

Phosphate Strategy Report

Rossett, Wrexham

CGH-R1-0017-PHOS-01

16.02.2022







1. Background

Following National Resources Wales (NRW) new guidance intended to reduce river phosphate levels in special areas of conservation across Wales, and a guidance note advising Local Planning Authorities to complete a Habitat Regulations Assessment prior to the granting of any planning consent for any foul drainage proposal that connects to the existing adopted foul drainage network, Castle Green Homes produced this Phosphate Strategy Report to demonstrate how phosphate levels will be significantly reduced following development.

2. Site Description

The proposed development site consists of 2No parcels – one north, one south of Rossett Road, the B5012 to the east of Rossett village. Total area of 15.34 acres (6.21 hectares). Both parcels consist of undeveloped agricultural land. Both parcels have perimeter post and wire fences complimented with perimeter hedgerows. There are several mature / semi-mature trees to the north parcel boundaries. Both parcels have existing housing developments along the west boundary.

Castle Green Homes are proposing to construct 132No. residential properties, 61No in the northern parcel, 71No in the southern parcel. An area of public open space is located to the south of the southern parcel. Refer to Castle Green Homes Overall Site Layout drawing ref. ROSSRD-SL01 (Refer to Appendix).

3. Foul Water Drainage Strategy

Prior to the guidance set by NRW, the foul water strategy for the new development was to discharge by gravity, commencing from the south area of the south parcel, running north through the south parcel, underneath the B5012, continuing north through the north parcel to a pumping station. From the pumping station located in the north area of the north parcel the foul drainage was to be pumped to an agreed Welsh Water Foul Sewer connection located in Trevalyn Hall View. The drainage system was to be adopted and maintained by Welsh Water. The foul water would then be treated at the local wastewater treatment works by Welsh Water.

A drainage design was developed to adoptable standards. Refer to Betts Associates Proposed Section 104 Agreement Main Drainage Layout [North Drg CAS02-301 & South Drg CAS02-302], located in the Appendix.



4. Current Phosphate Levels Prior to Development.

Betts Geotechnical attended the site on 25th January 2022 and took 5 No. water samples across the site. These samples were submitted to i2 Environmental Sciences to test the water samples for Total Phosphate. This analysis determines the total phosphate content of the on-site waters that are currently present, prior to any development works commencing.

The 5No. chemical analysis results showed a range from 29.8mg/l to a maximum total phosphate of **50.9 mg/l.** These test results provide Castle Green with a series of baseline values for the phosphate content that is present within the water that is flowing across our development. Refer to Appendix for test results.

5. Phosphate Level Following Development

Domestic Housing Criteria from British Water – Flows and Loads (4) provides population guidance :
(1bed =3p) (2bed = 4p) (3bed = 5p) (4bed = 6p) (5bed = 7p) provides total population of 697No people
Foul water discharge 150 litres per person per day (Part H Wales Building Regs 2010 Section 2.39)
0.99 kg/year (Impact of Phosphorus inputs from small discharges on designated freshwater sites, NECR170)
Foul Water discharge per year = $150 \times 697 \times 365 = 38160750$ Litres
Total Phosphate for 697 persons = $697 \times 0.99 = 690\text{kg} = 690 \times 10^6\text{mg}$
This equates to $690 \times 10^6 / 38160750 = \mathbf{18.08\text{mg/l.}}$



6. Site Location in relation to River Alyn



North Parcel

South Parcel

River Alyn



7. Site Plan to indicate locations of WS1 to WS6 for phosphate testing



North Parcel

South Parcel



8. Summary

1. The phosphate level within the current scenario (prior to development) = **range 29.8mg/l to max 50.9 mg/l**
2. The current site remains in agricultural use creating 29.8mg/l to 50.9mg/l phosphate
3. The phosphate level following development = **18.08mg/l**
4. The proposed drainage system will be adopted by Welsh Water and maintained by Welsh Water
5. The figures above show the total Phosphate from the development foul water will be less than the current agricultural land use [18.08 < 50.9].
6. The foul water will be treated by the local Welsh Water treatment works to 3mg/l

As stated in the summary above we consider this strategy will provide a sustainable and ecological solution to reduce total phosphate from the proposed development to a level much lower than the pre-development level. Following development for residential housing the amount of phosphate entering the River Alyn will be reduced by 64.5%.

Appendices.

- Castle Green Homes Overall Site Layout drawing ref. ROSSRD-SL01
- Betts Associates Drainage Designs [North Drg CAS02-301 & South Drg CAS02-302]
- i2 Environmental Sciences Total Phosphate Water Sample Results.

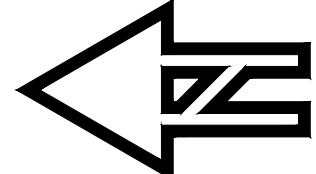


castlegreenhomes.uk

Castle Green Homes
Bridgemere House
Chester Road
Preston Brook
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Playing Field

SCHEDULE OF ACCOMMODATION				
HOUSETYPE	DESCRIPTION	SQFT	NUMBER	PERCENTAGE
Northfield/Pond				
DT18	1 Bed Apartment/2 Storey Duplex	951 SQFT	4	5.35
DT19	2 Bed, 2 Storey End & Mid-Terrace	705 SQFT	7	11.48
Appt/End (Midterrace)	3 Bed, 2 Storey End-Terrace	831 SQFT	4	6.56
Detached	3 Bed, 2 Storey Semi-Detached	979 SQFT	4	6.56
Detached	3 Bed, 2 Storey	1135 SQFT	2	3.28
Detached	3 Bed, 2 Storey	1245 SQFT	3	4.92
Detached	4 Bed, 2 Storey	1332 SQFT	3	4.92
Detached	4 Bed, 2 Storey	1344 SQFT	5	6.56
Detached	4 Bed, 2 Storey	1472 SQFT	6	9.84
Detached	4 Bed, 2 Storey	1570 SQFT	7	11.48
Detached	4 Bed, 2 Storey	1678 SQFT	3	4.92
Detached	4 Bed, 2 Storey	1711 SQFT	7	11.48
Detached	4 Bed, 2 Storey	1872 SQFT	2	3.28
Detached	4 Bed, 2 Storey	1985 SQFT	5	8.20
		Total	8808	51
Southfield/Pond				
DT18	1 Bed Apartment/2 Storey Duplex	951 SQFT	4	5.63
DT19	2 Bed, 2 Storey End & Mid-Terrace	705 SQFT	9	9.58
Appt/End (Midterrace)	3 Bed, 2 Storey End-Terrace	821 SQFT	4	5.93
Detached	3 Bed, 2 Storey Semi-Detached	979 SQFT	8	11.27
Detached	3 Bed, 2 Storey	1135 SQFT	4	5.63
Detached	3 Bed, 2 Storey	1245 SQFT	6	8.45
Detached	4 Bed, 2 Storey	1332 SQFT	4	5.63
Detached	4 Bed, 2 Storey	1472 SQFT	5	7.04
Detached	4 Bed, 2 Storey	1570 SQFT	2	2.82
Detached	4 Bed, 2 Storey	1678 SQFT	5	7.04
Detached	4 Bed, 2 Storey	1711 SQFT	5	7.04
Detached	4 Bed, 2 Storey	1872 SQFT	4	5.63
Detached	4 Bed, 2 Storey	1985 SQFT	4	5.63
		Total	8738	71
		16742	SQFT	122
TOTAL				
Gross Site Area	15.43 Acres	6.34 Hectares		
FCG	2.88 Acres	1.18 Hectares		
Single Sided Road	0.34 Acres	0.14 Hectares		
On-Transit Stop	0.13 Acres	0.05 Hectares		
Undevelopable: Entrance, Entry, L'Vocap, Car Park, Pump Station	0.77 Acres	0.31 Hectares		
NET SITE AREA:		11.33 ACRES	4.58 HECTARES	
Gross Density	8.55 Units/Acre	21.14 Units/Hectare		
NET DENSITY:		11.65 UNITS/ACRE	28.79 UNITS/HECTARE	
Gross Footage:				
		10850.42 SQFT/acre	2492.89 SQM/hectare	
NETT FOOTAGE:				
		14778.88 SQFT/acre	3382.27 SQM/hectare	

Key:

- Site Boundary
- 1.8m high boundary fence
- 1.8m high screen wall / fence
- Private Drive
- Visibility Splays - 2.4x70m to Site Entrances
- Indicative Landscaping
- Number of parking spaces proposed to Dwellings noted thus. In accordance with WCBC L'PGN 16 this does not include parking within a garage. All garage internal dimensions, both detached and integral, to be in excess of 2.7x5.5m. All driveways to be minimum length of 5.5m where in front of a garage, all in accordance with WCBC L'PGN 16 minimum standards.
- Parking space allocation to Dwellings in leu of driveway. Each bay size to be a minimum of 2.4m x 4.8m in accordance with WCBC L'PGN 16.
- Knee rails to parking bays to Highfield & Oakley House types
- Affordable Housing
- Existing retained hedges/landscaping
- Refer to Croft designs for Pathway links



Rev:	Description:	Date:
A	Amended in line with Planning Officers comments	11/12/20
B	Sub station added	18/01/21
C	Amends following meeting with Planning Officer	22/03/21
D	Further amends	13/04/21
E	Amends following meeting with Planning Officer	23/04/21
F	Turning heads shown by plots 76 and 96	05/05/21
G	Further amends	12/05/21



Castle Green,
Unit 20,
St. Asaph Business Park,
Ffordd Richard Davies, St Asaph,
Denbighshire, LL17 0LJ.
Tel. 01745 536677

Site:	
Rossett Road, Rossett	
Title:	
Site Layout	
Scale:	Date:
1:500@A0	21/07/2020
Ref:	Rev:
ROSSRD-SL.01	G

NOTES

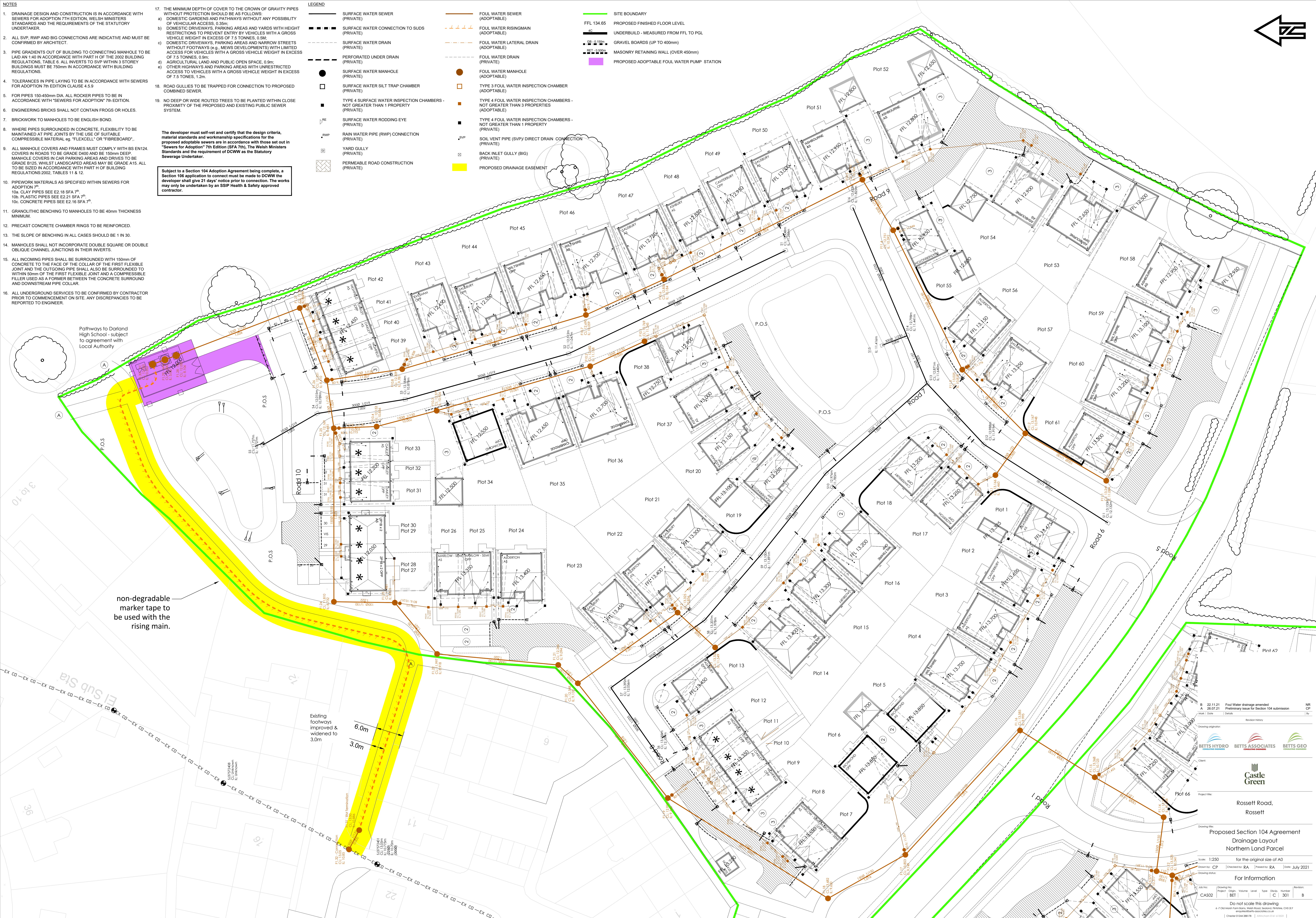
1. DRAINAGE DESIGN AND CONSTRUCTION IS IN ACCORDANCE WITH SEWERS FOR ADOPTION 7TH EDITION, WELSH MINISTERS STANDARDS AND THE REQUIREMENTS OF THE STATUTORY UNDERTAKER.
2. ALL SVP, RWP AND BIG CONNECTIONS ARE INDICATIVE AND MUST BE CONFIRMED BY ARCHITECT.
3. PIPE GRADIENTS OUT OF BUILDING TO CONNECTING MANHOLE TO BE LAID AN 1:40 IN ACCORDANCE WITH PART H OF THE 2002 BUILDING REGULATIONS, TABLE 6. ALL INVERTS TO SVP WITHIN 3 STOREY BUILDINGS MUST BE 750mm IN ACCORDANCE WITH BUILDING REGULATIONS.
4. TOLERANCES IN PIPE LAYING TO BE IN ACCORDANCE WITH SEWERS FOR ADOPTION 7th EDITION CLAUSE 4.5.9
5. FOR PIPES 150-450mm DIA. ALL ROCKER PIPES TO BE IN ACCORDANCE WITH "SEWERS FOR ADOPTION" 7th EDITION
6. ENGINEERING BRICKS SHALL NOT CONTAIN FROGS OR HOLES.
7. BRICKWORK TO MANHOLES TO BE ENGLISH BOND.
8. WHERE PIPES SURROUNDED IN CONCRETE, FLEXIBILITY TO BE MAINTAINED AT PIPE JOINTS BY THE USE OF SUITABLE COMPRESSIBLE MATERIAL eg "FLEXCELL" or "FIREBOARD".
9. ALL MANHOLE COVERS AND FRAMES MUST COMPLY WITH BS EN124. COVERS IN ROADS TO BE GRADE D400 AND BE 150mm DEEP. MANHOLE COVERS IN CAR PARKING AREAS AND DRIVES TO BE GRADE B125. WHILST LANDSCAPED AREAS MAY BE GRADE A15. ALL TO BE SIZED IN ACCORDANCE WITH PART H OF BUILDING REGULATIONS:2002, TABLES 11 & 12.
10. PIPEWORK MATERIALS AS SPECIFIED WITHIN SEWERS FOR ADOPTION 7th.
10a. CLAY PIPES SEE E2.18 SFA 7th.
10b. PLASTIC PIPES SEE E2.21 SFA 7th.
10c. CONCRETE PIPES SEE E2.16 SFA 7th.
11. GRANULITHIC BENCHING TO MANHOLES TO BE 40mm THICKNESS MINIMUM.
12. PRECAST CONCRETE CHAMBER RINGS TO BE REINFORCED.
13. THE SLOPE OF BENCHING IN ALL CASES SHOULD BE 1 IN 30.
14. MANHOLES SHALL NOT INCORPORATE DOUBLE SQUARE OR DOUBLE OBLIQUE CHANNEL JUNCTIONS IN THEIR INVERTS.
15. ALL INCOMING PIPES SHALL BE SURROUNDED WITH 150mm OF CONCRETE TO THE FACE OF THE COLLAR OF THE FIRST FLEXIBLE JOINT AND THE OUTGOING PIPE SHALL ALSO BE SURROUNDED TO WITHIN 50mm OF THE FIRST FLEXIBLE JOINT AND A COMPRESSIBLE FILLER USED AS A FORMER BETWEEN THE CONCRETE SURROUND AND DOWNSTREAM PIPE COLLAR.
16. ALL UNDERGROUND SERVICES TO BE CONFIRMED BY CONTRACTOR PRIOR TO COMMENCEMENT ON SITE. ANY DISCREPANCIES TO BE REPORTED TO ENGINEER.

The developer must self-wet and certify that the design criteria, material standards and workmanship specifications for the proposed adoptable sewers are in accordance with those set out in "Sewers for Adoption" 7th Edition (SFA 7th), The Welsh Ministers Standards and the requirement of DCWW as the Statutory Sewerage Undertaker.

Subject to a Section 104 Adoption Agreement being complete, a Section 105 application to connect must be made to DCWW the developer shall give 21 days' notice prior to connection. The works may only be undertaken by an SSIP Health & Safety approved contractor.

LEGEND

- | | | | | | |
|--|--|--|---|--|--|
| | SURFACE WATER SEWER (PRIVATE) | | FOUL WATER SEWER (ADOPTABLE) | | SITE BOUNDARY |
| | SURFACE WATER CONNECTION TO SUDS (PRIVATE) | | FOUL WATER RISING MAIN (ADOPTABLE) | | PROPOSED FINISHED FLOOR LEVEL |
| | SURFACE WATER DRAIN (PRIVATE) | | FOUL WATER LATERAL DRAIN (ADOPTABLE) | | UNDERBUILD - MEASURED FROM FFL TO PGL |
| | PERFORATED UNDER DRAIN (PRIVATE) | | FOUL WATER DRAIN (PRIVATE) | | GRAVEL BOARDS (UP TO 400mm) |
| | SURFACE WATER MANHOLE (PRIVATE) | | FOUL WATER MANHOLE (ADOPTABLE) | | MASONRY RETAINING WALL (OVER 450mm) |
| | SURFACE WATER SILT TRAP CHAMBER (PRIVATE) | | TYPE 3 FOUL WATER INSPECTION CHAMBER (ADOPTABLE) | | PROPOSED ADOPTABLE FOUL WATER PUMP STATION |
| | TYPE 4 SURFACE WATER INSPECTION CHAMBERS - NOT GREATER THAN 1 PROPERTY (PRIVATE) | | TYPE 4 FOUL WATER INSPECTION CHAMBERS - NOT GREATER THAN 3 PROPERTIES (ADOPTABLE) | | |
| | SURFACE WATER RODDING EYE (PRIVATE) | | TYPE 4 FOUL WATER INSPECTION CHAMBERS - NOT GREATER THAN 1 PROPERTY (PRIVATE) | | |
| | RAIN WATER PIPE (RWP) CONNECTION (PRIVATE) | | SOIL/VENT PIPE (SVP) DIRECT DRAIN CONNECTION (PRIVATE) | | |
| | YARD GULLY (PRIVATE) | | BACK INLET GULLY (BIG) (PRIVATE) | | |
| | PERMEABLE ROAD CONSTRUCTION (PRIVATE) | | PROPOSED DRAINAGE EASEMENT | | |



B 22.11.21 Foul Water drainage amended
A 26.07.21 Preliminary issue for Section 104 submission
Mason: D. Jones
Design: J. Jones

Drawing originator: CP
Client: Castle Green
Project title: Rossett Road, Rossett

Drawing title: Proposed Section 104 Agreement
Drainage Layout
Northern Land Parcel

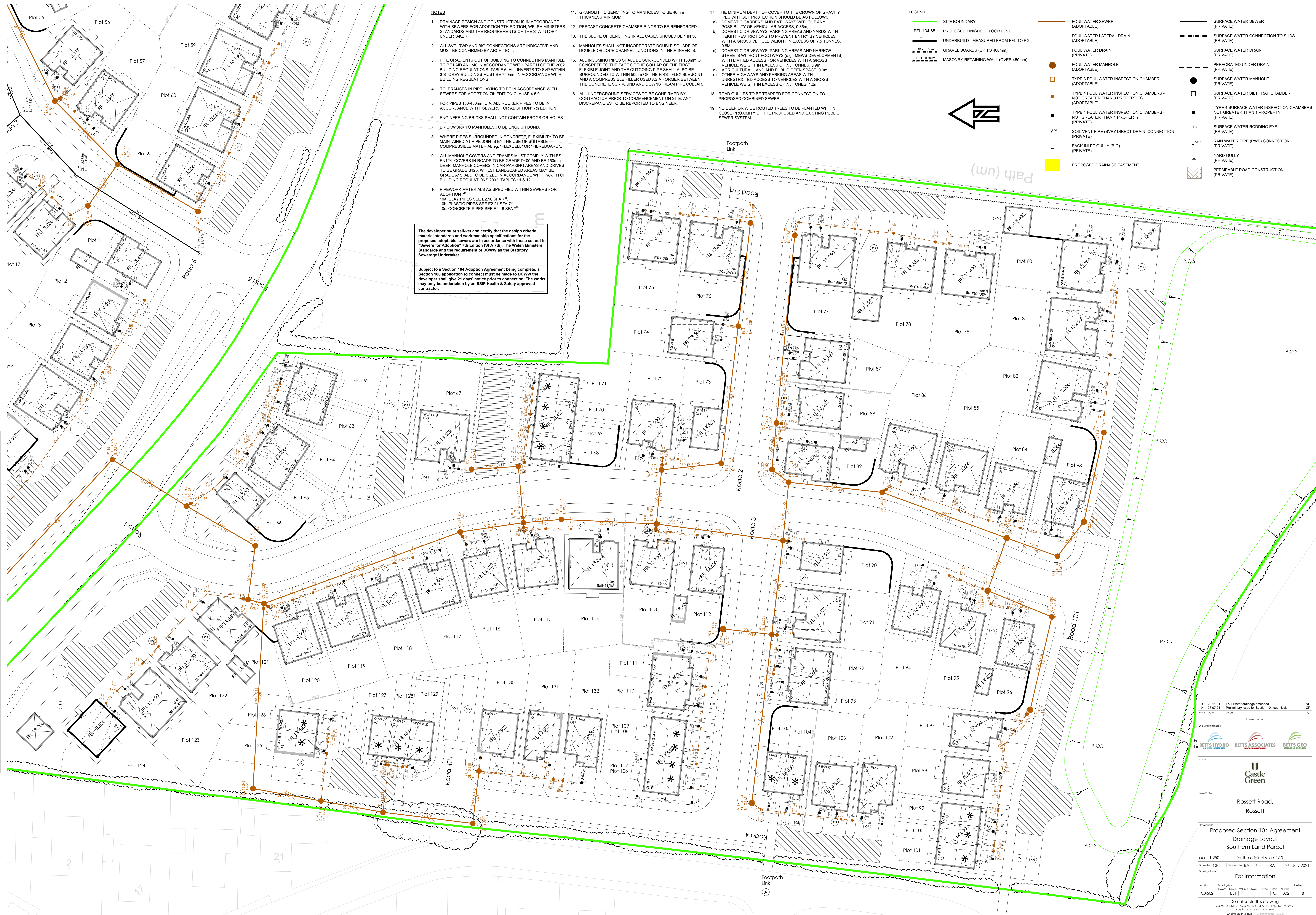
Scale: 1:250 for the original size of A0
Drawn by: CP
Checked by: RA
Project by: RA
Date: July 2021

For Information

Do not scale this drawing

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Checker: 01244 288118 | Administrator: 01244 288119





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Analytical Report Number : 22-35501

Project / Site name:	Tommy	Samples received on:	27/01/2022
Your job number:	21CGM025	Samples instructed on/ Analysis started on:	27/01/2022
Your order number:	BG4488	Analysis completed by:	31/01/2022
Report Issue Number:	1	Report issued on:	01/02/2022
Samples Analysed:	5 water samples		

Signed: *Karolina Marek*

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.



Analytical Report Number: 22-35501

Project / Site name: Tommy

Your Order No: BG4488

Lab Sample Number				2150260	2150261	2150262	2150263	2150264
Sample Reference				WS1	WS2	WS3	WS5	WS6
Sample Number				W1	W2	W3	W5	W6
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Time Taken				1445	1455	1505	1520	1530
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

General Inorganics

Sulphate as SO4	mg/l	0.045	ISO 17025	29.8	37.0	47.0	50.9	50.9
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U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 22-35501

Project / Site name: Tommy

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.