŵr Cymru
Welsh Water

PPA0008194 Water Main Plan



LEGEND

- | | | | |
|--|-------------------------|--|-----------------------|
| | Sluice valve | | Stop tap |
| | Pressure reducing valve | | Water Treatment Works |
| | Meter | | Water Pumping Station |
| | Bulk meter | | Existing main |
| | Hydrant | | Non-operational main |
| | Cap end | | Raw Water |
| | Air valve | | |
- NB: Water main symbol colour indicates the type.
 LIGHT BLUE - Trunk
 DARK BLUE - Distribution
 YELLOW - Raw Water

Notes:

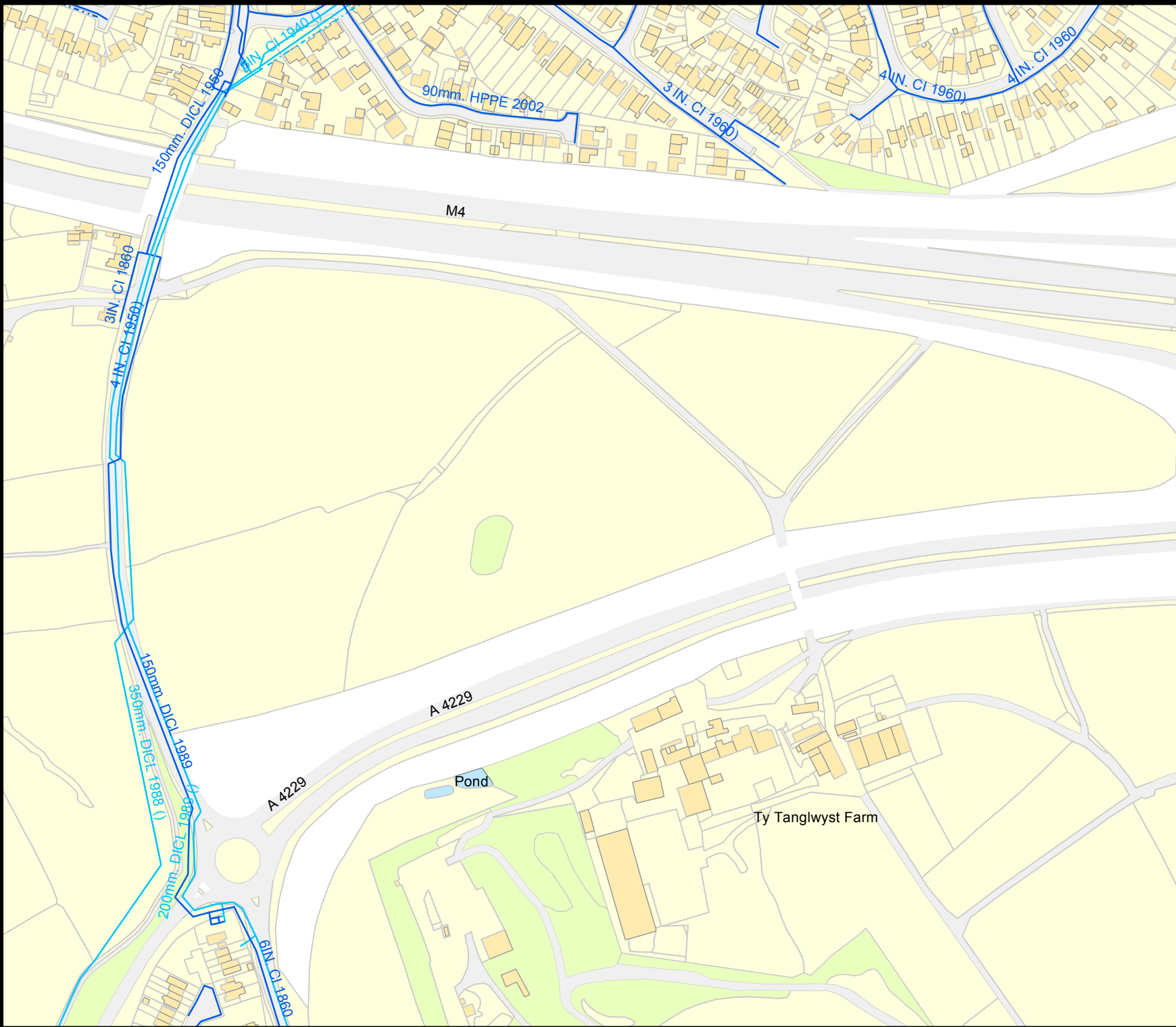
Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible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

Dŵr Cymru (Cyngedig) the Company agrees this information as to the position of its underground apparatus by way of general guidance only and on the basis of information that it has based on the best information available and is not warranted as to its correctness in the event of excavations or other works made in the vicinity of the company's apparatus. The error of locating apparatus involves carrying out any excavations and entering on site. The information which is supplied by the Company is done so in accordance with statutory requirements of sections 103 and 109 of the Water Industry Act 1989 which is based upon the level of 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 whereabouts of water main service pipes, sewer, lateral drains or disposal pipes and any related apparatus laid before 1 September 1989, or if they do, the direction of their location and their position and depth may not be accurate. It must be also stated that the furnishing of this information is entirely without prejudice to the provisions of the New Roads and Street Works Act 1991 and the Company's liability is limited to the best of its knowledge and belief.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

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Map Ref: 282102,180964
Map scale: 1:3200
Printed by: Jeremy Hackman
Printed on: 12 Sep 2023



PLANNING AND NEW DEVELOPMENT

Pre-Planning Advice & Next Steps



Dŵr Cymru
Welsh Water

Dŵr Cymru Welsh Water has a key role to play in the town and country planning process as the services provided are at the forefront of public health and protection of the environment.

Our engagement in the planning process allows us to ensure that we can suitably service new development from a clean water and sewerage treatment perspective, but also provides us with the controls to enable us to mitigate any potential negative impact that new development is likely to have on the performance of our infrastructure, the service we provide to customers, and the wider environment. Crucially, the planning process also enables us to identify where new development and growth is planned so that we are able to target investment in our existing infrastructure within these areas.

Our Pre Planning Advice to you

You have now received our pre-planning advice which will provide you with information regarding the impact of your proposed development upon our assets and apparatus. Our letter will advise whether the local network can support the proposal, whether off-site water mains and/or sewers will need to be provided, and whether there are any apparatus located within the land you wish to develop and the requirements for these apparatus.

However, in some circumstances we may require further information from you to fully evaluate the impact of your development. If this is the case please proceed to submit the required detail as requested in the letter. Upon receipt of the

information we can consider our position and provide you with an updated pre-planning response.

Please note that the advice provided is valid for a period of 12 months from the date of issue and will help us inform our response to the planning application for the development.

Next Steps....

You may now be proceeding to submit your planning application to the Local Planning Authority. Our preference is to see that drainage matters are resolved at pre-planning stage which will allow us to provide positive comments at planning consultation stage. In light of our pre-planning advice to you, it may therefore be in your interest to:

- Consider the drainage requirements and how the installation of new water mains/ sewers shapes the layout of your development. You will need to ensure that the design of the drainage layout will (where relevant) meet the appropriate standards for formal adoption by us (see further advice provided overleaf regarding Connecting to our Networks)
- Consider how your site layout ensures that any assets/ apparatus that may be located at the site are protected in line with the requirements set out in our letter
- Submit further information and/or drainage plans so that we can review your proposal in greater detail
- Where further assessments are recommended, to commission those before the planning

application is submitted to avoid any delays (see further advice provided overleaf on Network Modelling/WwTW Feasibility Studies)

- Provide a copy of our pre-planning enquiry response to the Local Planning Authority as part of your planning application submission to demonstrate you have considered drainage aspects of your development at pre-application stage, and that we are aware of your proposal.

Our Involvement in the Planning Application Process

We provide Local Planning Authorities with advice on the ability of our assets to accommodate proposed development. Our comments are crucial in providing comfort to the Local Authority that new development sites can be effectively drained and can be supplied with clean water.

When sites can be accommodated in our networks we will recommend drainage related planning conditions which may seek to control the point of communication with our networks and the type of discharges that we may permit. We may also recommend conditions to secure the submission of further details, such as drainage plans and strategies (please note that we will resist the physical communication to our networks until drainage related conditions have been discharged)

However, there are instances where further assessments are required and we will seek to work collaboratively with you and the Local Planning Authority to establish a positive outcome for all parties.

PLANNING AND NEW DEVELOPMENT

General Advice and Guidance

Our pre-planning response will provide advice dedicated to your development. However, we also offer the following general advice around drainage matters and communicating to our networks.

Managing Surface Water at your Development Site

As with all new development sites, you will need to consider how to deal with the surface water runoff from new buildings and hard standings. Traditionally, surface water has been managed by installing new pipes and large storage tanks to take flow away from land as quickly as possible. However, Dŵr Cymru actively encourage the use of Sustainable Urban Drainage Systems (SUDS), which is an approach to managing surface water run-off by imitating natural drainage systems and retaining water on or near the site.

SUDS involve a range of techniques including green roofs, rainwater harvesting, permeable pavements, etc. SUDS offer significant advantages over conventional piped drainage systems in reducing flood risk by attenuating the rate and quantity of surface water run-off from a site, promoting groundwater recharge, and improving water quality and amenity. The variety of SUDS techniques available means that virtually any development should be able to include a scheme based around these principles. Good justification would be required not to incorporate a SUDS scheme on the site.

All new developments will therefore be expected to consider surface water management techniques and

fully exhaust all technical options outlined under Sections 3.2 and 3.4 of Part H of the publication 'Building Regulations 2000'. These regulations ensure that disposal should be made through the hierarchical approach, preferring infiltration and, where infiltration is not possible, disposal to watercourses in liaison with the Land Drainage Authority and/or Natural Resources Wales or the Environment Agency in England. Discharge of surface water to the public sewer is only to be made as a last resort. The management of highway or land drainage run off will also need to be considered as these flows will not be allowed to discharge directly or indirectly into the public sewerage system.

Network Hydraulic Modelling/ WwTW Feasibility Studies

Our pre-planning advice will provide you with an indication of whether our networks can accommodate your development. However there may be instances where our assets cannot at present service your site.

Our aim is to support economic development and growth within our operational area and we do not want to resist new development where possible. However we must be mindful of our assets, existing customers and the environment. In areas where there are issues either on our network or at the Wastewater Treatment Works (WwTW), we may already have proposals in place to address these concerns and to create capacity within the network for new developments.

However, there may be instances where you intend to develop your site in advance of Dwr Cymru

undertaking improvements. If this is the case, to ensure there is no detriment to our existing customers you may be required to implement solutions identified by an assessment of either the network or Wastewater Treatment Works. Please note that you will not be expected to resolve any operational issues that exist.

Where further assessments are recommended, please be advised that you will need to allow sufficient time in your development program for these studies to be undertaken and for any improvements to be implemented, as in some circumstances we will not permit a communication to our networks until these works are completed.

Where possible, we will seek to control the delivery of any solutions as part of the planning process. Dependent on the progress of the assessment, we may be in a position to recommend appropriate planning conditions so that the outcomes of the assessment can be delivered as part of any planning permission. This approach allows us to support the progression of the site through the planning process, however in the absence of a completed assessment and known solutions we may need to work with you and the Local Planning Authority until the assessment is completed and the outcomes are known.

PLANNING AND NEW DEVELOPMENT

Making Connections to our Networks

Installing Your Drainage System and Making Connections to the Public Sewer

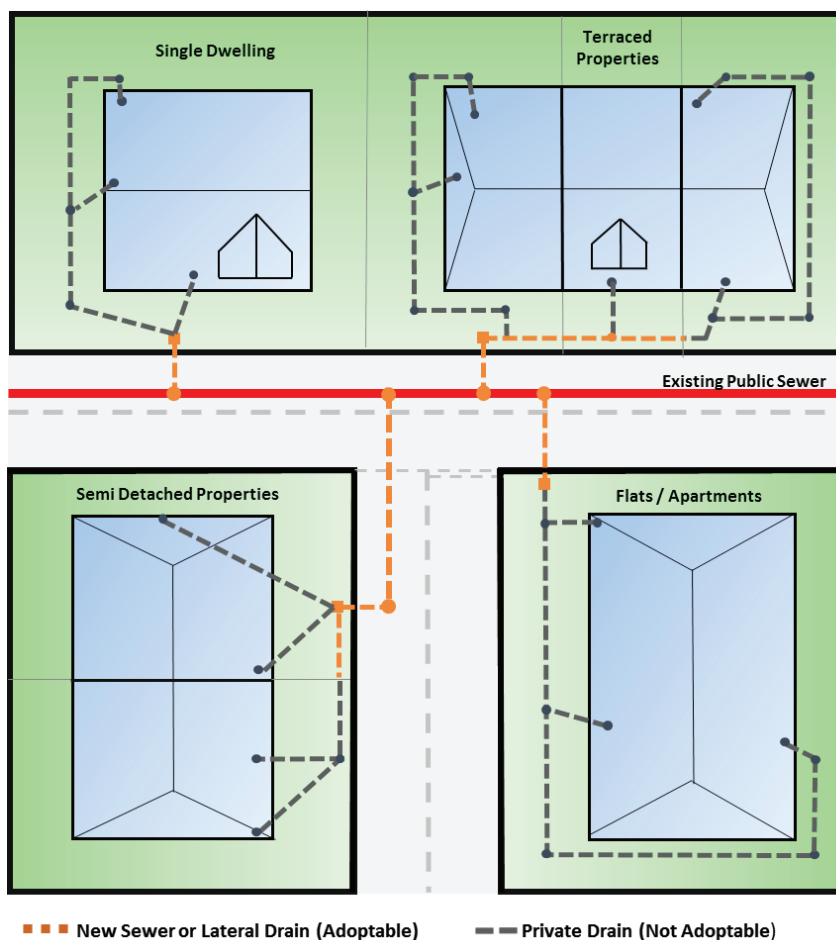
You will need to apply to us to make a connection to the public sewer, and depending on the layout of the drainage system you are proposing for your site, you may also be required to enter into an Adoption Agreement with us.

If your 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) with us.

The design of the sewer and lateral drain must also conform to the Welsh Ministers Standards for Gravity Foul Sewers and Lateral Drains, and conform with the publication "Sewers for Adoption"- 7th Edition.

Please be advised that we will not enter into a sewer adoption agreement for any sewer or lateral drain which is constructed in advance of the adoption agreement being in place. Further information on whether you will require a Section 104 Adoption Agreement and the adoption process can be obtained by contacting us.

To make the physical communication to the public sewer you will need to apply under Section 106 of the Water Industry Act 1991. An application pack can be obtained from our website and as part of the submission you will need to demonstrate that an adoption



agreement (if applicable) is in place, and that you have the relevant planning permissions in place for your development. Please be advised that if your site is subject to an Adoption Agreement we will not permit your communication until the agreement is in place.

Your New Water Supply

Our pre-planning advice will indicate whether your site can be adequately serviced by our clean water network. If new connections are required, we would invite you to submit an application to us at www.dwrcymru.com under Developer Services. Here you will find information about the services we have available and all

our application forms and guidance notes. You can complete forms online and also make payments via our website.

Upon approval of your Application and Water Regulations Notification we will notify you accordingly, send you a quotation for our estimated cost of your connection and a plan advising you of the work you need to carry out.

Our quotation is valid for 6 months. If payment is not received during this period you will need to re-submit a new application plus application fee if you wish to continue.

PLANNING AND NEW DEVELOPMENT

Requisitions and Asset Protection



Requisition a Water Main or Public Sewer

As the Statutory Water and Sewerage Undertaker we have a duty under the Water Industry Act 1991 to comply with a Requisition Notice served on us for the provision of a water main and/or public sewer to serve the development site.

Two main reasons exist for the person(s) exercising the rights to serve Notice. The first is where a person(s) wishes us to lay water mains and/or sewers in private land (by us serving Notice under Section 159 (WIA91) so that a communication with an existing watermain or public sewer can be achieved; the second is where, as a consequence of the provision of the new watermain/public sewer, reinforcement of the existing network is required to ensure that the development, and the local area, has an effective system (refer to Section 37 (water) and Section 94 (sewers) of the Water Industry Act 1991)

Under the provisions of the WIA 1991, we are entitled to recover the costs we incur in providing a requisitioned watermain or sewer. This includes, among other things, the reasonable costs of design, labour, plant, materials, reinstatement, land purchase (if applicable), compensation, and quality testing, inspection, supervision, administration and overhead costs.

Further information on the Requisition process can be obtained by contacting our team of dedicated Engineers or by visiting the Developer Services pages of our

website.

Assets Located at your Development Site

Our pre-planning advice letter may have drawn your attention to assets and/or apparatus located within your development site. It is important to note that under section 159 of the Water Industry Act 1991, Welsh Water has rights of access in order to inspect, maintain adjust repair or alter any asset or apparatus at all times.

Locating an Asset

Our pre-planning letter will be accompanied by water main and sewer extract plans, providing you with an indication of the asset location within the site. However, we provide this information as general guidance only and on the strict understanding that it is on the best information available (see notes within our plans for further information). The onus of locating the apparatus before carrying out any excavation rests entirely with you. To accurately locate any assets, please contact our team of planning officers for further guidance.

Protecting an Asset

The presence of an asset within the development site will have an impact on the layout and general arrangement of the site. Our pre-planning advice letter will provide you with the requirements for the protection of the asset(s) and you will need to ensure that the layout incorporates these requirements. Our recommendation is that our assets are incorporated into any site layout plan that is submitted as part of any planning application, so that

we and the Local Planning Authority can be satisfied that you have acknowledged the presence of such assets and have taken the necessary steps to protect them at the site.

Diverting a Water Main or Public Sewer

If you have concluded that the asset located within the site could not be incorporated within the layout of the new development, or our rights of access to the asset may be hindered by your proposal, you may request the alteration or removal, including diversion of that apparatus to accommodate a proposed improvement of that land (e.g. development or change of use). This provision is provided under Section 185 of the Water Industry Act 1991. Further information on diverting an asset can be obtained by contacting our team of dedicated Engineers or by visiting the Developer Services pages of our website.

Contact Us

For more information, contact Welsh Water's Planning team:

Email: developer.services@dwrcymru.com

Visit: www.dwrcymru.com

Tel: 0800 917 2652

Appendix E: Cambria Drawings





2200
2200

SEE INSET

INSET
SCALE 1:1000

Possible pinch point at existing bridge
Further survey required

Footpath to connect site
to local network

A 4229

0078

2082

Ty Tanglwyst Farm

Cattle Grid

3287

5086

NOTES:

1. SUBJECT TO PROPOSED LEVELS DESIGN AND DRAINAGE MODELING.
2. SITE INVESTIGATION TO CONFIRM WHETHER INFILTRATION IS FEASIBLE.
3. DRAINAGE STRATEGY SUBJECT TO SAB CONSULTATION. DISCHARGE RATES, SUDS AND ATTENUATION PROVISIONS TO BE AGREED WITH THE SAB.
4. GREASE TRAPS TO BE FITTED DOWNSTREAM OF ALL COMMERCIAL KITCHENS.

SUD STANDARDS:

STANDARD S1: SURFACE WATER DESTINATION

PRIORITY LEVEL 1: COLLECTED FOR REUSE:
THE FEASIBILITY OF A SMALL RAINWATER TANK WILL BE EXPLORED IN THE PETROL FILLING STATION.

PRIORITY LEVEL 2: INFILTRATION TO GROUND:
NO INFILTRATION TESTING HAS BEEN UNDERTAKEN AS YET. BRE365 SOAKAWAY TESTING HAS BEEN SCHEDULED.

PRIORITY LEVEL 3: NEAREST SURFACE WATER BODY:
THERE IS A WATERCOURSE SOUTH OF THE OF THE SITE THAT WILL TAKE TO THE ACCESS ROAD AND FOOTPATH. DUE TO THE SITE TOPOGRAPHY ONLY THE SOUTHERN EMBANKMENT CAN BE DISCHARGED INTO THE WATERCOURSE.

PRIORITY LEVEL 4: SURFACE WATER SEWER, DRAIN, HIGHWAY DRAIN:
NOT CONSIDERED. HIGHER PRIORITY LEVEL ACHIEVABLE.

PRIORITY LEVEL 5: COMBINED SEWER:
NOT CONSIDERED. HIGHER PRIORITY LEVEL ACHIEVABLE.

STANDARD S2: SURFACE WATER RUNOFF HYDRAULIC CONTROL

THE DISCHARGE INTO THE EXISTING LAND DRAINAGE SYSTEM WILL BE RESTRICTED TO GREENFIELD RUNOFF RATES. THE GREENFIELD RUNOFF RATE (4.66L/S) HAS BEEN CALCULATED USING REF#2.

ALL PARKING SPACES ARE PERMEABLE PAVING AND WILL COMPLY WITH THE 5MM INTERCEPTION CRITERIA. RUNOFF FROM THE ADJACENT FOOTPATHS AND ROADS WILL SHED INTO A SERIES OF SHALLOW SWALES TO ENSURE INTERCEPTION COMPLIANCE.

ATTENUATION STORAGE FOR THE 1 IN 100YR+40% EVENT WILL BE BE PREDOMINANTLY STORED WITHIN OPENGRADED SUBBASE BENEATH THE SWALES AND CELLULAR STORAGE.

STANDARD S3: WATER QUALITY

POTENTIAL FOR POLLUTED RUNOFF WITHIN THE PETROL STATION WILL BE VERY HIGH AND WILL NEED TO BE TREATED SEPARATELY BEFORE ENTERING INTO THE SURFACE WATER NETWORK. THE SWALE SYSTEM WILL PROVIDED SUFFICIENT TREATMENT FOR FOOTPATHS AND ROAD RUNOFF THROUGHOUT THE SITE. A SIMPLE INDEX APPROACH ASSESSMENT WILL BE UNDERTAKEN FOR THE SAB APPLICATION.

STANDARD S4&S5: AMENITY & BIODIVERSITY

A SERIES OF RAINGARDEN / SWALES WILL BE USED THROUGHOUT THE SITE AND BE VISIBLE TO VISITORS AND STAFF. VISITORS AND STAFF WILL BE GREETED WITH A RAIN GARDEN IN THE CENTRAL ROUNDABOUT FROM THE ACCESS ROAD.

STANDARD S6: CONSTRUCTION, OPERATION & MAINTENANCE

MAINTENANCE ACCESS WILL BE PROVIDED TO THE SOUTH. THE SWALES WILL BE DESIGNED TO BE SHALLOW AND EASILY MAINTAINED WITH LESS RELIANCE ON A PIPED AND MANHOLE SYSTEM. THE ORIFICE FLOW CONTROLS WILL INCLUDE WEIR OVERFLOWS AND MESH GUARDS. THE SYSTEM WILL BE DESIGNED IN ACCORDANCE WITH SUDS MANUAL.

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CONTRACTORS MUST CHECK ALL DIMENSIONS ON SITE. ONLY FIGURED DIMENSIONS ARE TO BE WORKED FROM. DISCREPANCIES MUST BE REPORTED IMMEDIATELY TO CAMBRIA CONSULTING LIMITED BEFORE PROCEEDING.

THE CONTRACTOR IS TO REFER TO THE SPECIFICATION, FULL SCHEDULE OF RESIDUAL RISKS IN THE CONTRACT DOCUMENTATION AND ALSO TO INFORMATION FROM OTHER DESIGNERS, IN PARTICULAR THE M&E CONSULTANT REGARDING EXISTING LIVE SERVICES.

THIS SYMBOL IS USED TO HIGHLIGHT INSTANCES OF RISK WITHIN THE CONSTRUCTION PROCESS. ALWAYS CHECK FOR LATER REVISIONS OF THIS DRAWING.

KEY:

- PROPOSED SW DRAINAGE
- PROPOSED FW DRAINAGE
- PROPOSED TREATED EFFLUENT FW DRAINAGE
- PROPOSED OVERFLOW COWL
- PROPOSED HIT & MISS KERBING
- PROPOSED KERB DRAIN
- PROPOSED LAND DRAIN
- PROPOSED RAINWATER HARVESTING TANK
- PROPOSED RAINWATER HARVESTING FEED
- PROPOSED RAINGARDEN INLET
- PROPOSED ORIFICE FLOW CONTROL CHAMBER WITH WEIR WALL AND MESH GUARD (PLASTIC)
- PROPOSED HYDROBRAKE FLOW CONTROL CHAMBER WITH LEVEL OVERFLOW
- PROPOSED SURFACE WATER CULVERT HEADWALL
- PROPOSED SURFACE WATER ROAD GULLY
- INDICATIVE RAINWATER PIPE
- PROPOSED CELLULAR STORAGE
- PROPOSED SEWAGE TREATMENT PLANT
- PROPOSED RAINGARDEN
- PROPOSED PERMEABLE PAVING (ROAD)
- PROPOSED PERMEABLE PAVING (FOOTPATH)
- PROPOSED DISTRIBUTION TRENCH
- PROPOSED FILTER STRIP
- EXISTING WATERCOURSE
- PROPOSED CULVERT
- SITE BOUNDARY

P03	SITE LAYOUT REVISED	DC	BW	BW
				12/02/24
P02	RAIN GARDENS REMOVED	DC	BW	BW
				28/11/23
Rev.	Description	By	Chk	App

Client:
DRAYCOTT GROUP

Project:
JUNCTION 37 M4

Drawing Title:
PROPOSED DRAINAGE STRATEGY PLAN (OVERALL)

Drawing No.
CC2507 CAM XX XX DR C 0500

Project	Originator	Vol.	Level	Type	Role	Number
S1	PRELIMINARY		1:500			P03

CAMBRIA
Constructive Thinking

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 - PROPOSED CELLULAR STORAGE
 - PROPOSED SEWAGE TREATMENT PLANT
 - PROPOSED RAINGARDEN
 - PROPOSED PERMEABLE PAVING (ROAD)
 - PROPOSED PERMEABLE PAVING (FOOTPATH)
 - PROPOSED DISTRIBUTION TRENCH
 - PROPOSED FILTER STRIP
 - EXISTING WATERCOURSE
 - PROPOSED CULVERT
 - SITE BOUNDARY

P03	SITE LAYOUT REVISED	DC	BW	BW
				12/02/24
P02	RAIN GARDENS REMOVED	DC	BW	BW
				28/11/23
Rev.	Description	By	Chk	App

Client:
DRAYCOTT GROUP

Project:
JUNCTION 37 M4

Drawing Title:
PROPOSED DRAINAGE STRATEGY PLAN (SHEET 1)

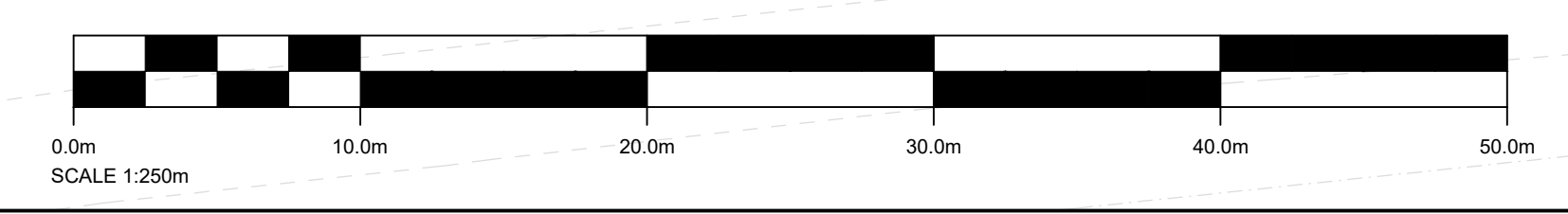
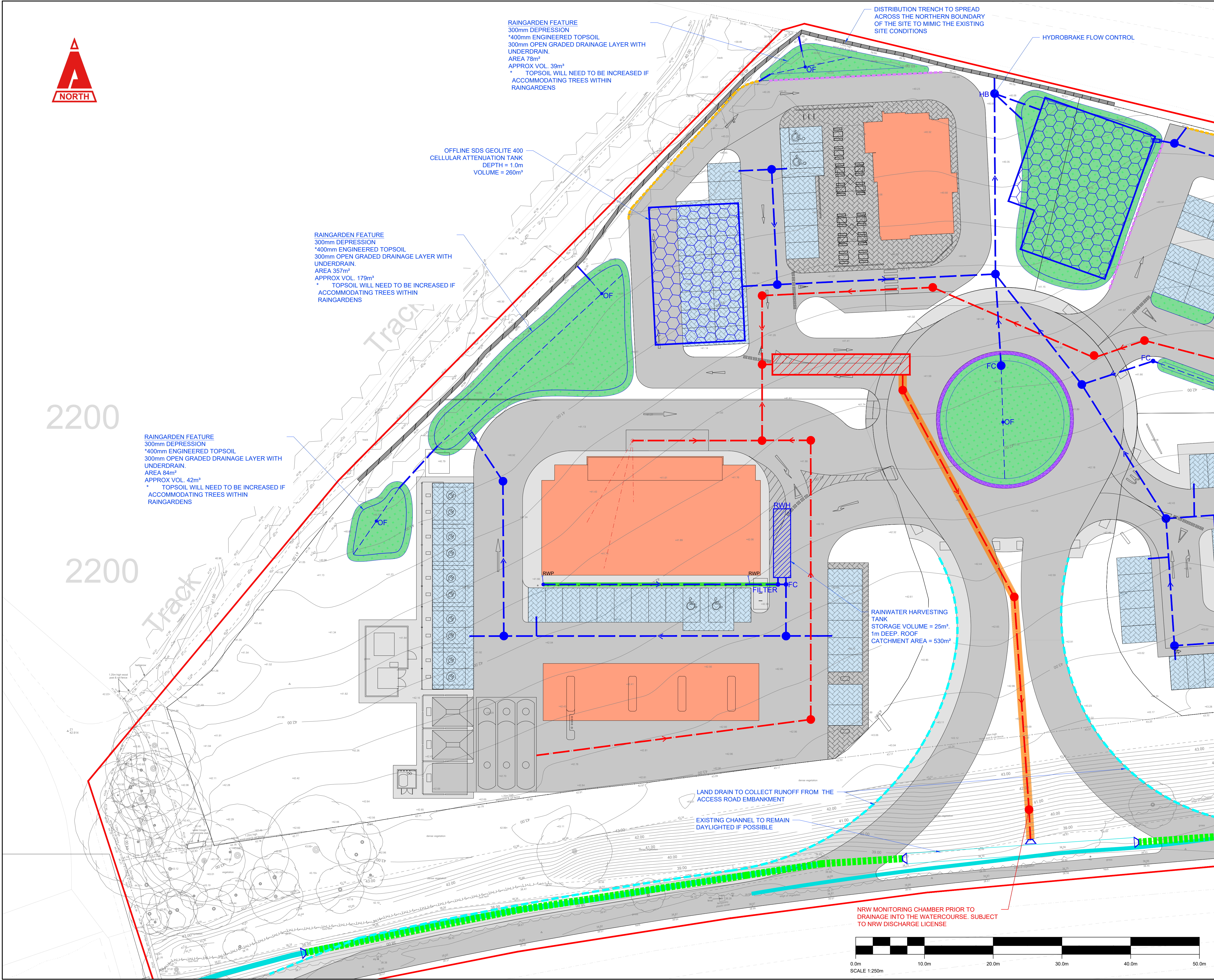
Drawing No.
CC2507 CAM XX XX DR C 0501

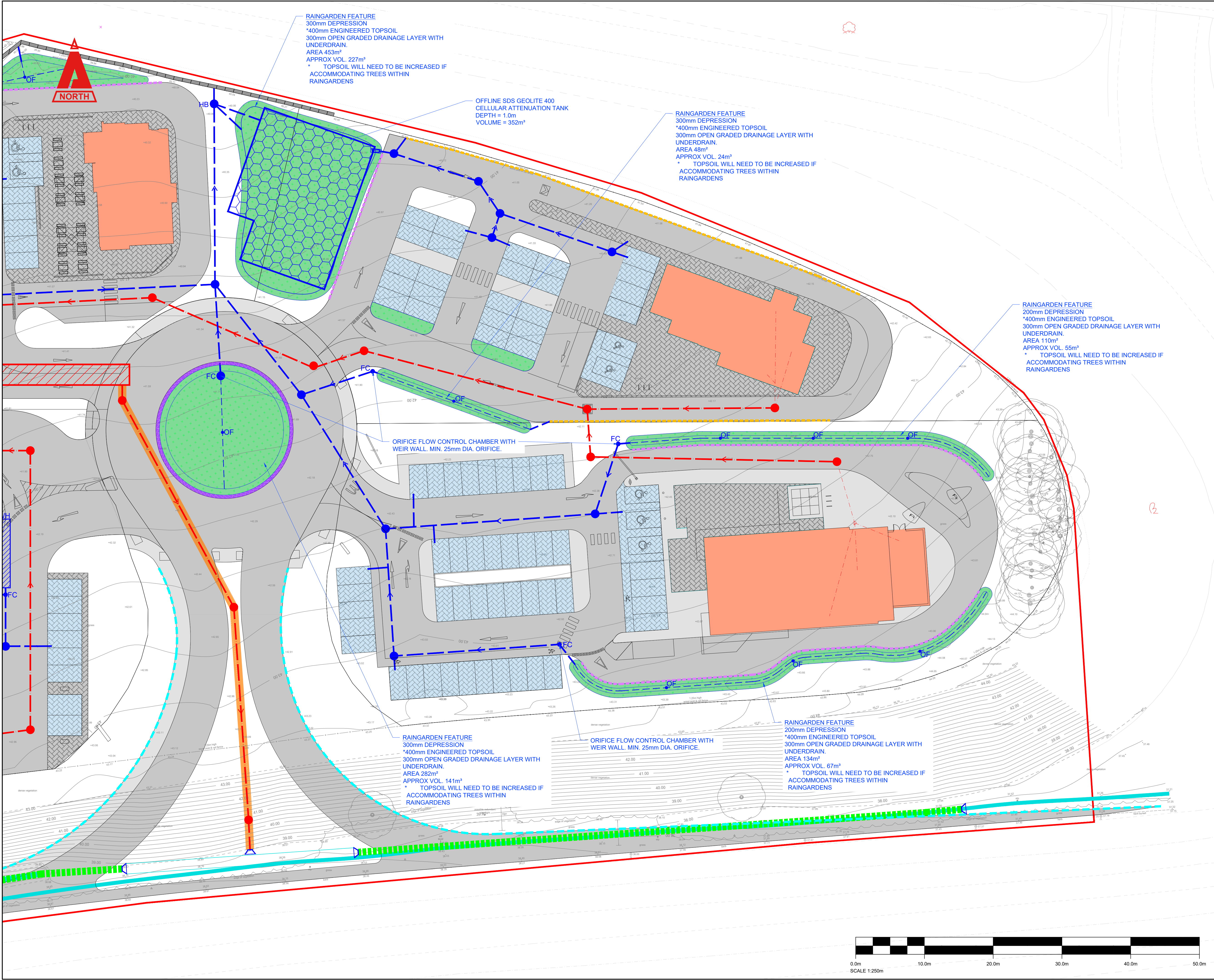
Status	Originator	Vol.	Level	Type	Role	Number
S1	PRELIMINARY		1:250			P03

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 THIS SYMBOL IS USED TO HIGHLIGHT INSTANCES OF RISK WITHIN THE CONSTRUCTION PROCESS. ALWAYS CHECK FOR LATER REVISIONS OF THIS DRAWING.

- KEY:**
- PROPOSED SW DRAINAGE
 - PROPOSED FW DRAINAGE
 - PROPOSED TREATED EFFLUENT FW DRAINAGE
 - OF PROPOSED OVERFLOW COWL
 - PROPOSED HIT & MISS KERBING
 - PROPOSED KERB DRAIN
 - PROPOSED LAND DRAIN
 - PROPOSED RAINWATER HARVESTING TANK
 - PROPOSED RAINWATER HARVESTING FEED
 - PROPOSED RAINGARDEN INLET
 - FC PROPOSED ORIFICE FLOW CONTROL CHAMBER WITH WEIR WALL AND MESH GUARD (PLASTIC)
 - HB PROPOSED HYDROBRAKE FLOW CONTROL CHAMBER WITH LEVEL OVERFLOW
 - PROPOSED SURFACE WATER CULVERT HEADWALL
 - G PROPOSED SURFACE WATER ROAD GULLY
 - INDICATIVE RAINWATER PIPE
 - PROPOSED CELLULAR STORAGE
 - PROPOSED SEWAGE TREATMENT PLANT
 - PROPOSED RAINGARDEN
 - PROPOSED PERMEABLE PAVING (ROAD)
 - PROPOSED PERMEABLE PAVING (FOOTPATH)
 - PROPOSED DISTRIBUTION TRENCH
 - PROPOSED FILTER STRIP
 - EXISTING WATERCOURSE
 - PROPOSED CULVERT
 - SITE BOUNDARY

P03	SITE LAYOUT REVISED	DC	BW	BW
				12/02/24
P02	RAIN GARDENS REMOVED	DC	BW	BW
				28/11/23
Rev.	Description	By	Chk	App

Client:
DRAYCOTT GROUP

Project:
JUNCTION 37 M4

Drawing Title:
PROPOSED DRAINAGE STRATEGY PLAN (SHEET 2)

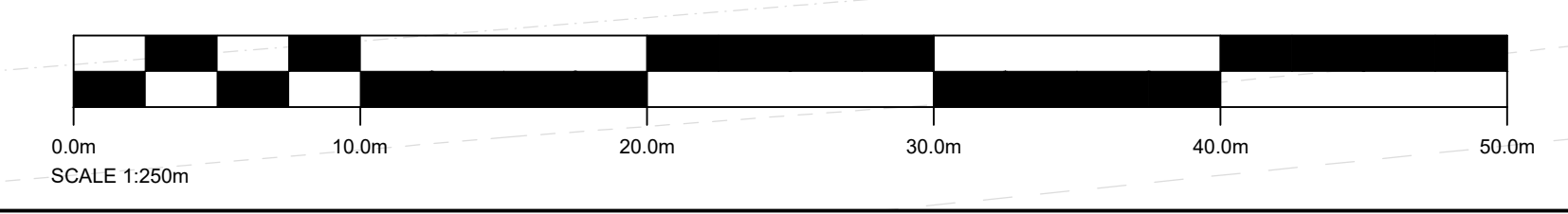
Drawing No.
CC2507 CAM XX XX DR C 0502

Status	Originator	Vol.	Level	Type	Role	Number
S1	PRELIMINARY		1:250			P02

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



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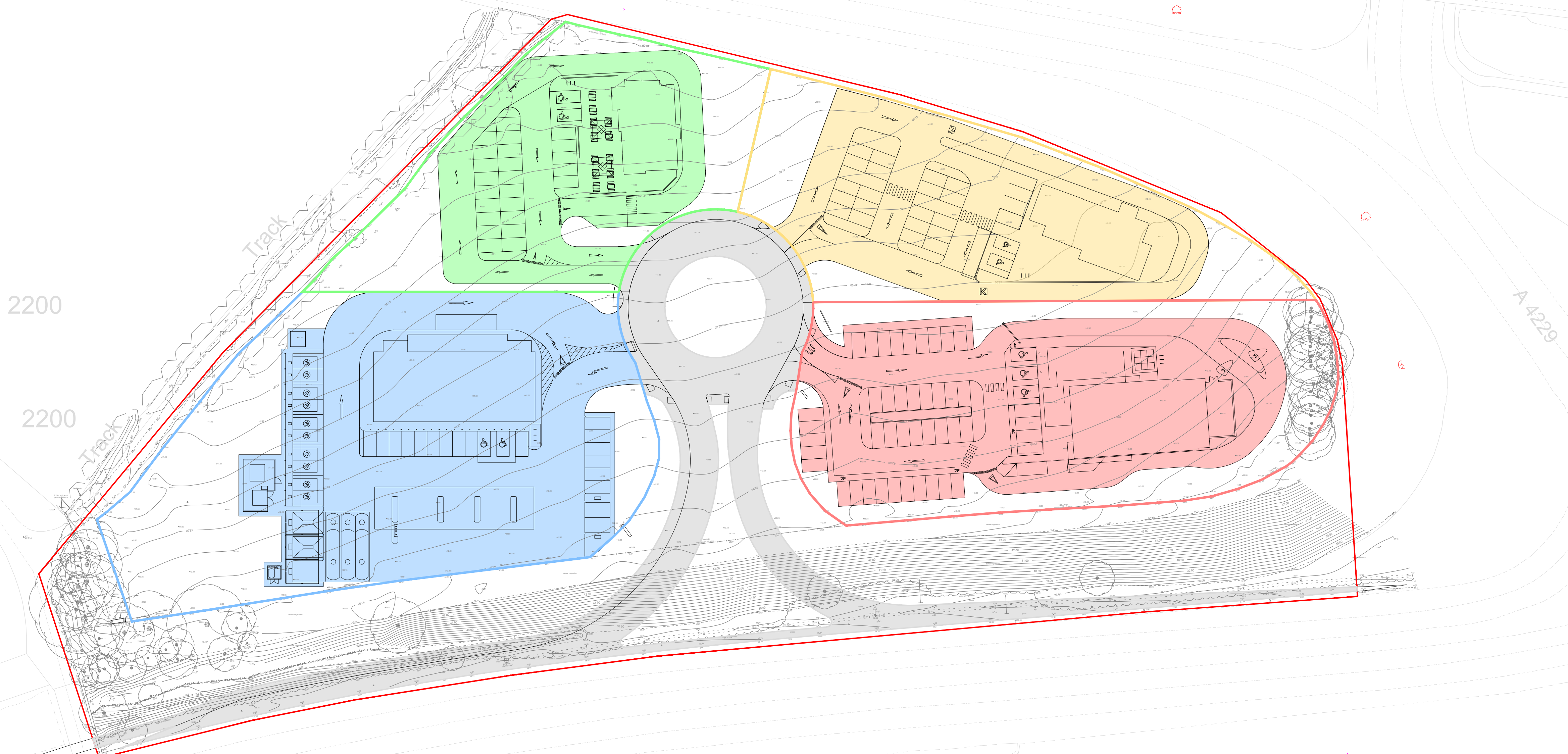
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 THIS SYMBOL IS USED TO HIGHLIGHT INSTANCES OF RISK WITHIN THE CONSTRUCTION PROCESS. ALWAYS CHECK FOR LATER REVISIONS OF THIS DRAWING.

KEY:

	PETROL FILLING STATION TOTAL AREA = 5,221m ² IMP AREA = 3,650m ²
	GREGGS DRIVE THROUGH TOTAL AREA = 2,882m ² IMP AREA = 1,924m ²
	STARBUCKS DRIVE THROUGH TOTAL AREA = 3,079m ² IMP AREA = 2,304m ²
	MCDONALDS DRIVE THROUGH TOTAL AREA = 4,139m ² IMP AREA = 2,957m ²
	ACCESS ROAD TOTAL AREA = 2,487m ²

TOTAL IMPERMEABLE AREA = 13,294m²



P02	REVISED SITE LAYOUT	DC	BW	BW
				15/02/24
P01	ISSUED FOR PAC	DC	BW	BW
				27/11/23
Rev.	Description	By	Chk	App

Client:
DRAYCOTT GROUP

Project:
JUNCTION 37 M4

Drawing Title:
PROPOSED CATCHMENT PLAN

Drawing No:
CC2507 CAM XX XX DR C 1500

Project	Originator	Vol.	Level	Type	Role	Number
S1	PRELIMINARY					P02

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Appendix F: Hydraulic Calculations

Description	Return period (yrs)	As-rural peak flow (m³/s)	Greenfield (l/s/ha)	As-rural direct runoff (ML)
1 year	1	0.002947226	2.95	0.018095613
2 year	2	0.003362114	3.36	0.020941903
5 year	5	0.004779336	4.78	0.030666836
10 year	10	0.005832402	5.83	0.03789493
30 year	30	0.007591684	7.59	0.049973587
50 year	50	0.00848511	8.49	0.0561089
75 year	75	0.009251199	9.25	0.061370405
100 year	100	0.009833933	9.83	0.065372994
200 year	200	0.011416285	11.42	0.076191856
1000 year	1000	0.01752577	17.53	0.117850015

Greenfield Rates Per Hectare

Development Contributing Area (m²)	Return period (yrs)	As-rural peak flow (m³/s)	Greenfield (l/s/ha)	As-rural direct runoff (ML)
10000	Q1		2.95	
	Q2		3.36	
	Q5		4.78	
	Q30		7.59	
	Q100		9.83	
	QBAR (approx Q2.3)		3.50	l/s/ha

Restricted Discharge Rate - Whole Site

Development Contributing Area (m²)	Return period (yrs)	As-rural peak flow (m³/s)	Greenfield (l/s/ha)	As-rural direct runoff (ML)
13337	Q1		3.93	
	Q2		4.48	
	Q5		6.37	
	Q30		10.13	
	Q100		13.12	
	QBAR (approx Q2.3)		4.67	l/s

Restricted Discharge Rate - Petrol Filling Station

Development Contributing Area (m²)	Return period (yrs)	As-rural peak flow (m³/s)	Greenfield (l/s/ha)	As-rural direct runoff (ML)
3650	Q1		1.08	
	Q2		1.23	
	Q5		1.74	
	Q30		2.77	
	Q100		3.59	
	QBAR (approx Q2.3)		1.28	l/s

Restricted Discharge Rate - Greggs Drive Through

Development Contributing Area (m²)	Return period (yrs)	As-rural peak flow (m³/s)	Greenfield (l/s/ha)	As-rural direct runoff (ML)
1924	Q1		0.57	
	Q2		0.65	
	Q5		0.92	
	Q30		1.46	
	Q100		1.89	
	QBAR (approx Q2.3)		0.67	l/s

Restricted Discharge Rate - Starbucks Drive Through

Development Contributing Area (m²)	Return period (yrs)	As-rural peak flow (m³/s)	Greenfield (l/s/ha)	As-rural direct runoff (ML)
2304	Q1		0.68	
	Q2		0.77	
	Q5		1.10	
	Q30		1.75	
	Q100		2.27	
	QBAR (approx Q2.3)		0.81	l/s

Restricted Discharge Rate - Mcdonalds Drive Through

Development Contributing Area (m²)	Return period (yrs)	As-rural peak flow (m³/s)	Greenfield (l/s/ha)	As-rural direct runoff (ML)
2957	Q1		0.87	
	Q2		0.99	
	Q5		1.41	
	Q30		2.24	
	Q100		2.91	
	QBAR (approx Q2.3)		1.04	l/s

Restricted Discharge Rate - Access Road

Development Contributing Area (m²)	Return period (yrs)	As-rural peak flow (m³/s)	Greenfield (l/s/ha)	As-rural direct runoff (ML)
2487	Q1		0.73	
	Q2		0.84	
	Q5		1.19	
	Q30		1.89	
	Q100		2.45	
	QBAR (approx Q2.3)		0.87	l/s

CC2507 – Development off J37 M4
Quick Storage Estimates

Total Site Storage

The screenshot shows the 'Quick Storage Estimate' dialog box with the 'Variables' tab selected. The 'Micro Drainage' logo is in the top left. A vertical sidebar on the left contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area is titled 'Variables' and contains the following fields:

FEH Rainfall	Cv (Summer)	1.000
Return Period (years): 100	Cv (Winter)	1.000
Version: 2013	Impemeable Area (ha)	1.334
Point	Maximum Allowable Discharge (l/s)	4.7
Site: GB 282403 181013 SS 82403 81013	Infiltration Coefficient (m/hr)	0.00000
	Safety Factor	2.0
	Climate Change (%)	40

Buttons at the bottom: Analyse, OK, Cancel, Help. A status bar at the bottom reads: Enter Return Period between 2 and 1000.

The screenshot shows the 'Quick Storage Estimate' dialog box with the 'Results' tab selected. The 'Micro Drainage' logo is in the top left. A vertical sidebar on the left contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area is titled 'Results' and contains the following text:

Global Variables require approximate storage of between 1182 m³ and 2228 m³.

These values are estimates only and should not be used for design purposes.

Buttons at the bottom: Analyse, OK, Cancel, Help. A status bar at the bottom reads: Enter Return Period between 2 and 1000.

Petrol Filling Station

Quick Storage Estimate

Micro Drainage

Variables

FEH Rainfall

Return Period (years) 100

Version 2013 Point ...

Site GB 282403 181013 SS 82403 81013

Cv (Summer) 1.000

Cv (Winter) 1.000

Impemeable Area (ha) 0.365

Maximum Allowable Discharge (l/s) 1.3

Infiltration Coefficient (m/hr) 0.00000

Safety Factor 2.0

Climate Change (%) 40

Analyse OK Cancel Help

Enter Infiltration Coefficient between 0.00000 and 100000.00000

Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 322 m³ and 607 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Infiltration Coefficient between 0.00000 and 100000.00000

Greggs Drive Through

The screenshot shows the 'Quick Storage Estimate' dialog box with the 'Variables' tab selected. The left sidebar contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area contains the following fields:

Parameter	Value
FEH Rainfall	FEH Rainfall
Return Period (years)	100
Version	2013
Point	Point
Site	GB 282403 181013 SS 82403 81013
Cv (Summer)	1.000
Cv (Winter)	1.000
Impervious Area (ha)	0.192
Maximum Allowable Discharge (l/s)	0.7
Infiltration Coefficient (m/hr)	0.00000
Safety Factor	2.0
Climate Change (%)	40

Buttons: Analyse, OK, Cancel, Help

Enter Infiltration Coefficient between 0.00000 and 100000.00000

The screenshot shows the 'Quick Storage Estimate' dialog box with the 'Results' tab selected. The left sidebar contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area displays the following results:

Global Variables require approximate storage of between 168 m³ and 317 m³.

These values are estimates only and should not be used for design purposes.

Buttons: Analyse, OK, Cancel, Help

Enter Infiltration Coefficient between 0.00000 and 100000.00000

Starbucks Drive Through

Quick Storage Estimate

Micro Drainage

Variables

FEH Rainfall

Return Period (years) 100

Version 2013 Point ...

Site GB 282403 181013 SS 82403 81013

Cv (Summer) 1.000

Cv (Winter) 1.000

Impermeable Area (ha) 0.230

Maximum Allowable Discharge (l/s) 0.8

Infiltration Coefficient (m/hr) 0.00000

Safety Factor 2.0

Climate Change (%) 40

Analyse OK Cancel Help

Enter Infiltration Coefficient between 0.00000 and 100000.00000

Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 205 m³ and 386 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Infiltration Coefficient between 0.00000 and 100000.00000

McDonalds Drive Through

The screenshot shows the 'Quick Storage Estimate' dialog box with the 'Variables' tab selected. The left sidebar contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area contains the following fields:

FEH Rainfall	Cv (Summer)	1.000
Return Period (years): 100	Cv (Winter)	1.000
Version: 2013	Impemeable Area (ha)	0.296
Point	Maximum Allowable Discharge (l/s)	1.1
Site: GB 282403 181013 SS 82403 81013	Infiltration Coefficient (m/hr)	0.00000
	Safety Factor	2.0
	Climate Change (%)	40

Buttons at the bottom: Analyse, OK, Cancel, Help.

Footer: Enter Maximum Allowable Discharge between 0.0 and 999999.0

The screenshot shows the 'Quick Storage Estimate' dialog box with the 'Results' tab selected. The left sidebar contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area displays the following text:

Global Variables require approximate storage of between 258 m³ and 485 m³.

These values are estimates only and should not be used for design purposes.

Buttons at the bottom: Analyse, OK, Cancel, Help.

Footer: Enter Maximum Allowable Discharge between 0.0 and 999999.0

Access Road

Quick Storage Estimate

Micro Drainage

Variables

FEH Rainfall	Cv (Summer)	1.000
Return Period (years) 100	Cv (Winter)	1.000
Version 2013 Point	Impervious Area (ha)	0.249
Site GB 282403 181013 SS 82403 81013	Maximum Allowable Discharge (l/s)	0.9
	Infiltration Coefficient (m/hr)	0.00000
	Safety Factor	2.0
	Climate Change (%)	40

Analyse OK Cancel Help

Enter Infiltration Coefficient between 0.00000 and 100000.00000

Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 219 m³ and 412 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Infiltration Coefficient between 0.00000 and 100000.00000