

FLOOD RISK & DRAINAGE IMPACT ASSESSMENT

FOR

**PROPOSED RETIREMENT LIVING
DEVELOPMENT**

AT

**KIRKBY, ST CHAD'S DRIVE, LIVERPOOL,
L32 8RE.**

ON BEHALF OF

McCARTHY STONE
Life, well lived

Project ref:	29958/DIA/WOB
Date First Issued:	21 st November 2023
Issue:	02
Revision Date:	30 th November 2023
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CONTENTS

1. Introduction
2. Description of Existing Site
 - 2.1 Description of Existing Drainage
3. Proposed Site
 - 3.1 Development Flood Risk Vulnerability
4. Design Philosophy
5. Proposed Site Drainage
6. Point of Discharge
 - 6.1 Interception Storage
 - 6.2 Water Quality
 - 6.3 Peak Flow Rate & Volume Control
 - 6.3.1 Brownfield Site
7. Construction Design Elements
 - 7.1 Water Quality Treatment
 - 7.2 Functionality of the Design
8. Maintenance
9. Attenuation Summary

APPENDICES

- I Existing Site Location Plan
- II Existing Impermeable Area
- III Existing Drainage Plan
- IV United Utilities Sewer Maps.
- V Proposed Site Plan
- VI Proposed Landscaping Plan
- VII Proposed Surface Water Drainage Layout
- VIII Proposed Foul Water Drainage Layout
- IX Proposed Impermeable Area Layout
- X 1:100 Year Storm Event +40% CC (5l/s)
- XI 1:30 Year Storm Event +40% CC (5l/s)
- XII 1:1 Year Storm Event +40% CC (5l/s)

Document Revision Box			
Revision	Date	Description	Author
01	21 st November '23	First issued	WOB
02	30 th November '23	Second Issue	WOB

1.0 Introduction

GGP Consult has been instructed by McCarthy Stone to prepare a flood risk & drainage impact assessment for the proposed retirement living development on land off St Chad's Drive, Liverpool, L32 8RH.

The following assessment will detail how the proposed development will drain surface and foul water from the site with consideration to the National Planning Policy Framework (NPPF).

2.0 Description of Existing Site

The site is located within Kirkby, northeast of the city of Liverpool.

The site has an area of 3,525m² and is partially impermeable. The site is currently occupied, being used as 'St Chad's Drive Short Stay Car Park' for the public. The site is bound to the north by 'Trentham Medical Centre', to the east by 'County Road', to the west by 'St Chad's Drive' and to the south by 'Kirkby Police Station'.

Approximately, the grid reference for the site is SJ 41438 98760.

Refer to Appendix I for the Existing Site Location Plan.

Refer to Appendix II for the Existing Impermeable Area.

The site has an average existing level of 29.000m.

2.1 Description of Existing Site Drainage

The existing site is positively drained, and a full understanding is noted regarding this; however, existing information received does not correlate with the United Utilities Sewer Maps.

A GPR survey was carried out at the site within August 2023, from this internal manhole can be found within the site which GGP believe are to be 'Foul' related.

Refer to Appendix III for the Existing Drainage Plan.

Refer to Appendix IV for the United Utilities Sewer Maps.

From this, there is suspicion that the surface water manhole identified on site discharges into an existing foul water manhole owned by United Utilities.

United Utilities are to confirm that the Sewer maps are correct when comments are sent through.

3.0 Proposed Site

It is proposed to develop a McCarthy Stone Retirement Living Development. This is to be accompanied by a car park which includes 22 spaces, 22 of these are to be dual EV charging points.

Refer to Appendix V for the Proposed Site Plan.

Refer to Appendix VI for the Proposed Landscaping Plan.

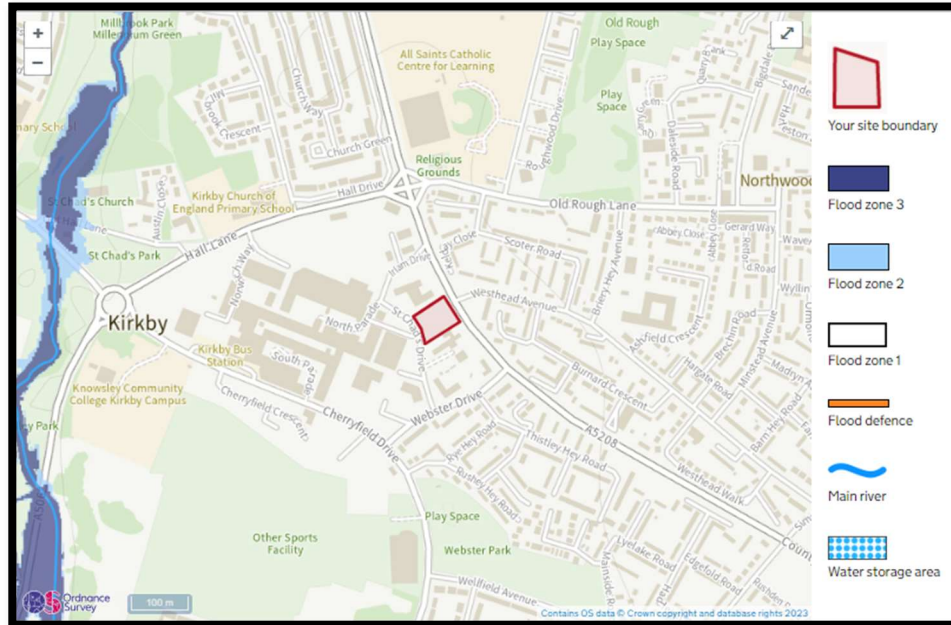
The living complex will have an FFL of 28.900m AOD.

As the site comprises more than 10 dwellings, it is classified as a major development and the Lead Local Flood Authority will be consulted as part of the planning process.

3.1 Development Flood Risk Vulnerability

In accordance with the NPPF flood risk vulnerability classification, the proposed development is classified as a 'more vulnerable' development.

The site is entirely located within flood zone 1, as shown in the below Environment Agency flood risk map. This means the site has a less than 1:1000 annual probability of river and sea flooding.

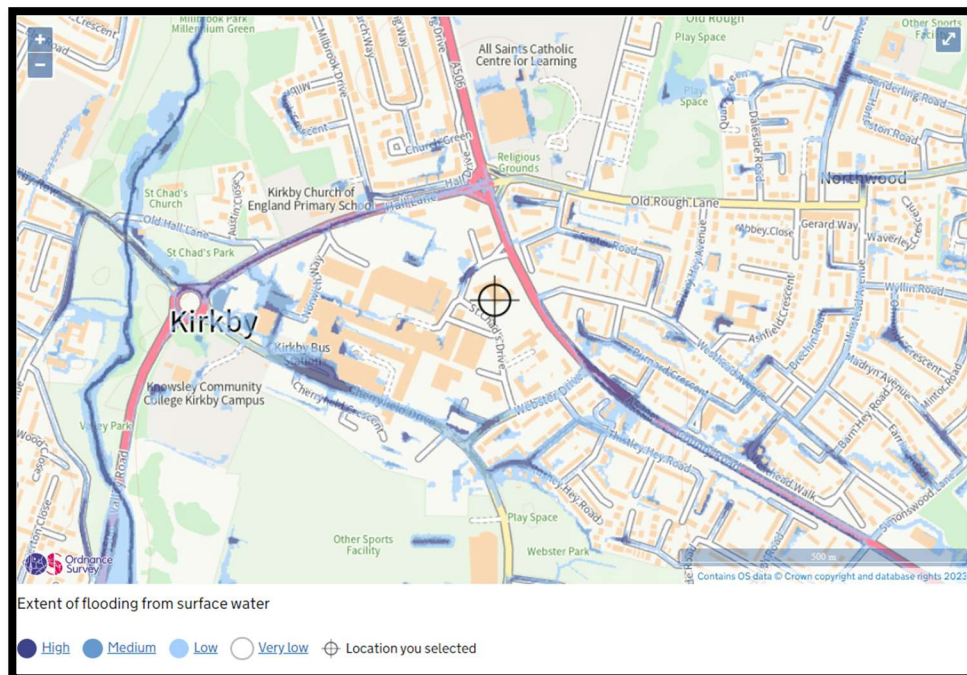


Environment Agency Flood Risk Zone Map

As per table 3 of the NPPF, all developments with a 'more vulnerable' classification proposed within flood zone 1 are acceptable.

Additionally, as shown in the below Environment Agency flood risk map, the entire site is at 'very low' risk of surface water flooding, meaning the site has a 0.1% annual probability of surface water flooding.

Therefore, flood risk to the site is considered negligible and the proposal is deemed acceptable.



Environment Agency Surface Water Flood Risk Map

4.0 **Design Philosophy**

Part H of the Building Regulations details a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to infiltration system, watercourse, surface water sewer & combined sewer in that priority order.

Ground investigation has been carried out for the development site by engineering consultants Patrick Parson, which confirm soakaway drainage may be feasible for this site. Subject to in-situ testing and groundwater levels.

'Given the likely granular nature of the on-site superficial soils, soakaway drainage may be feasible for this site, depending on the depth of Made Ground and subject to in-situ testing and groundwater levels.'

Patrick Parsons Phase II Geological report states that Falling Head Test have been undertaken across the site in two locations within window sample boreholes. The below shows the results which were received from the tests.

Falling Head Test Location	Test 1
WS08	1.19×10^{-4}
WS11	8.74×10^{-6}

WS08 = 1.19×10^{-4} = 0.4284m/hr.

WS11 = 8.74×10^{-6} = 0.0314m/hr

The above testing shows a huge difference in rates which can be achieved. GGP have undertaken to use the worst-case scenario being 'WS11'. Which allows soakaways to be achievable within this stage of the project.

Note – This is awaiting further BRE 365 testing to be carried out.

The closest watercourse is located 1km to the northwest of the site; this has been identified as a 'Mill Pond', which has been deemed as an unfeasible connection.

As the connection into the pond located to the northwest of the site is unfeasible, it is proposed that the surface water drainage system will be discharge to the ground through the form of 'Infiltration'. Therefore, foul water is to be discharged into an existing chamber within the site which GGP believe to be deemed as 'Foul' water. This is subject to further testing to clarify the use of this system prior to construction.

The existing chamber which the foul water has been designed to discharge into flows into the existing 225mm dia VC system within the footpath adjacent to the site boundary located to the west.

Therefore, it is proposed to discharge surface water via infiltration. Foul water will discharge into the existing United Utilities system.

5.0 Proposed Site Drainage

As mentioned within section 4.0, it is proposed to discharge all surface water from the site into the ground via infiltration.

It is proposed to discharge through a Wavin AquaCell Core-R cellular storage tank at a rate of 8.74×10^{-6} (0.0313m/hr).

In accordance with local drainage standards, a 40% climate change allowance will be applied to the calculations.

The existing site has an impermeable area of 3,525m² and is discharged at an unrestricted rate, note that the following discharge route is not yet finalised and fully understood, further surveys will be undertaken to understand the flow direction.

Surface water from the development is to be collected by a series of chambers, gullies and pipes where it will be brought into the car park area and discharged into a cellular storage system.

Surface water runoff from the carpark will be collected by several gullies located in the carpark and discharged into a Klargester NSBP003 Bypass Separator before discharging into the proposed attenuation tank.

A Wavin AquaCell Core-R cellular storage system is to be used. This will be designed to contain 140.7m³ of runoff at 95% voids. This has been designed to contain the 1:100 year + 40% CC below ground. Refer to section 6.0 for calculation details.

Refer to Appendix VII for the Proposed Surface Water Drainage Layout.

Foul water from the development is to be collected through a series of soil vent pipes, sewers and manhole chambers. This will be brought to the west of the site where it will discharge into the existing foul water system within the site.

Refer to Appendix VIII for the Proposed Foul Water Drainage Layout.

6.0 Point of Discharge

6.1 Interception Storage

- a) Preliminary calculations have been undertaken in accordance with “SUDS Manual 2015, Section 24.8, simple approaches to interception delivery and compliance assessment”.

The proposed site does not incorporate rainwater harvesting, infiltration, permeable paving, or other suitable SUDS components.

6.2 Water Quality

Define pollution hazard indices – see below tables

TABLE 4.3 Minimum water quality management requirements for discharges to receiving surface waters and groundwater			
Land use	Pollution hazard level	Requirements for discharge to surface waters, including coasts and estuaries ²	Requirements for discharge to groundwater
Residential roofs	Very low	Removal of gross solids and sediments only	
Individual property driveways, roofs (excluding residential), residential car parks, low traffic roads (eg cul de sacs, home zones, general access roads), non-residential car parking with infrequent change (eg schools, offices)	Low	Simple index approach ³ Note: extra measures may be required for discharges to protected resources ¹	
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	Simple index approach ³ Note: extra measures may be required for discharges to protected resources ¹	Simple index approach ³ Note: extra measures may be required for discharges to protected resources ¹ In England and Wales, Risk Screening ⁴ must be undertaken first to determine whether consultation with the environmental regulator is required. In Northern Ireland, the need for risk screening should be agreed with the environmental regulator.
Trunk roads and motorways	High	Follow the guidance and risk assessment process set out in HA (2009) ⁵	
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured, industrial sites	High	Discharges may require an environmental licence or permit ⁶ . Obtain pre-permitting advice from the environmental regulator. Risk assessment is likely to be required ⁶ .	

Pollution Hazard Level is ‘Low’.

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

Pollution Hazard Level is 'Low'.

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters

Type of SuDS component	Mitigation indices ¹		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond ⁴	0.7 ³	0.7	0.5
Wetland	0.8 ³	0.8	0.8
Proprietary treatment systems ^{4,8}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

As the site hardstanding is over 800m², mitigation measures are required. Therefore, the site will use a 'Proprietary treatment system'.

6.3 Peak Flow Rate & Volume Control

6.3.1 Brownfield Site

- a) As existing the site is entirely brownfield.

Catchment areas can be defined as follows,

Catchment Areas

Existing

Total Existing Impermeable Area	= 2,075m ²
Total Existing Permeable Area	= 1.460m ²
Total Site Area	= <u>3,525m²</u>

Proposed

Proposed Impermeable Car Park Road Area	= 871m ²
Proposed Impermeable Building Area	= 986m ²
Proposed Impermeable Path Area	= 200m ²
Proposed Impermeable Patio Area	= 62m ²
Total Impermeable Area	= <u>2,119m²</u>
Proposed Permeable Ground Area	= 1,430m ²
Total Permeable Area	= <u>1,397m²</u>

Refer to Appendix IX for the Proposed Impermeable Area Layout

- b) The following Micro Drainage output are based on infiltration set to a rate of 8.74×10^{-6} (0.0313m/hr) and an attenuation volume of 140.7m³

Additional parameter within the model are;

Ground Level	= 28.685m AOD
Tank Invert Level	= 26.375m AOD
Area	= 187m ²
Length	= 34m
Width	= 5.5m
Depth	= 0.80m
Void Ratio	= 0.95%
Total Impermeable Area	= 0.212ha

Extract from Source Control – Showing Model Tank Parameters

- c) The below table identifies the storage structure along with drain downtime for the 1:100 yr. 6hr event + 40% CC.

The below results are a summary taken from the MicroDrainage Model.

Structure Name	Cover Level	Max Water Level	Max Infiltration (l/s)	Above Ground Flooding	Flooding Depth
SW Tank	28.685m AOD	27.140m AOD (360 Winter)	1.0l/s	0.0m³	0mm

See Appendix X for full MicroDrainage calculations for the above.

- d) The below table identifies the storage structure along with drain downtime for the 1:1 yr. event + 40% CC.

The below results are a summary taken from the MicroDrainage Model.

Structure Name	Cover Level	Max Water Level	Max Infiltration (l/s)	Above Ground Flooding	Flooding Depth
SW Tank	28.685m AOD	26.598m AOD (360 Winter)	0.9l/s	0.0m³	0mm

As shown above, all flows up to and including the 1:1-year storm event can be contained below ground. See Appendix XII for full MicroDrainage calculations for the above.

- e) The below table identifies the storage structure along with drain downtime for the 1:30 yr. event + 40% CC.

The below results are a summary taken from the MicroDrainage Model.

Structure Name	Cover Level	Max Water Level	Max Infiltration (l/s)	Above Ground Flooding	Flooding Depth
SW Tank	28.685m AOD	26.965m AOD (720 Winter)	0.9l/s	0.0m ³	0mm

As shown above, all flows up to and including the 1:30-year storm event can be contained below ground. See Appendix XI for full MicroDrainage calculations for the above.

- f) The below table identifies the storage structure along with drain downtime for the 1:100 yr. event + 40% CC.

The below results are a summary taken from the MicroDrainage Model.

Structure Name	Cover Level	Max Water Level	Max Infiltration (l/s)	Above Ground Flooding	Flooding Depth
SW Tank	28.685m AOD	27.211m AOD (720 Winter)	1.0l/s	0.0m ³	0mm

As shown above, no above-ground flooding occurs during the 1:100 year storm event +40% CC.

Refer to Appendix X for full MicroDrainage calculations for the above.

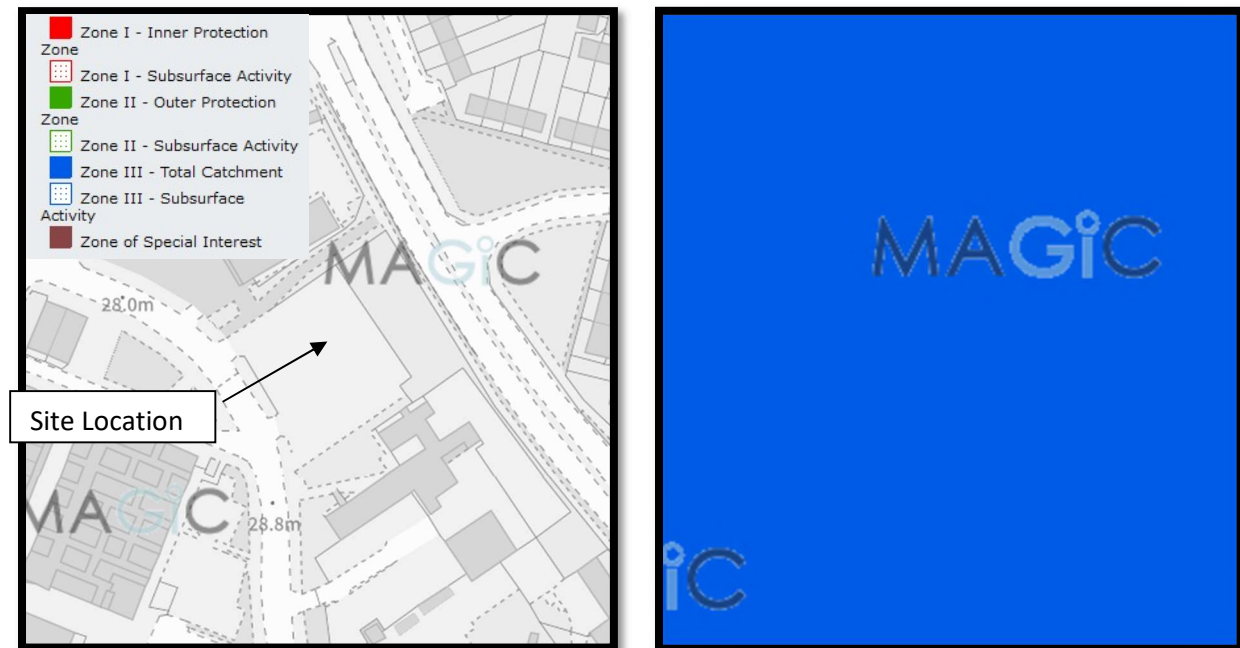
As shown above, all flows up to and including the 1:100 year storm event +40% CC can be contained below ground.

7.0 Construction Design Elements

- All chambers discharging directly to attenuation structures should be preceded by a catchpit manhole to help remove sediment prior to discharge.
- Channel drains are to have sump units to help remove sediment prior to discharge.
- All SUDs structures are to be lined with an impermeable geomembrane due to local ground conditions

7.1 Water Quality Treatment

As shown on the Environment Agency map below, the site is located within Source Protection Zone III



7.2 Functionality of the Design

- The client has full ownership on the land within the redline boundary. Along with the obligation to construct new access for the site.
- Pipework is to be maintained as per manufacturer's instructions.

8.0 Maintenance

Recommendations for inspection and maintenance can be seen in the table overleaf. It is worth noting that both the drainage and highway elements of the design will remain under the ownership of the landowner who will be solely responsible for the maintenance and upkeep of these elements of the proposal.

The landowner will perform a thorough site inspection biannually and as a minimum the following maintenance item should be actioned without fail.

- Lifting of manhole lids to check flows.
- Catchpits to be emptied.
- Rodding of external pipework.

Where defects exist, maintenance will be carried out in accordance with the below maintenance schedule. In addition to this a CCTV survey of the full drainage system will be undertaken every 5 years to check the condition of the pipework

ITEM	DEFECT CHECK	DETAILED INSPECTION VISUAL INSPECTION	ACTION REQUIRED	REPLACEMENT	ADDITIONAL COMMENTS
FLOW CHECK	Surface water ponding	6months. Lifting of manhole lids to check flows.	Check downstream for blockages. Clean system and undertake CCTV survey if issues are identified	N/A	Under the maintenance responsibility of the landowner.
MANHOLE COVERS	Broken lids.	6 months.	Replace.	When broken.	Under the maintenance responsibility of the landowner.
MANHOLE	Blockages, surcharging.	6months. Lifting of manhole lids to check flows.	Check downstream for blockages. Clean system and undertake CCTV survey if issues are identified	N/A	Under the maintenance responsibility of the landowner.
INSPECTION CHAMBER	Blockages, surcharging.	6months. Lifting of manhole lids to check flows.	Check downstream for blockages. Clean system and undertake CCTV survey if issues are identified	N/A	Under the maintenance responsibility of the landowner.
SILT TRAPS/ CATCHPITS	Blockages, slit build up	6months. Lifting of manhole to check for silt.	Empty and clean sump	N/A	Under the maintenance responsibility of the landowner.
PIPEWORK	Blockages, Cracking	6 months.	Rodding required	When damaged.	Under the maintenance responsibility of the landowner.
GUTTERING	Blockages	6 months.	Cleaning and removal of debris	N/A	Under the maintenance responsibility of the landowner.
ACCESS ROAD	Surface damage	6 months.	Pressure washing of surface Surface Patching when required	When damaged. (Surfacing to be patched to original specification.)	Under the maintenance responsibility of the landowner.
GULLIES	Blockages, silt removal	Yearly	Gullies to be inspected and emptied to reduce sediment entry to the tank.	N/A	Under the maintenance responsibility of the landowner.

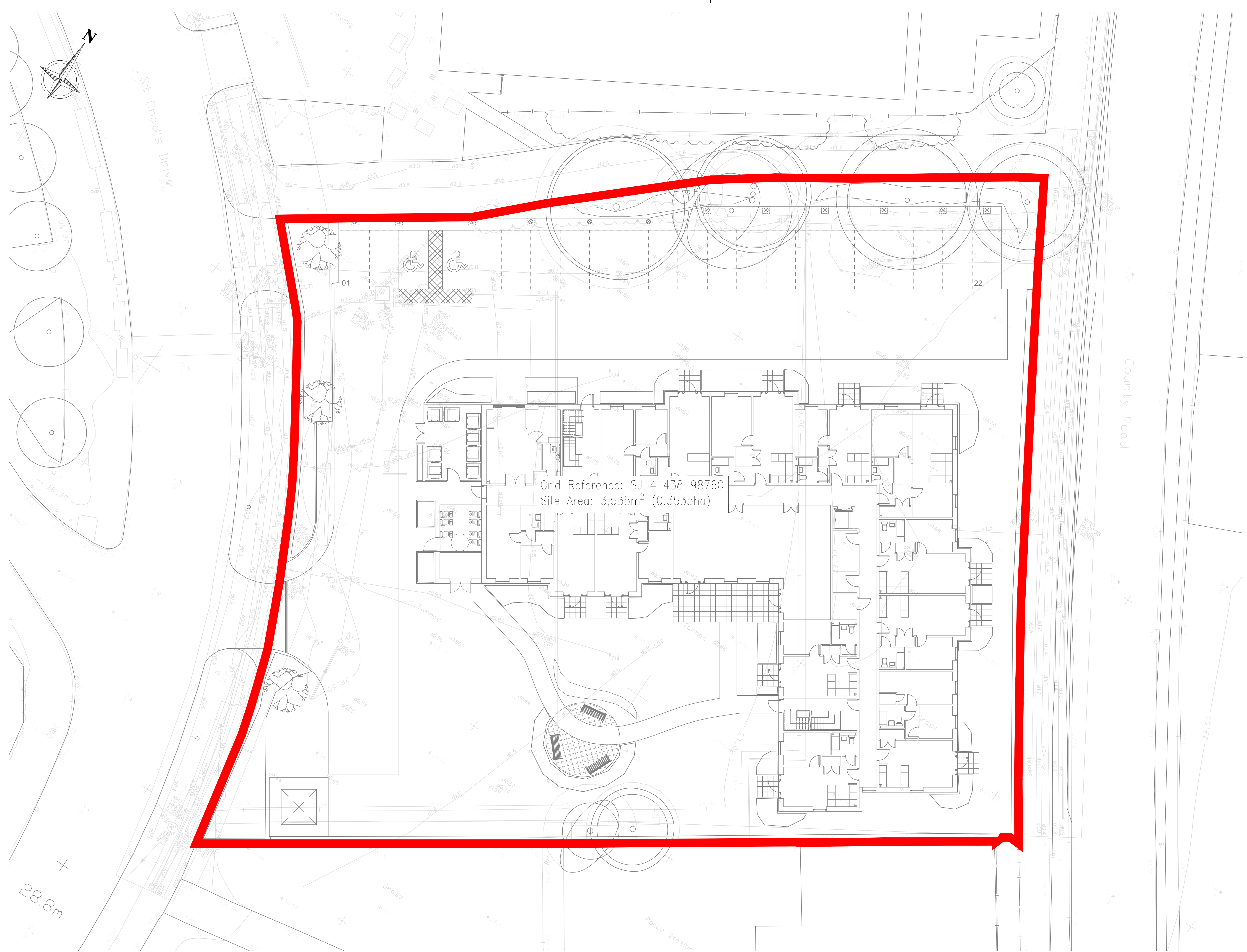
9.0 Attenuation Summary

Within section 6.3.1, various storm periods have been modelled based on outline parameters. This has resulted in a required attenuation volume to satisfy the storm events up to and including the 1:100yr storm.

From the calculations undertaken, it has been established that 140.7m³ of attenuation is required to be contained up to the 1:100yr event while maintaining a peak infiltration rate of 1l/s.

APPENDIX I

Existing Site Location Plan



Grid Reference: SJ 41438 98760
Site Area: 3,535m² (0.3535ha)

- NOTES:-
1. All dimensions must be checked on site and not scaled from this drawing.
 2. The Contractor shall make a survey of the site and shall be responsible for obtaining all dimensions and levels necessary for the proper fabrication of the structure as indicated.
 3. All levels shown on this drawing are relative to Agreed Datum.
 4. This drawing is to be read in conjunction with 29958/100 Series Drawings.
 5. All existing invert levels are to be confirmed by contractor prior to construction. Connection subject to approval.
- Denotes Site Boundary – 3,535m²

B	27/11/23	ISSUED FOR APPROVAL	WP	WP
A	20/11/23	ISSUED FOR APPROVAL	WP	WP
Rev	Date	Description	DR	CH

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Drawing Title
Site Location Plan

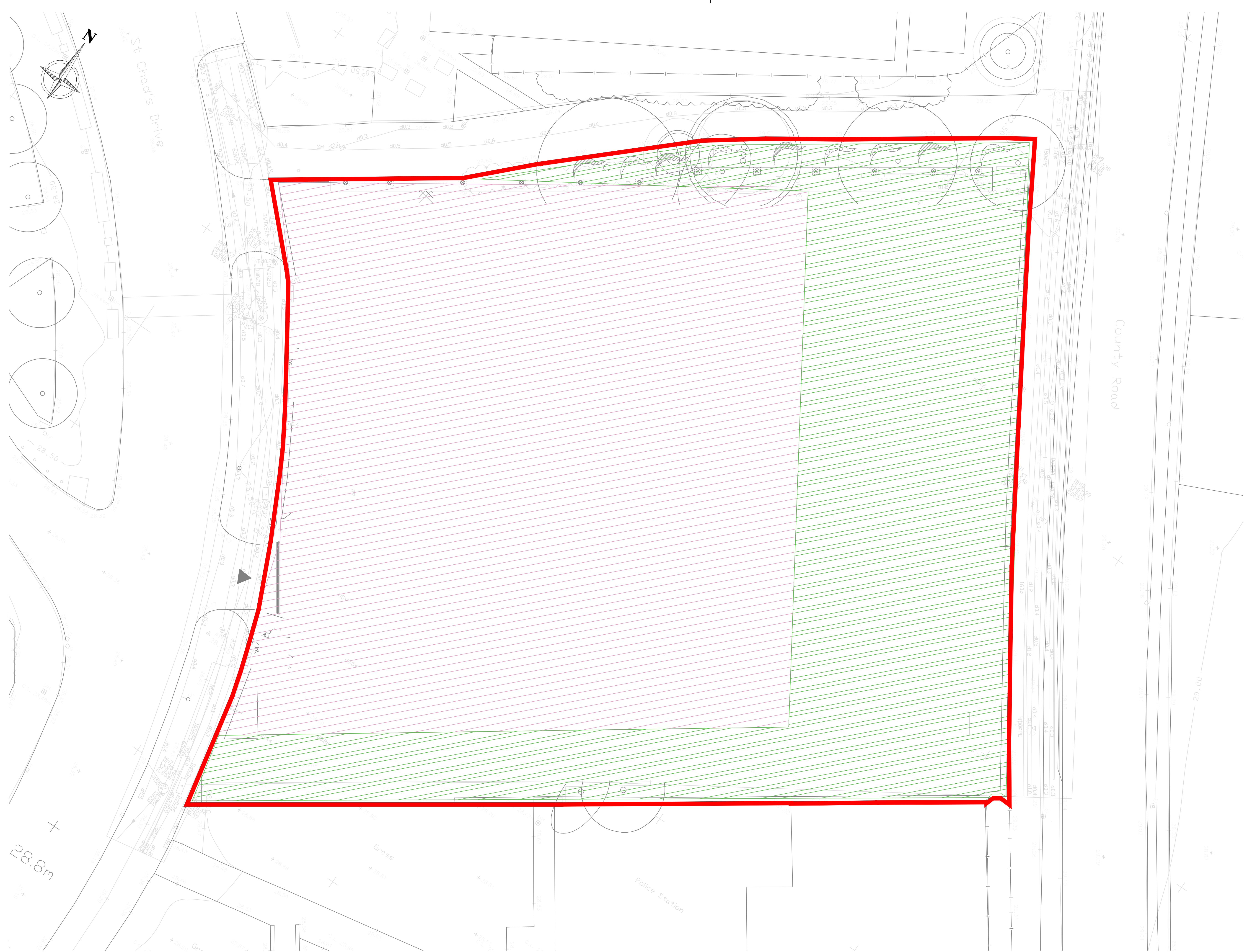
Status	APPROVAL		
Scale	1:150 @ A1	Date	Nov' 2023
Drawn By	W. Brown	Checked	W.B
		Approved	J.H.C

Drw. No.	29958 / 100	Rev	B
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NOT FOR CONSTRUCTION

APPENDIX II

Existing Impermeable Area



- NOTES:-
1. All dimensions must be checked on site and not scaled from this drawing.
 2. The Contractor shall make a survey of the site and shall be responsible for obtaining all dimensions and levels necessary for the proper fabrication of the structure as indicated.
 3. All levels shown on this drawing are relative to Agreed Datum
 4. This drawing is to be read in conjunction with 29958/100 Series Drawings.
 5. All existing invert levels are to be confirmed by contractor prior to construction. Connection subject to approval.

Denotes Site Boundary – 3,535m²

Denotes Proposed Impermeable Car Park Area – 2,075m²

Denotes Proposed Permeable Grassed Area – 1,460m²

Proposed Total Impermeable Area – 2,075m²

Proposed Total Permeable Area – 1,460m²

Rev	Date	Description	WD	WP
A	20/11/23	ISSUED FOR APPROVAL	DR	CH

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Drawing Title
Existing Impermeable
Area Plan

Status APPROVAL

Scale 1:150 @ A1 Date Nov' 2023

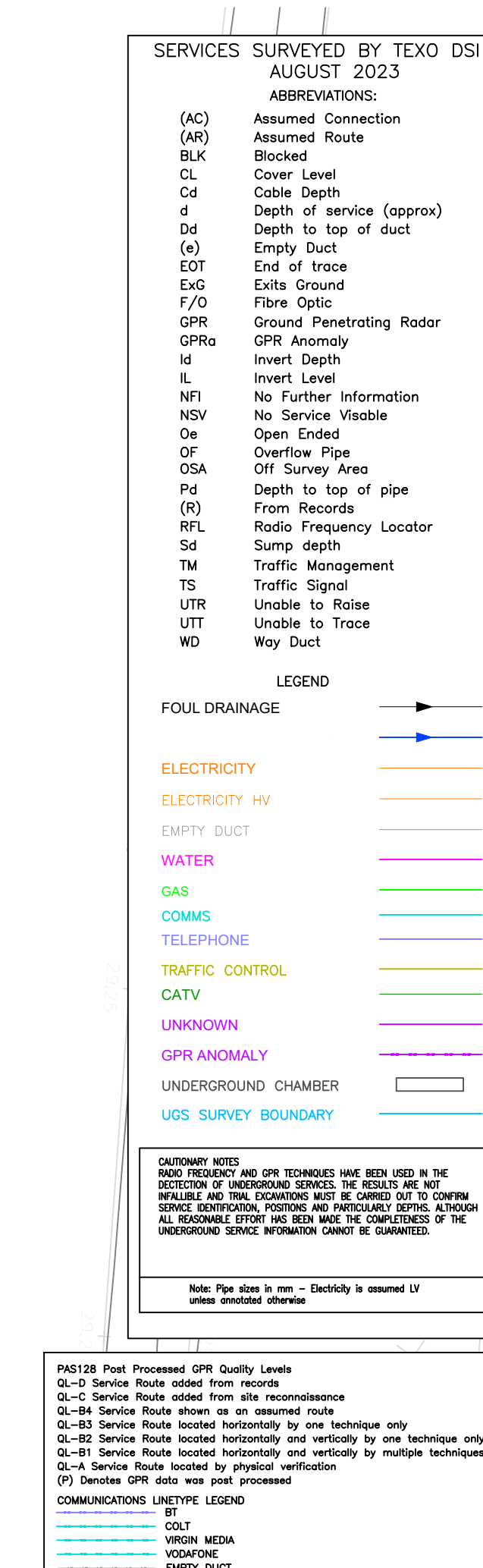
Drawn By *W. Brown* Checked W.B Approved J.H.C

Dwg. No.	Rev
29958 / 101	A

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APPENDIX III

Existing Drainage Plan



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Drawing Title

Existing Utilities Plan

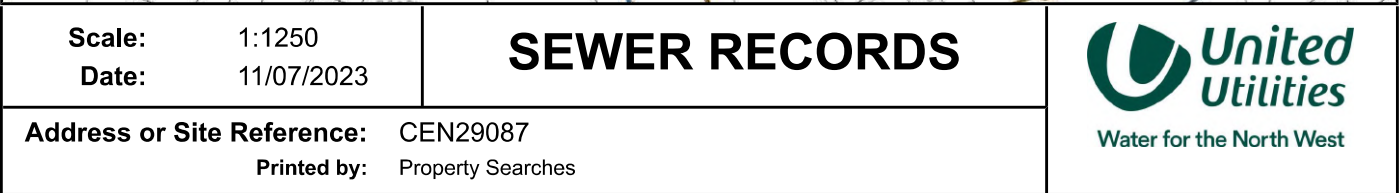
Status			APPROVAL		
Scale			1:150 @ A1		
Date			Nov' 2023		
Drawn By		Checked		Approved	
K. Thompson		W.B		J.H.C	

Drg. No. 29958 / 103	Rev A
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APPENDIX IV

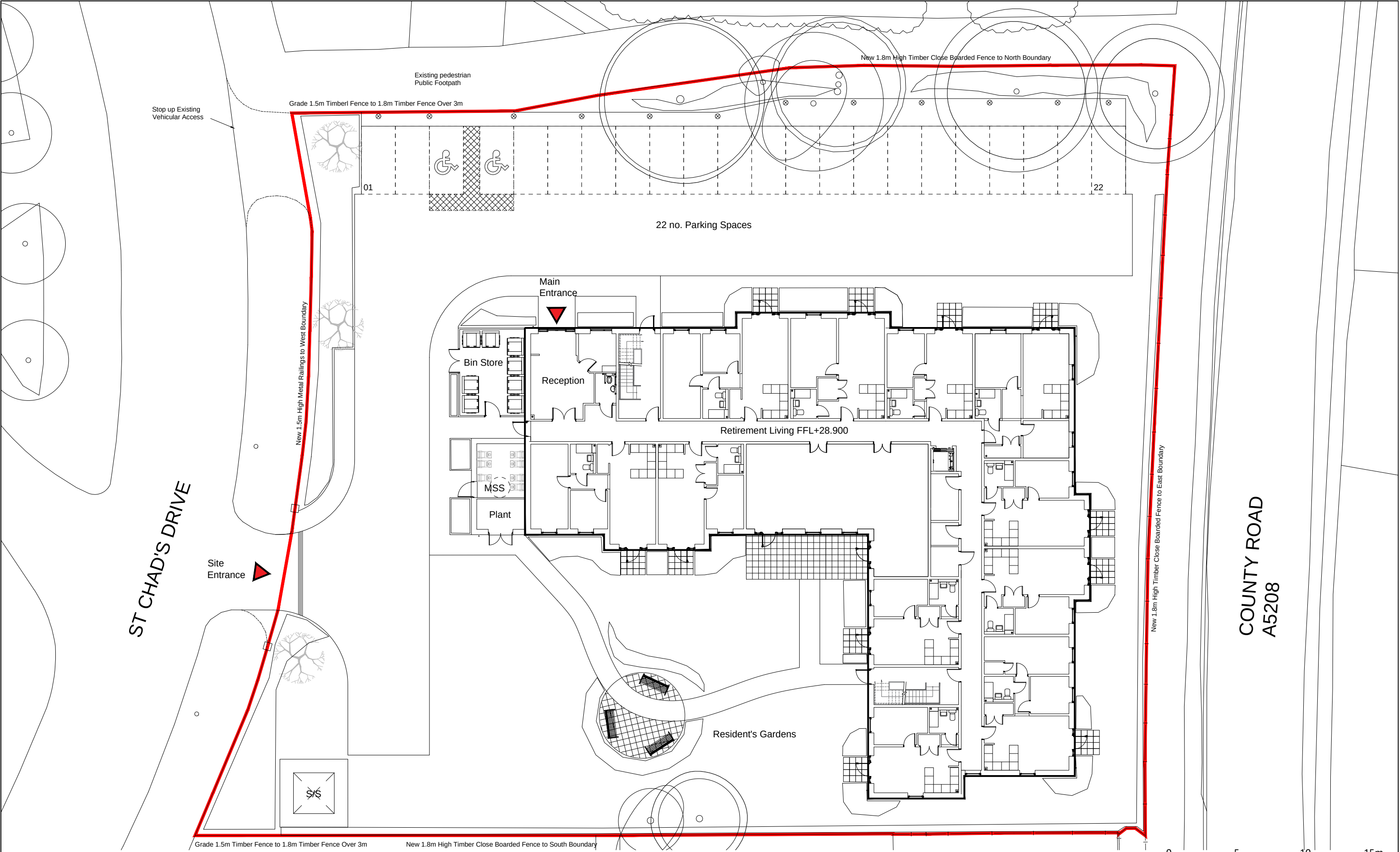
United Utilities Sewer Maps



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APPENDIX V

Proposed Site Plan



1002
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Proposed Site Plan
Scale 1:250

- Notes:
- All drawings are subject to Planning and Building Control consent.
 - The details shown are for design intent purposes only and are subject to further design development with suppliers and sub-contractors
 - Proposals subject to consultation and approval from Local Authority Building Control or an Approved Inspector
 - All setting out dimensions should be checked on-site prior to construction and any discrepancies and/or omissions should be reported to the Architect immediately



Rev. Date Details

Drawn Chkd

Rev. Date Details

Drawn Chkd

Drawn By: MP
Date: 17.11.23
Checked By: MA
Date: 17.11.23
Project No: 23046
Scale: 1:250 @A3
Dwg No: 1002
Rev: P1

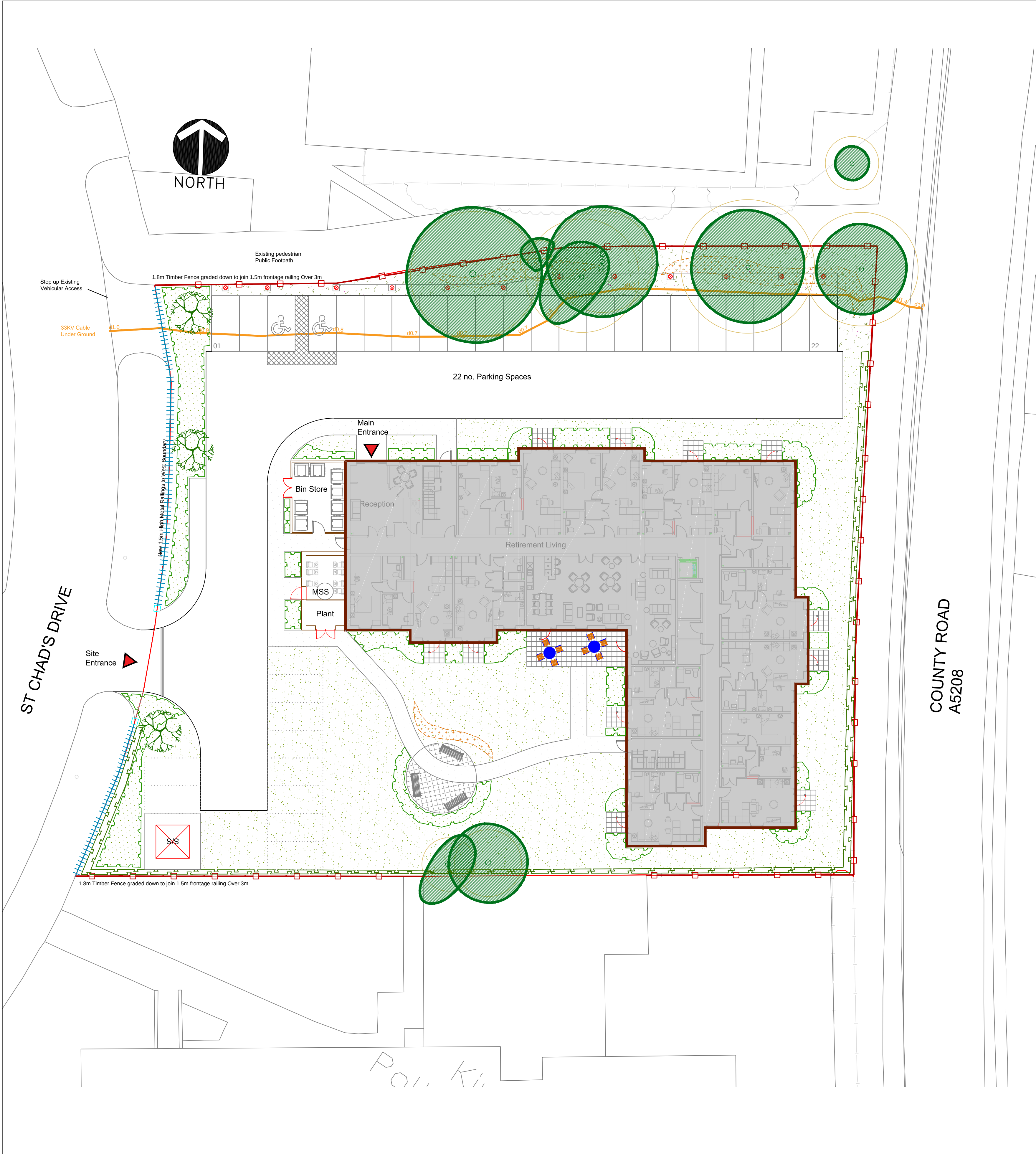
Issued for: **PLANNING ISSUE**
Project/Client: Project Evolve RL Scheme, St Chad's Drive
Drawing: Proposed Site Plan
Kirkby, McCarthy Stone

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architects

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APPENDIX VI

Proposed Landscaping Plan



NOTES

CONCEPT

The communal open spaces form an integral part of the development, which includes separate areas for sitting and socialising with interest provided through the use of different paving materials and planting styles. Planting will maximise biodiversity enhancement.

TREE PLANTING

Planting of extra-heavy standard trees around the entrance and frontage to the site will give early structure and maturity to the scheme. Specimen garden trees will provide year round colour and interest in the garden areas. Foundation design of new buildings shall accommodate proposed tree planting in accordance with NHBC guidelines.

Species to be chosen from suggested species such as:
Acer campestre (Ac) Prunus padus 'Albertyi' (Pp)
Betula utilis jaquemontii (Buj) Sorbus aucuparia 'Asplenifolia' (SaA)
Liquidamber styraciflua 'Worplesdon' (LsW)

SHRUB PLANTING

A mix of evergreen and deciduous shrubs as well as herbaceous perennials will be planted throughout the site to give enclosure and structure to the development and to provide year round interest through form, foliage and colour. Medium/large species will be planted against screen fences and walls and medium/low species will be planted around paths and entrance areas.

Species to be selected from a range of species including: () density/m2

Berberis frikartii 'Amstelveen'(5), Bergenia cordifolia 'Silberlicht'(6), Buddleia davidii 'Lochinch'(2), Ceanothus thrysiflorus repens(4), Chaenomeles superba 'Jet Trail'(4), Cornus alba 'Spaethii'(2), Cornus stolonifera 'Flaviramea'(2), Cytisus 'Allgold'(4), Elaeagnus pungens 'Maculata'(3), Escallonia 'Apple Blossom'(4), Euonymus fortuneii 'Emerald Gaiety'(6), Euphorbia griffithii 'Fireglow'(5), Festuca spp(6), Geranium 'Johnson's Blue'(4), Hebe albicans 'Red Edge'(4), Hebe 'Autumn Glory'(4), Hypericum x moserianum(4), Juniperus sabina 'Tamariscifolia' (3), Lavandula 'Hidcote'(6), Lonicera 'Maygreen'(4), Nepeta faassenii(4), Perovskia 'Blue Spire'(6), Phormium var, Potentilla 'Red Ace'(5), Prunus laurocerasus 'Zabelana'(3), Pyracantha 'Orange Charmer'(3), Rubus x 'Betty Ashburner'(4), Spiraea 'Gold Flame'(4), Spiraea 'Shirobana'(4), Viburnum tinus 'Eve Price'(3)

HARD LANDSCAPE

Footpaths around the building to be surfaced with tarmac with a non slip paving unit used for the sitting areas and patios to create a more intimate character. A wander path across the lawned area to the Resident's Garden will be surfaced with a pedestrian tarmac with a paved sitting area on the route.

GRASS AREAS

A lawned area to the rear the building will provide a more highly maintained area to the Resident's Garden with more irregularly mown species rich flowering lawn and meadow areas to enhance biodiversity forming a boundary to the site beneath existing trees.

NATIVE SPECIES PLANTING

A mixed native hedge is to be planted along the eastern boundary. Mixed naturalising bulb mixes will provide further enhancement to biodiversity.

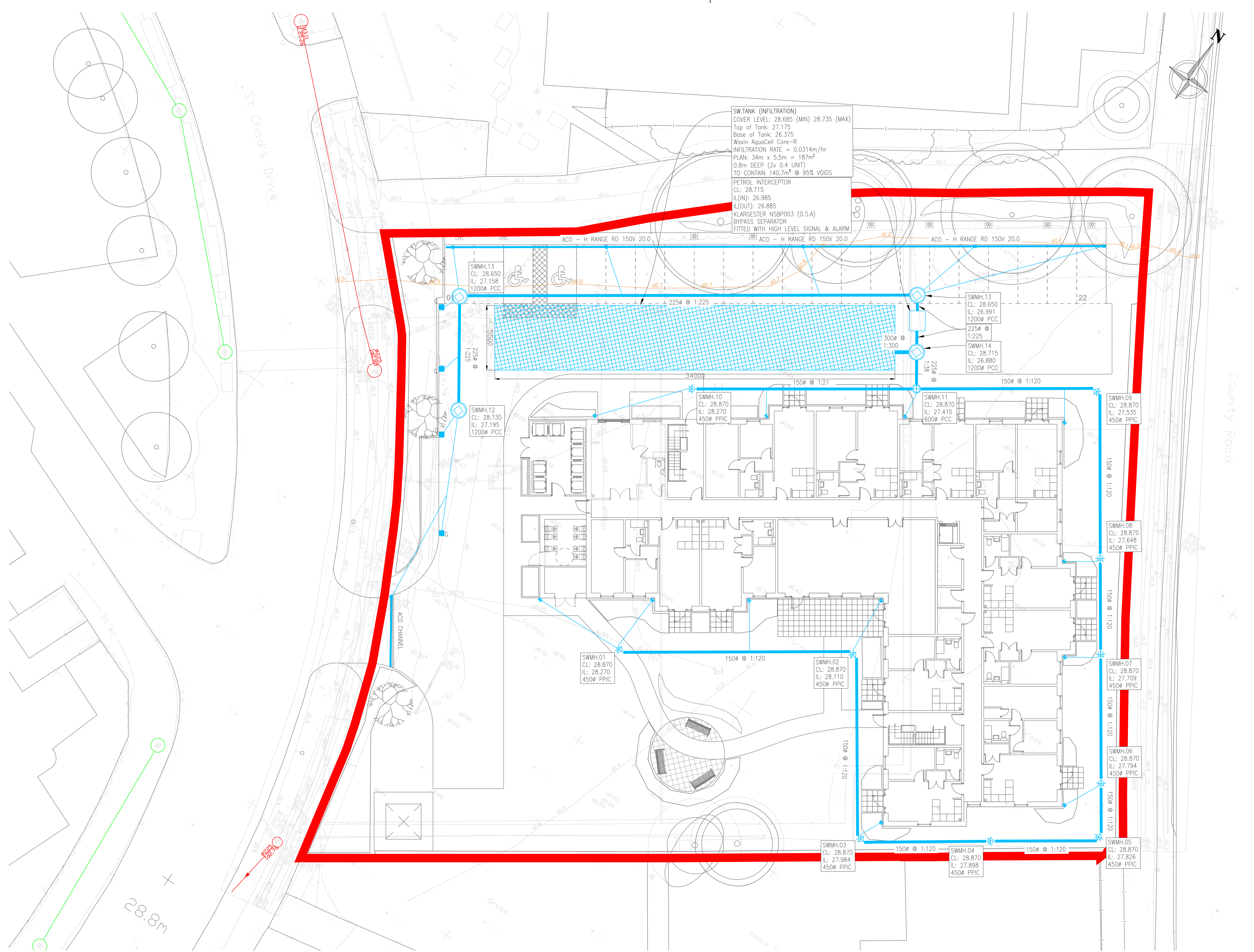
KEY

- Proposed heavy standard (12-14cm girth) tree
- Proposed native hedge
- Proposed ornamental shrub and herbaceous perennial planting
- Proposed turf
- Proposed species rich flowering lawn
- Proposed meadow grass
- Proposed bulb planting
- Proposed 450 x 450 x 50mm concrete flag paving
- Proposed self binding gravel path
- Proposed pedestrian tarmacadam
- Proposed vehicular tarmacadam
- Indicative tables/seats
- Proposed 1500mm high metal railing
- Proposed 1800mm timber close boarded fence

Rev.A:Substation relocated (SF)		November 2023	
Sue Farmer BA MA LD MLI Landscape Architect fdalandscape Westleigh Hall Wakefield Road Denby Dale Huddersfield HD8 8QJ telephone 01484 861611 fax 01484 861616 isdn 01484 866900 email info@fdalandscape.co.uk www.fdalandscape.co.uk	client	McCarthy Stone	
	project	Proposed Residential Development	
		ST CHADS DRIVE, KIRKBY	
	drawing title	LANDSCAPE MASTERPLAN	
scale 1:250 @A1	date Oct 23	drwn by SF	drawing no R/2714/1A

APPENDIX VII

Proposed Surface Water Drainage Layout



NOTES:-

- All dimensions must be checked on site and not scaled from this drawing.
- The Contractor shall make a survey of the site and shall be responsible for obtaining all dimensions and levels necessary for the proper fabrication of the structure as indicated.
- All levels shown on this drawing are relative to Agreed Datum.
- This drawing is to be read in conjunction with 29958/100 Series Drawings.
- All existing invert levels are to be confirmed by contractor prior to construction. Connection subject to approval.

Denotes Existing Surface Water Manhole

Denotes Existing Surface Water Pipe

Denotes Existing Foul Water Manhole

Denotes Existing Foul Water Pipe

Proposed Surface Water PPIC Chamber

Proposed Rainwater Pipe

Proposed Channel Drain

Proposed Surface Water Sewer

Proposed Surface Water Concrete Chamber

Proposed HydroBrake Chamber

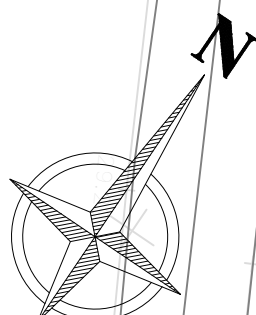
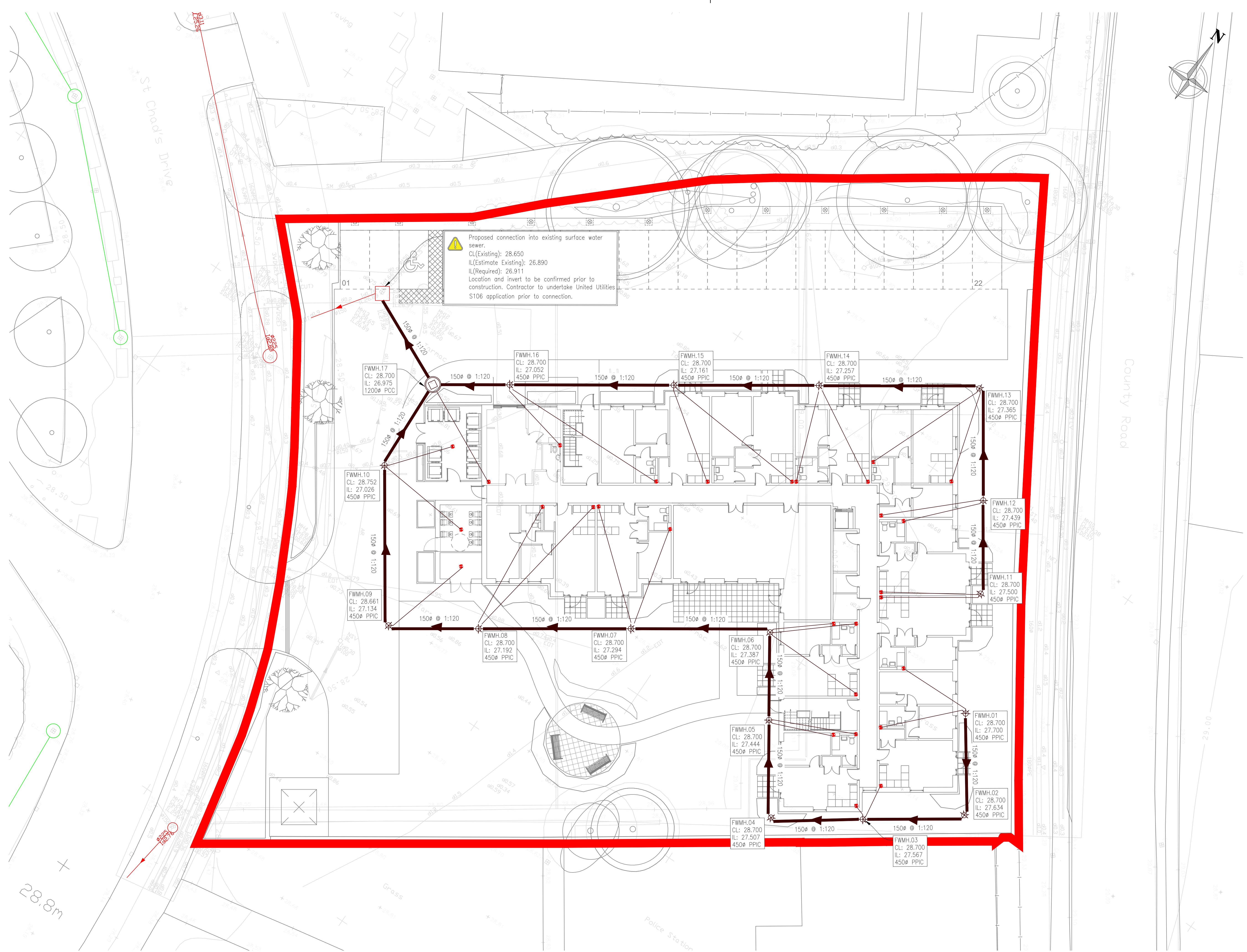
Proposed Road Gully

A	30/11/23	ISSUED FOR APPROVAL	WP	WP
Rev	Date	Description	DR	CH
© copyright				
Constructionline intertek Achilles UVDB SILVER PLUS Audited RISQS GGP CONSULT CONSULTING ENGINEERS ARCHITECTS PROJECT MANAGEMENT 2 Hallam Road Priory Park East HULL HU4 7DY United Kingdom Telephone(+44) 01482 627963 Fax (+44) 01482 641736 Email info@ggpconsult.co.uk				
Client McCarthy Stone <i>Life, well lived</i>				
Job Title Kirkby, St Chad's Drive, Liverpool, L32 8RH				
Drawing Title Proposed Surface Water Drainage Plan (Infiltration)				
Status APPROVAL				
Scale 1:150 @ A1		Date Nov' 2023		
Drawn By W. Brown		Checked W.B	Approved J.H.C	
Dwg. No. 29958 / 112		Rev A		

NOT FOR CONSTRUCTION

APPENDIX VIII

Proposed Foul Water Drainage Layout



- NOTES:-
1. All dimensions must be checked on site and not scaled from this drawing.
 2. The Contractor shall make a survey of the site and shall be responsible for obtaining all dimensions and levels necessary for the proper fabrication of the structure as indicated.
 3. All levels shown on this drawing are relative to Agreed Datum.
 4. This drawing is to be read in conjunction with 29958/100 Series Drawings.
 5. All existing invert levels are to be confirmed by contractor prior to construction. Connection subject to approval.

- Denotes Site Boundary – 3,535m²
- Denotes Existing Surface Water Manhole
- Denotes Existing Surface Water Pipe
- Denotes Existing Foul Water Manhole
- Denotes Existing Foul Water Pipe
- Proposed Foul Water Sewer
- Proposed Foul Water Concrete Chamber
- Proposed Foul Water PPIC Chamber
- Proposed Soil Vent Stack

B	27/11/23	ISSUED FOR APPROVAL	WP	WP
A	20/11/23	ISSUED FOR APPROVAL	WP	WP
Rev	Date	Description	DR	CH

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Client **McCARTHY STONE**
Life, well lived

Job Title
Kirkby,
St Chad's Drive,
Liverpool,
L32 8RH

Drawing Title
**Proposed Foul Water
Drainage Plan**

Status	APPROVAL		
Scale	1:150 @ A1	Date	Nov' 2023
Drawn By	K. Thompson	Checked	W.B
		Approved	J.H.C

Drw. No.	29958 / 105	Rev	B
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