



RIDGE

BELOW DRAINAGE STRATEGY
COWPLAIN SCHOOL
WATERLOOVILLE

June 2022

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COWPLAIN SCHOOL, WATERLOOVILLE

June 2022

Prepared for

Frontier Estates

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SECTION 1

INTRODUCTION

1. INTRODUCTION

1.1. Appointment and Brief

This surface and foul water drainage strategy (DS) has been prepared on behalf of Frontier Estates for a proposed development at Cowplain School in Hart Plain Ave, Waterlooville, Hampshire PO8 8RX (hereby referred to as the 'Application Site').

The purpose of this document is to outline the development of the proposed DS, providing sufficient detail to enable both a thorough review of design principles adopted and further refinement of the design as part of the ongoing development of the project.

It aims to demonstrate the foul and surface water management at the Application Site, as follows:

Provide an analysis of the impact of the proposed development on surrounding foul water infrastructure and identify the constraints present on the site in terms of suitability of conventional gravity drainage. Demonstrate the principles of surface water management in terms of constraints on discharge, permitted discharge rates and required volumes of attenuation (where required), describing how these can be accommodated within the development proposals.

The proposed DS outlined herein is subject to further detailed analysis at design stage.

1.2. Aims and Objectives

The DS has been prepared with reference to the following requirements:

The DS must:

- Ensure that flood risk to the Application Site and surrounding area is not increased over the lifetime of the Proposed Development;
- Conform with all relevant National and Local flood risk policies;
- Adopt current design standards; and
- Consider long-term maintenance with respect to practicality, ownership and funding.

The DS should:

- Mimic the existing drainage characteristics of the Application Site as far as is practical;
- Look for opportunities to provide a reduction in flood risk to the Application Site and the surrounding area;
- Adhere to current best practice guidance;
- Contribute to the enhanced amenity and aesthetic value of the Application Site; and
- Propose opportunities for biological enhancement and provide habitats for wildlife in urban areas.

1.3. Limitations

The purpose of this report as outlined in Section 1.2, together with those related matters specifically referred to therein and it is not intended to be used for any other purposes. The report is for the sole benefit and may only be relied upon by the addressee, to whom we will owe a duty of care. The report and any part of it is confidential to the addressee and should not be disclosed to any third party for any purpose, without the prior written consent of Ridge and Partners LLP as to the form and context of such disclosure. The granting of such consent shall not entitle the third party to place reliance on the report, nor shall it confer any third-party rights pursuant to the Contracts (Rights of Third Parties) Act. The report may not be assigned to any third party.

1.4. Reference Information

The following information has been obtained and interrogated as part of this study:

Topographical survey. Ref: 13056. Clear View Surveys. Feb 2021;
KNC2116-500-01-A Residential Development Location Plan. June 2021;
KNC2116-500-00-A Care Home Location Plan. June 2021;
KNC2116-602-02-A Drainage Layout-Residential Development. June 2021;
KNC2116-602-01-A Drainage Layout-64 Beds Care Home. June 2021;
Response Letter- residential. Ref: DS_CC_PPE-155564. Southern Water;
IH124 Playfield-Existing Run Off. Microdrainage. June 2021;
Care Home Attenuation 100yrs+40%. Microdrainage. June 2021;

In addition, the following documents have been consulted:

Communities and Local Government Document. (2019). The National Planning Policy Framework;
Environment Agency. (2016). Flood Risk Assessments: Climate Change Allowances;
Environment Agency. (2013). Rainfall Runoff Management for Developments;
Environment Agency. (2019). Flood Risk Assessments: Climate Change Allowances;
CIRIA C753 – The SuDS Manual;
Secretary of State. (2015). Building Regulations Approved Document H;
Butler & Davies. (2012). 2nd Ed. Urban Drainage;
British Geological Survey Online Mapping Tool;
DEFRA / EA Interactive online mapping (magic.defra.gov.uk);
Department for Environment, Food and Rural Affairs. (2015). Non-Statutory Technical Standards for Sustainable Drainage Systems;
Department for Environment, Food and Rural Affairs & Environment Agency. (2017). Flood Risk Assessment for Planning Applications;

SECTION 2

PROJECT BACKGROUND

2. PROJECT BACKGROUND

2.1. Site Location and Existing Land Use

The site is located to the south of Hart Plain Avenue. Part of the application site (location 1) is belong to Cowplain School which is currently unused and composed of asphalt ground. To west of the site, there is Lawson J F & Sons. The other part (location 2) is unused green space located between Cowplain School and Hart Plain Infant School.

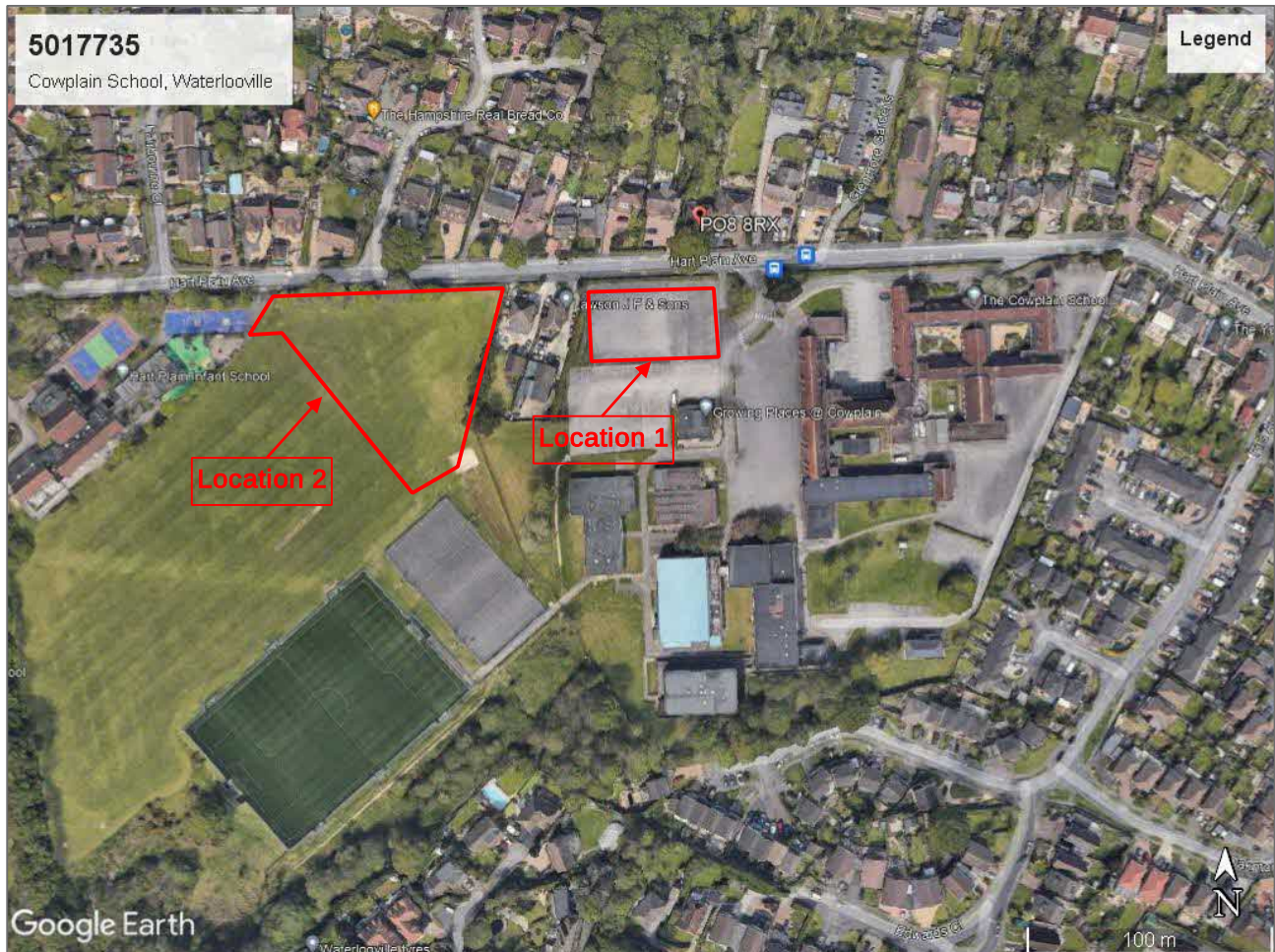


Figure 1: Site Location (Google Earth Map)

The Ordinance Survey (OS) grid reference for the application site is approximately 468543 Easting, 110802 Northing (location 1) and 468439 Easting, 110792 Northing (location 2) the nearest Post Code is PO8 8RX. Location 1 site area is circa 0.19 Hectares and location 2 site area is circa 0.5 Hectares .

2.2. Existing Drainage Infrastructure

The Sewerage Undertaker is understood to be Southern Water Ltd and review of their asset records (see appendices) suggests the following significant public infrastructure on or within close vicinity of the Application Site:

To the Northern Boundary:

- There is 225mm VC mm diameter foul water sewer flowing East to West within Hart Plain Avenue.

To the Eastern Boundary:

- There is unknown diameter foul water sewer flowing North to South.

To the Western Boundary of location 2:

- There is unknown diameter foul water sewer flowing South to North.

The topographic survey undertaken shows that there are some existing manholes and sewers across the site, and a review of the records confirms that there are existing private and public foul and surface water sewers and drains.

2.3. Topography

The topographical survey undertaken by Clear View Surveys show that the site (location 1) is predominantly flat with an elevation of approximately between 48m AOD – 49m AOD. Location 2 is also generally flat with an elevation of approximately between 46m AOD – 47m AOD.

2.4. Geology and Hydrogeology

British Geological Survey (BGS) online mapping indicates that the Application Site is largely situated on a bedrock of London Clay (Clay, silt and sand) and the map suggest that there is no records of superficial.

The Environment Agency's online mapping (MAGIC) suggests the underlying bedrock is classified as **unproductive** and the site is known to be located in **unproductive** groundwater vulnerability zone.

2.5. Hydrology

The nearest watercourse is the Hermitage Stream which is approximately 700m - 800m from the application site.

2.6. Proposed Development

The proposal includes erection of a care home (within Use Class C2) and erection of 6 dwellings (within Use Class C3), with associated works including access, parking and landscaping.

2.7. Easements and Other Constraints

Having reviewed the Topography Survey and sewer records, the following sewer will have an impact on the proposed application site:

Surface water sewer along edge of care home site

Foul water sewer along edge of care home site

These sewers benefit from easements and will therefore require further consideration during the ongoing course of design development.

2.8. Assessing Flood Risk

The Department for Environment, Food and Rural Affairs & Environment Agency (2017). *Flood Risk Assessment for Planning Applications* confirms that detailed flood risk assessment is required where the Application Site is:

- Located in Flood Zone 2 or 3, including minor development and change of use; or
- More than 1 hectare (Ha) in Flood Zone 1; or
- Less than 1 Ha in Flood Zone 1, including change of use in a development type to a more vulnerable class, where the development could be affected by sources of flooding other than by rivers and the sea; or
- In an area within Flood Zone 1 that has critical drainage problems as notified by the Environment Agency.

The Government's online Flood Map for Planning indicates that the Application site is predominantly situated within Flood Zone 1. In accordance with Table 1 (Flood Zones) of the NPPF, this classifies the site of having a less than 1:1000 annual probability of river or sea flooding.

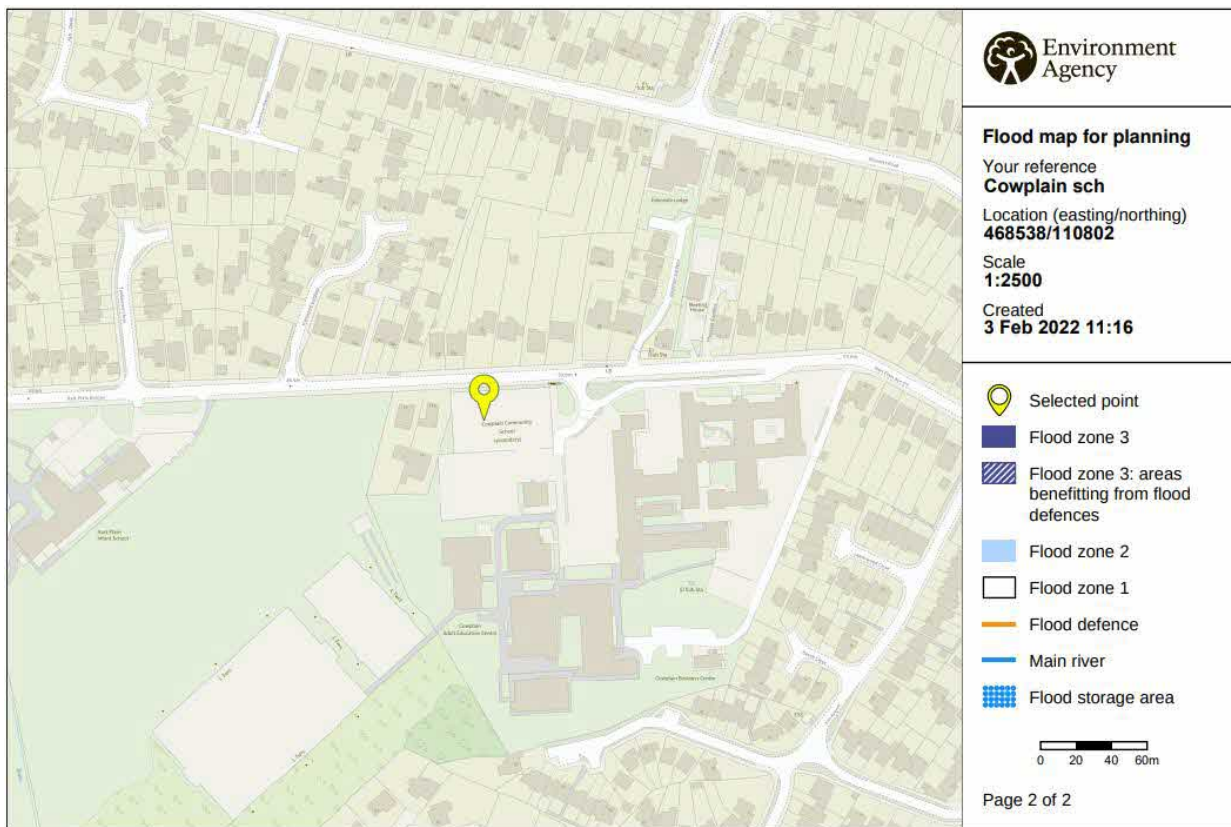


Figure 2: Flood Map showing the application site located in zone 1

SECTION 3

ANALYSIS OF NATIONAL AND LOCAL POLICY

3. ANALYSIS OF NATIONAL AND LOCAL POLICY

3.1. National Policy

National Planning Policy Framework (NPPF)

Communities and Local Government Document. (2021). *The National Planning Policy Framework* requires the Planning Application to demonstrate that the Proposed Development will be safe for the duration of its' design life, taking into account the vulnerability of its' users and without increasing flood risk elsewhere, and where possible, reducing flood risk overall.

Non-Statutory Technical Standards for Sustainable Drainage Systems

Department for Environment, Food and Rural Affairs. (2015). *Non-Statutory Technical Standards for Sustainable Drainage Systems* state that the peak rate of discharge from a redevelopment during the 1:1 year and 1:100 year rainfall events should be as close as reasonably practical to the corresponding greenfield runoff rate, but should never exceed that of the pre-development state.

The standards also recommend that, where reasonably practicable, the runoff volume generated from the 1:100 year, 6 hour rainfall event should be constrained to the corresponding greenfield runoff volume.

Building Regulations Approved Document H

Secretary of State. (2015). *Building Regulations Approved Document H* establishes a hierarchy for surface water disposal and encourages a SuDS approach. The hierarchy stipulates that surface water runoff which is not collected for re-use must be discharged in the following order of priority:

1. Discharge to ground via infiltration; or, where not reasonably practicable,
2. Discharge to a surface water body (i.e. river, watercourse or the like); or, where not reasonably practicable,
3. Discharge to a surface water sewer, highway drain or other surface water drainage system; or, where not reasonably practicable,
4. Discharge to a combined sewer.

3.2. Local Policy

The site is located in the Borough of Havant in Hampshire.

Havant Borough Council Core Strategy – Adopted in March 2011

Policy CS15 Flood and Coastal Erosion Risk

The policy states the following:

Development in areas at risk of flooding now and in the future as identified on the latest Environment Agency flood risk maps and Strategic Flood Risk Assessment climate change maps will only be permitted where:

1. It meets the sequential and exception test (where required) in relation to PPS25.
2. The site is located in a low hazard area as defined in the Strategic Flood Risk Assessment.
3. A site-specific flood risk assessment demonstrates that the development will be safe, including the access, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
4. The scheme incorporates flood protection, flood resilience and resistance measures appropriate to the character and biodiversity of the area and the specific requirements of the site.

5. Appropriate flood warning and evacuation plans are in place.
6. New site drainage systems are designed taking account of events which exceed the normal design standard.

All development will be required to ensure that there is no net increase in surface water runoff. Priority should be given to incorporating Sustainable Drainage Systems (SuDS) to manage surface water drainage, unless it is proven that SuDS are not appropriate. Where SuDS are provided arrangements must be put in place for their whole life management and maintenance.

The council will work with partners to implement the Coastal Policy Zones in the North Solent Shoreline Management Plan to ensure that development avoids areas at risk from coastal erosion and coastal flooding and that areas required to offset coastal squeeze and prevent habitat fragmentation, to allow species to adapt to climate change, are identified and protected from development.

3.3. Opportunities

The redevelopment of the Application Site presents an opportunity to contribute to a reduction in flood risk by reducing the current rate of discharge to the public sewer network for the proposed residential properties.

The incorporation of sustainable drainage systems within the Proposed Development should seek to offer a reduction in peak runoff rates in accordance with the National and local policies described above.

Subsequently, a reduction in peak flow rates would result in a lower surface water flood risk downstream of the Proposed Development, with larger reductions providing a greater betterment.

Surface water currently generated by the Application Site is believed to discharge un-treated directly to the public surface water network. Subsequently the management of surface water in accordance with the requirements of local policy and CIRIA. (2015). *C753 – The SuDS Manual* would result in an increase in the quality of the surface water generated by the Application Site as a result of the Proposed Development.

SECTION 4

FOUL WATER MANAGEMENT

4. FOUL WATER MANAGEMENT

4.1. Existing Discharge Rates and Points of Connection

The Application Sites do not currently benefit from a foul connection to the public foul water sewer.

4.2. Proposed Discharge Rates and Points of Connection

The proposed development will provide a total of 6 residential units at location 1 and 64 beds Care Home at location 2.

Foul water discharge rates are to be calculated in accordance with Appendix C Design & construction Guidance to the Code for Adoption and Urban Drainage (Butler & Davies, 2nd Ed, 2004).

The new houses will have new foul water sewer connections which then will join the existing drainage.

4.3. Analysis & Summary

The analysis demonstrates that the Proposed Development will generate a nett increase in foul water volume and peak flow to the public foul water sewer network, as summarised below:

Location 1 (Residential Buildings)

DESCRIPTION	RESULT	UNIT
Existing Flow	0	l/s
Proposed Flow	0.28	l/s
Increase / Decrease	+0.28	l/s

Location 2 (Care Home)

DESCRIPTION	RESULT	UNIT
Existing Flow (discounted)	0	l/s
Proposed Flow	1.71	l/s
Increase / Decrease	+1.71	l/s

The increase attributed to the new proposed development is not anticipated to cause an issue for the existing public sewer network. This has been confirmed by the capacity check applications which are attached to the report as an appendices.

SECTION 5

SURFACE WATER MANAGEMENT

5. SURFACE WATER MANAGEMENT

5.1. Existing Site Location Data

The site location and hydrological data used within this assessment is summarised as follows:

Grid Reference:	SU 685108 (468543 E, 110802 N) - Location 1 (Residential homes) SU 684107 (468439 E, 110792 N) - Location 2 (Care Home)
Average Annual Rainfall (SAAR):	800 mm/year
Soil Index:	0.45
UK Hydrological Region:	Region 7

5.2. Existing Total Site Area

LOCATION 1 (RESIDENTIAL BUILDINGS)

Total existing site area is calculated as follows:

ITEM	AREA (SQ. M)	AREA (HECTARES)
Within red line boundary	1878	0.19
Totals:		0.19

5.3. Existing Impermeable Area & Percentages

Total impermeable areas for the existing site have been calculated as follows:

ITEM	AREA (SQ. M)	AREA (HECTARES)
	1878	0.19
Totals:		0.19

Therefore, existing permeable and impermeable percentages are calculated as follows:

	IMPERMEABLE	PERMEABLE
Area (Ha)	0.19	0
Percentage (%)		0

5.4. Calculation of Greenfield Runoff Rates

Greenfield runoff rates have been estimated for the site using the methodology outlined in the Institute of Hydrology Report 124 method as set out within the Interim Code of Practice for SuDS (ICP) and Environment Agency guidance for catchment areas of 50 hectares or less.

This method of assessment is widely recognised as current best practice for estimation of catchment release rates for small catchments.

Detailed calculations can be found within the appendices of this document with results summarised below.

RETURN PERIOD (1 IN X YEARS)	GREENFIELD RUN OFF RATE (L/S)
1	0.8
QBar (2.3)	1
30	2.2
100	3.1

5.5. Proposed Site Total Area

Total proposed site area is calculated as follows:

ITEM	AREA (SQ. M)	AREA (HECTARES)
Within red line boundary	1878	0.19
Totals:		0.19

5.6. Proposed Site Impermeable Area & Percentages

Total impermeable areas for the proposed site have been calculated as follows, however, due to the site geology being known to be unproductive, for the purpose of this strategy it has been assumed that each catchment is 100% impermeable.

ITEM	AREA (SQ. M)	AREA (HECTARES)
Buildings, Parking & Roads	8500	.085
Totals:	8500	0.085

Therefore, proposed permeable and impermeable percentages are calculated as follows:

	IMPERMEABLE	PERMEABLE
Area (Ha)	0.085	0.105
Percentage (%)	45	55
Change from Existing (%)	-55	+55

LOCATION 2 (CARE HOME)

5.7. Existing Total Site Area

Total existing site area is calculated as follows:

ITEM	AREA (SQ. M)	AREA (HECTARES)
Within red line boundary	5075.5	0.51
Totals:		0.51

5.8. Existing Impermeable Area & Percentages

Total impermeable areas for the existing site have been calculated as follows:

ITEM	AREA (SQ. M)	AREA (HECTARES)
Buildings	0	0
Parking	0	0
Roads/Paths	0	0
Totals:		0

Therefore, existing permeable and impermeable percentages are calculated as follows:

	IMPERMEABLE	PERMEABLE
Area (Ha)	0	0.51
Percentage (%)		100

5.9. Calculation of Greenfield / Brownfield Runoff Rates

Greenfield runoff rates have been estimated for the site using the methodology outlined in the Institute of Hydrology Report 124 method as set out within the Interim Code of Practice for SuDS (ICP) and Environment Agency guidance for catchment areas of 50 hectares or less.

This method of assessment is widely recognised as current best practice for estimation of catchment release rates for small catchments.

Detailed calculations can be found within the appendices of this document with results summarised below.

RETURN PERIOD (1 IN X YEARS)	GREENFIELD RUN OFF RATE (L/S)
1	2.2
QBar (2.3)	2.6
30	5.9
100	8.4

5.10. Proposed Site Total Area

Total proposed site area is calculated as follows:

ITEM	AREA (SQ. M)	AREA (HECTARES)
Within red line boundary	5075.5	0.51
Totals:		0.51

5.11. Proposed Site Impermeable Area & Percentages

Total impermeable areas for the proposed site have been calculated as follows, however, due to the site geology being known to be unproductive, for the purpose of this strategy it has been assumed that each catchment is 100% impermeable.

ITEM	AREA (SQ. M)	AREA (HECTARES)
Building, Road and parking areas	2610	0.261

Therefore, proposed permeable and impermeable percentages are calculated as follows:

	IMPERMEABLE	PERMEABLE
Area (Ha)	0.261	.249
Percentage (%)	51	49
Change from Existing (%)	+51	-49

5.12. Allowance for Climate Change

Table 2 (Peak Rainfall Intensity Allowance in Small and Urban Catchments) of Environment Agency. (2019). Flood Risk Assessments: Climate Change Allowances confirms the climate change allowance of **40%** should

be adopted for the Application Site, assuming a lifespan of 100 years for residential development as recommended within the NPPF.

5.13. Allowance for Creep

A 10% allowance for creep has been applied to the residential buildings at location 1. A creep allowance has not been made for the care home as it is anticipated any future development of the care home would require planning permission and as such accompanied with a suitable drainage strategy for the extension.

5.14. SuDS Management Train & Proposed SuDS Features

In accordance with the discharge hierarchy identified in Section 3, surface water generated by the Proposed Development should be discharged to ground via infiltration, where practicable to do so.

The underlying soils present at the Application Site are known to be unsuitable for soakaways due to the groundwater vulnerability and therefore discharge of surface water via infiltration-based SuDS features (i.e. soakaways, infiltration basins or permeable paving) is not considered appropriate.

It is not possible to discharge to the nearest watercourse due to distance topography and obstructions from roads and existing buildings.

Resulting from this, surface water attenuation will be required to temporarily store surface water on-site. It is likely that these will take the form of oversized pipes for location 1 (Residential dwellings) and a geo-cellular attenuation tank for location 2 (Care Home).

The care home site will incorporate permeable paving in the car parking spaces to offer treatment and storage capabilities. They will include an underdrain to ensure the storage capacity is available for subsequent storms.

Both sites will then discharge to the public surface water sewer.

5.15. Proposed Flow Restriction per Catchment and Attenuation Estimates

Location 1 – Residential dwellings

For location 1, the existing site currently has a connection to the surface water sewer. It has been calculated that this flow rate for a 1 in 1 year event is 25.7l/s in to the public sewer. Due to the available site area and the invert level of the surface water sewer to be connected to it is proposed to restrict the flow to 10l/s which offers a reduction of 61% during a 1in 1 year event. During extreme events this benefit is increased. This flow rate has been confirmed by Southern Water to be acceptable to flow in to the public surface water sewer.

The proposed storage is proposed to be contained within a 750mm diameter oversized concrete pipe. This can be seen on drawing no 5017735-RDH-XX-ST-DR-C-0501. The proposed outline drainage network has been modelled using Infodrainage (the new version of Microdrainage by Innovyze). This confirms that the proposed network is suitably designed to contain up to the 1 in 100yr event plus 40% allowance for climate change along with the 10% allowance for creep.

Location 2 – Care Home

For location 2, the existing site is currently greenfield and should therefore discharge to the public sewer at greenfield run off rate. This has been calculated as 2.6l/s for the QBAR event. It is proposed to restrict the

flow rate from the site at 2.6l/s for all storm events up to and including the 1 in 100 yr. event = 40% allowance for climate change. This flow rate has been confirmed by Southern Water to be acceptable to flow in to the public surface water sewer.

The proposed storage is proposed to be contained within the permeable paving build up and geocellular storage tank. This can be seen on drawing no 5017735-RDH-XX-ST-DR-C-0500. The proposed outline drainage network has been modelled using Infodrainage (the new version of Microdrainage by Innovyze). This confirms that the proposed network is suitably designed to contain up to the 1 in 100yr event plus 40% allowance for climate change along with the 10% allowance for creep.

CATCHMENT AREA	IMPERMEABLE AREA (HA)	FLOW RESTRICTION (L/S) UP TO 1 : 100 YR + 40% EVENT	1 : 100 YR + 40% STORAGE PROVIDED
Location 1 (Residential)	0.085	10	96m ³ in
Location 2 (Care Home)	0.261	2.6	96m ³ in geocellular storage crates 360m ² of permeable paving with 400mm of no fines aggregate with 30% voids

5.16. Water Quality

The Proposed Development intends to construct new surface water SuDS features and associated drainage networks.

Car parking areas are understood to be to serve residents only and of an insufficient area to constitute a requirement for hydrocarbon interceptors.

This new construction to modern standards is likely to reduce the risk of overall pollutant loading and therefore the vulnerability of water quality within the wider surface water catchment is low and indeed reduced by the Proposed Development.

It is proposed that where possible roof areas will be passed through a SuDS feature such a rain garden or tree pit. Road surfaces and parking will, where possible, be permeable paving which will act as a level of treatment to the resultant surface water flows.

5.17. Summary

Surface Water management is summarised as follows:

Surface water will be managed through oversized pipes, permeable paving, standard gullies and a geocellular tank.

Site 1 (Residential dwellings) proposes a significant decrease in impermeable area.

Site 2 (Care home) proposed new impermeable areas which will be drained via SuDS scheme which is restricted to greenfield run off rate

Both sites will be attenuated to flow rates agreed with Southern Water and in line with National and Local policy

The underlying soils present at the Application Site suggest they are unsuitable for soakaways due to the groundwater vulnerability

With the above in consideration, the Proposed Development would therefore contribute to a reduction in flood risk associated with the exceedance of the public sewerage network within the vicinity of the Application Site, by providing a significant reduction in peak discharge rates during extreme events.

SECTION 6

OUTLINE OWNERSHIP AND MAINTENANCE SCHEDULE

6. OUTLINE OWNERSHIP AND MAINTENANCE SCHEDULE

To ensure the long-term performance of the proposed DS, the on-site drainage system will be owned and maintained by the site operator or a maintenance company (MC) in accordance with the indicative schedule below:

ELEMENT / DRAINAGE COMPONENT	OWNERSHIP	MAINTENANCE REQUIREMENTS
Catchpit Manholes	Site Operator / MC	To be monitored for silt build-up and cleaned as required using suction methods. Inspection annually and before / after extreme storm events.
Permeable paving	Site Operator / MC	Non-aggressive brushing of the whole surface (avoiding disruption of the jointing material, with suction rates adjusted, based on a trial), either manually or mechanically carried out annually. Top up of the gritstone may be required after cleaning. Weed control – excessive weed growth can be managed by localised spot-treatment with weed killers, in accordance with suppliers' recommendations. Inspection annually.
Geocellular Attenuation Tank	Site Operator / MC	To be monitored for silt build-up and cleaned as required using suction methods, ensuring no solid material passes through outlet. Monitored for general condition of the tank and system generally, to suit manufacturer's guidance, check for leaks and displacement of 'cells'. Inspection annually and before / after extreme storm events.
Flow Restriction Device & Chamber	Site Operator / MC	To be monitored for silt build-up and cleaned as required using suction methods. Check function of flow restriction componentry to suit manufacturer's guidance. Inspection annually and before / after extreme storm events.
Rain Water Pipes	Site Operator / MC	Clearance of leaves / debris from guttering and hopper inlets. Rodding points provided to clear blockages via conventional rodding methods. Inspection annually and before / after extreme storm events.
Soil Vent Piles / "Stub Stacks"	Site Operator / MC	Rodding points to be provided to clear blockages via conventional rodding methods. Inspection annually.

Gullies (Internal & External)	Site Operator / MC	To be monitored for silt build-up and cleaned as required. Where provided, ensure air traps are primed and sealed to prevent smells. Inspection quarterly.
Below Ground Pipework Generally	Site Operator / MC	To be inspected for reduction in cross-sectional area (i.e. due to blockage, silt or debris build-up, root ingress etc) general condition of materials, pipe displacement and the like. Inspection annually and where appropriate before / after extreme storm events.
Manholes / Inspection Chambers Generally	Site Operator / MC	To be inspected for debris and integrity of chambers and covers generally. Inspection annually and where appropriate before / after extreme storm events.

SECTION 7

CONCLUSIONS

7. CONCLUSIONS

The scheme proposes the construction of 2 sites consisting of 6 residential dwellings and a 64 beds care home along with associated amenity facilities, car parking and external landscaping, including private residents' gardens.

Surface water will be managed through oversized pipes, permeable paving, standard gullies and a geocellular tank.

Site 1 (Residential dwellings) proposes a substantial decrease in impermeable area.

Site 2 (Care home) proposed new impermeable areas which will be drained via SuDS scheme which is restricted to greenfield run off rate

Both sites will be attenuated to flow rates agreed with Southern Water and in line with National and Local policy

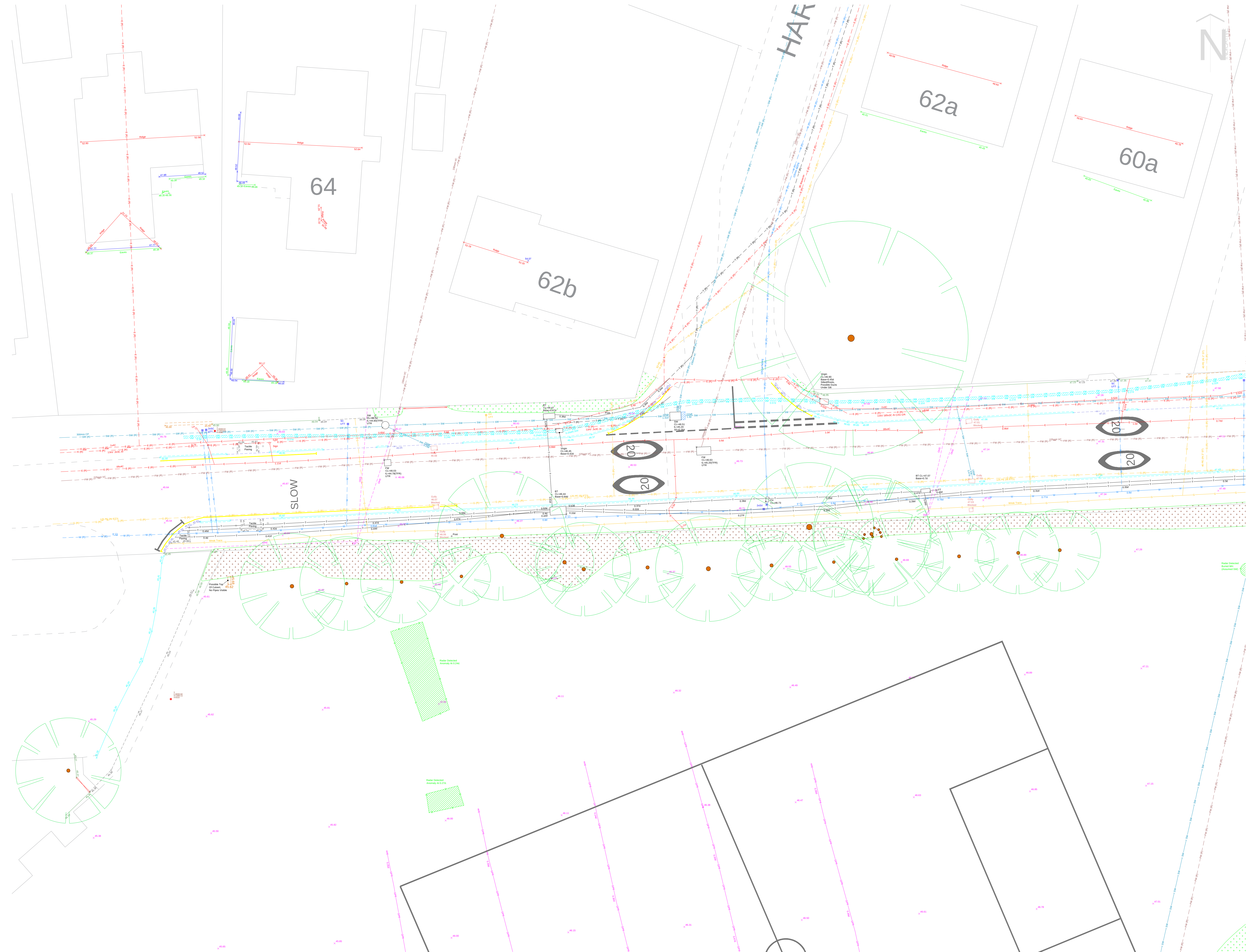
Due to the unproductive nature of the underlying soils at the site, the incorporation of soakaways and other infiltration devices is not considered to be practicable.

The increase in foul water flows have been confirmed as acceptable to Southern Water.

It should be noted that this strategy presents one possible solution to demonstrate that the Proposed Development can be sustainably drained and should not be interpreted as the definitive solution.

APPENDIX A

EXISTING SITE PLAN / SURVEYS



Notes

Utilities may continue outside of the survey area. Any point marks outside of the area are for investigative purposes only and may not represent the full extent of the sub-surface utilities.

Only sub-surface utility information is provided. Above ground utility information may be shown where it assists with positional referencing.

Where basic indicators a utility exists but which cannot be positively confirmed with the

ClearView Surveys does not procure statutory or private source utility information (unless requested at time of order) as part of its detection service nor does it record any such information in a utility survey unless otherwise requested. Statutory plans should be consulted to supplement this survey.

Vertical & Horizontal Position - vertical position (depth) is indicative to the top of the utility feature and is recorded as GTS (depth is top of service) and should not be taken as exact. Where depth information from the technology is unclear, depth is not shown. Owners may have been detected using breasting and the depth indicated could be between the top and the bottom of the shaft. Horizontal position is indicative to the centre of the utility feature and should not be taken as exact.

Warning: Roadgradeable joints are used to mark-out the position of the utilities. Before long joint markings may become illegible depending on ground, weather and traffic conditions. No warranty is given in respect of the durability of the paint markings and that they are a complete representation of the sub-surface utilities therefore this drawing should be used as the primary reference for the survey results.

These findings does not provide an absolute representation of the sub-market. Utilities have been tested using non-invasive technologies only and the performance can be adversely affected by ground, weather and site conditions outside of Clearview Survey's control. Therefore, these utilities may be unreliable, while Clearview Surveys uses reasonable endeavors to protect its clients, it does not warrant that 100% detection will be achieved and that appropriate grade penetration of the technologies will be greater than two-metres.

Gender and manifest details shown on this drawing have been obtained by observation and measurement from the surface and as such cannot be guaranteed. Where precise sewer details will be utilized in the project design Clearview Survey's qualified staff only should be used. Clearview Surveys is not responsible for any consequences arising from any errors. These claims can be supplied on request.

Investigation of the information provided by a utility survey and vicinity plans, excavation work should be undertaken with extreme caution and in accordance with HSE Guidelines - R3047 Avoiding Danger from Underground Services

Additional Notes:

- The correct identification of the utility types can not be 100% guaranteed. Therefore these should be independently verified prior to use in any design or building works.
- All pipe diameters and levels are assumed to be correct, but due to non entry of the inspection chambers, these should be verified before any works commence.
 - All utility depths are in metres.
 - All pipeod sizes are in millimetres.
- Information provided should not be altered. It should not be used for any purpose other than for which it was intended and should not be used for any other project without the written consent of ClearView Surveyors.
- All alterations should be checked on site before any drainage construction or excavation.
- CCTV Drainage Pipe positions are indicative only and are in an approximate location.
- Ridge and Eaves levels were observed remotely where possible on surrounding properties. Highest Ridge levels and Average Eave levels.

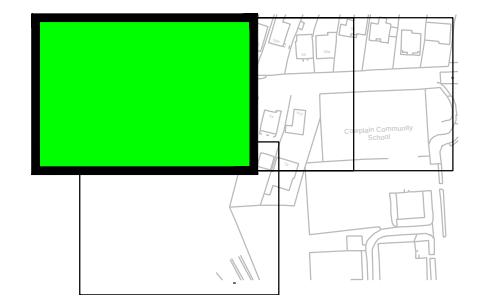
Key:

COMPONENT	LEVEL 1 DESCRIPTION	INSPECTION CHARGES
1. General	1.1. General	1.1. General
2. Structure	2.1. Structure	2.1. Structure
3. Foundation	3.1. Foundation	3.1. Foundation
4. Walls	4.1. Walls	4.1. Walls
5. Floors	5.1. Floors	5.1. Floors
6. Roofs	6.1. Roofs	6.1. Roofs
7. Windows	7.1. Windows	7.1. Windows
8. Doors	8.1. Doors	8.1. Doors
9. Stairs	9.1. Stairs	9.1. Stairs
10. Elevators	10.1. Elevators	10.1. Elevators
11. Mechanical	11.1. Mechanical	11.1. Mechanical
12. Electrical	12.1. Electrical	12.1. Electrical
13. Plumbing	13.1. Plumbing	13.1. Plumbing
14. Fire	14.1. Fire	14.1. Fire
15. Safety	15.1. Safety	15.1. Safety
16. Security	16.1. Security	16.1. Security
17. Accessibility	17.1. Accessibility	17.1. Accessibility
18. Environmental	18.1. Environmental	18.1. Environmental
19. Energy	19.1. Energy	19.1. Energy
20. Other	20.1. Other	20.1. Other

Linetype Key:

[illegible]

Date	Notes	By



AGENT

ed3 Projects

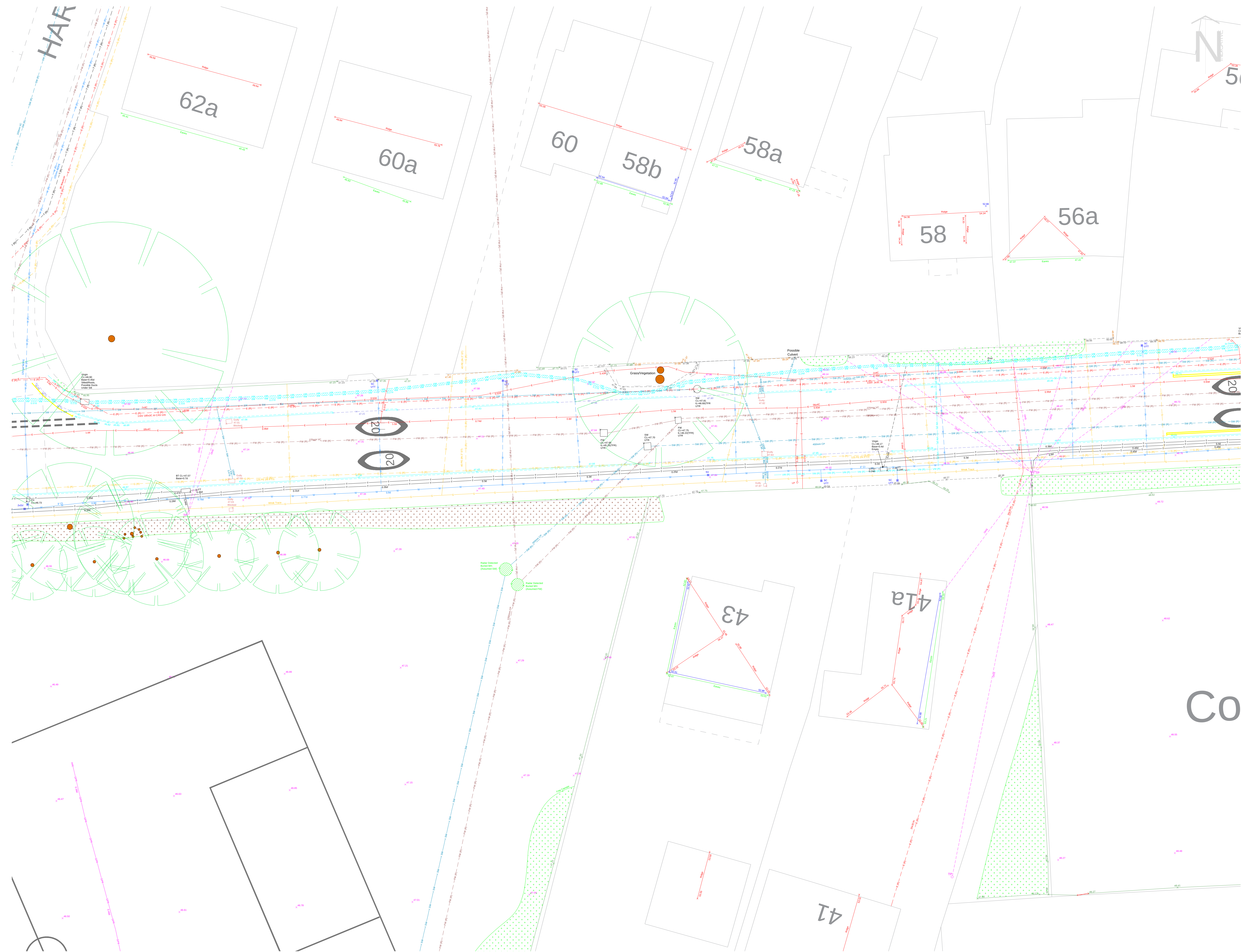
and Adjacent To Cowplain School
East Plain Avenue
Waterloo, PO8 8RX

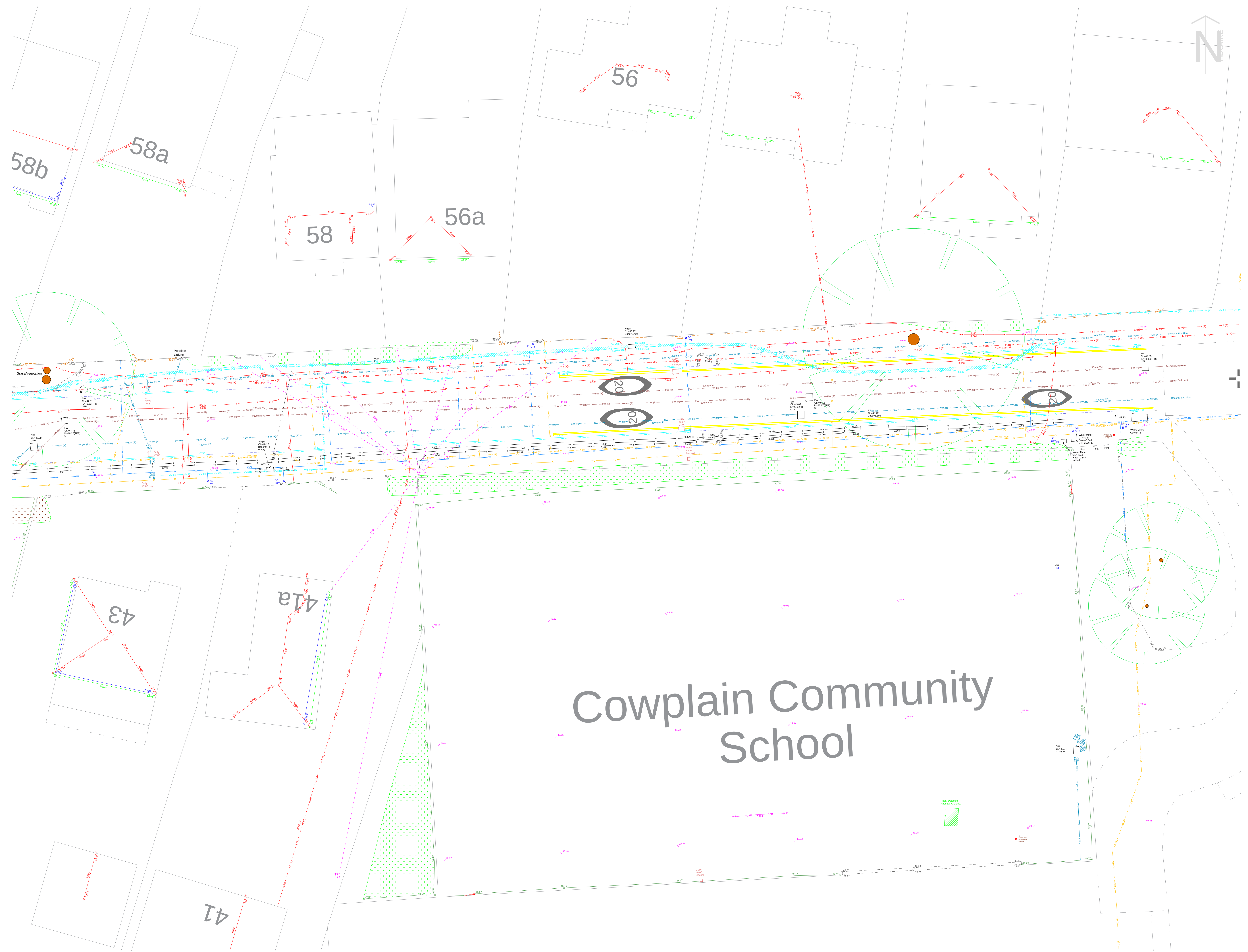
DRAWING TITLE
 Topographical Survey With Utility Mapping
 PROJECT NUMBER
 4056
 DRAWING NUMBER
 13056-001
 DATE
 FEB 2021
 SURVEYED BY
 A
 DRAWN BY
 DG
 CHECKED BY
 MW
 SCALE
 1" = 40'
 SHEET
 1 OF 4



UNIT 301, OLD BARN FARM ROAD
WOOLSBIDGE INDUSTRIAL PARK
THREE LEGGED CROSS, WIMBORNE, BH21 6SP

T 01202 828281
F 01202 824777
E info@clearviewsurveys.co.uk
W www.clearviewsurveys.co.uk





Notes

Only sub-surface utility information is provided. Above ground utility information may be shown where it assists with positional referencing.

Check/rew Surveys does not procure statutory or private source utility information (prices requested at time of order) as part of its detection service nor does it record any such information in a utility survey unless otherwise requested. Statutory plans should be consulted to supplement this survey.

Vertical & Horizontal Position – Vertical position (depth) is indicative to the top of the utility feature and is recorded as DTS [depth to top of service] and should not be taken as exact. Where depth information from the technology is unclear, depth is not shown. Chans may have been detected using sounding and the depth indicated could be between the tip and the bottom of the drain. Horizontal position is indicative to the centre of the utility feature and should not be taken as exact.

Accuracy: *Hand-drawn points are used to mark-out the positions of the utilities. Before long-paint markings may become illegible depending on ground, weather and traffic conditions. The accuracy is given in respect of the durability of the paint markings and that they are a complete representation of the sub-surface utilities therefore this drawing should be used as the primary reference for the survey results.*

has shown does not provide an absolute representation of the sub-surface. Utilities have been limited using non-invasive technologies only and the performance can be adversely affected by ground, weather and site conditions outside of Clearview Surveys control therefore some utilities may be undesirable. While Clearview Surveys uses maximum endeavours to detect all utilities, it does not warrant that 100% detection will be achieved and that approximate depth-penetration of the technologies will be greater than two-metres.

Investigation of the information provided by a utility survey and victory plans, excavation work should be undertaken with extreme caution and in accordance with

Additional Notes:

- The correct identification of the utility types can not be 100% guaranteed. Therefore these should be independently verified prior to use in any design or building works.
- All pipe diameters and levels are assumed to be correct, but due to non entry of the inspection chambers, these should be verified before any works commence.
- All utility depths are in metres.
- All pipedict sizes are in millimeters.
- Information provided should not be altered. It should not be used for any purpose other than for which it was intended and should not be issued to other parties without prior agreement of Clear/Before Surveys.
- All alterations should be checked on site before any fabrication, construction or excavation.
- CCTV Camera Pipe positions are indicative only and are in an approximate position.
- Ridge and Eaves levels were observed remotely where possible on surrounding properties. Highest Ridge levels and Average Eaves levels

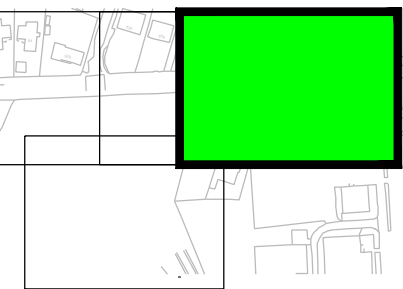
Key:

COMPONENT	LEVEL 1 & 2 DEFINITION	INJECTION COMMENTS
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Beam	2 Beam	2 Beam
Beam	3 Beam	3 Beam
Beam	4 Beam	4 Beam
Beam	5 Beam	5 Beam
Beam	6 Beam	6 Beam
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Beam	142 Beam	142 Beam

Linetype Key:

[illegible]

Date	Notes	By



IDENT

ed3 Projects

TC

and Adjacent To Cowplain School
East Plain Avenue
Waterloo, POB 8RX

DRAWING TITLE	
Topographical Survey With Utility Mapping	
PROJECT NUMBER	DRAWING NUMBER
1056	13056-001
PREPARED BY	DRAWN BY
DA	DG
SCALE	SHEET SIZE
100	A0



UNIT 301, OLD BARN FARM ROAD
WOOLSBRIDGE INDUSTRIAL PARK
THREE LEGGED CROSS, WIMBORNE, BH21 6SP
T 01202 828281
F 01202 824777
E info@clearviewsurveys.co.uk
W www.clearviewsurveys.co.uk

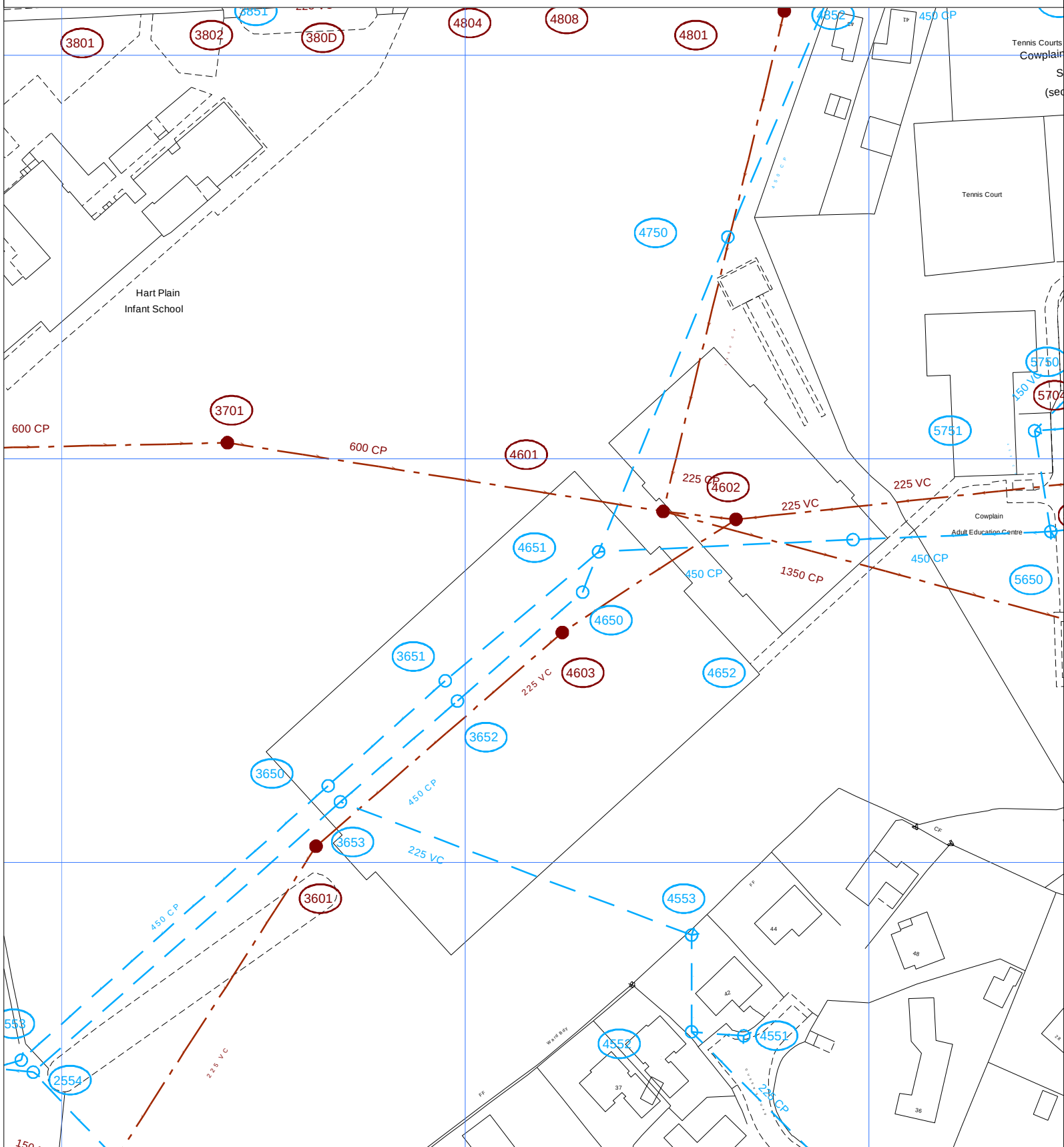
APPENDIX B

PROPOSED SITE PLAN

APPENDIX C

SOUTHERN WATER ASSET PLANS

SOUTHERN WATER



The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site.

Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530

O.S. REF: SU6810NW

Scale: 1:1250

Screen Print

WARNING: BAC pipes are constructed of Bonded Asbestos Cement

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement



Printed By: banuh

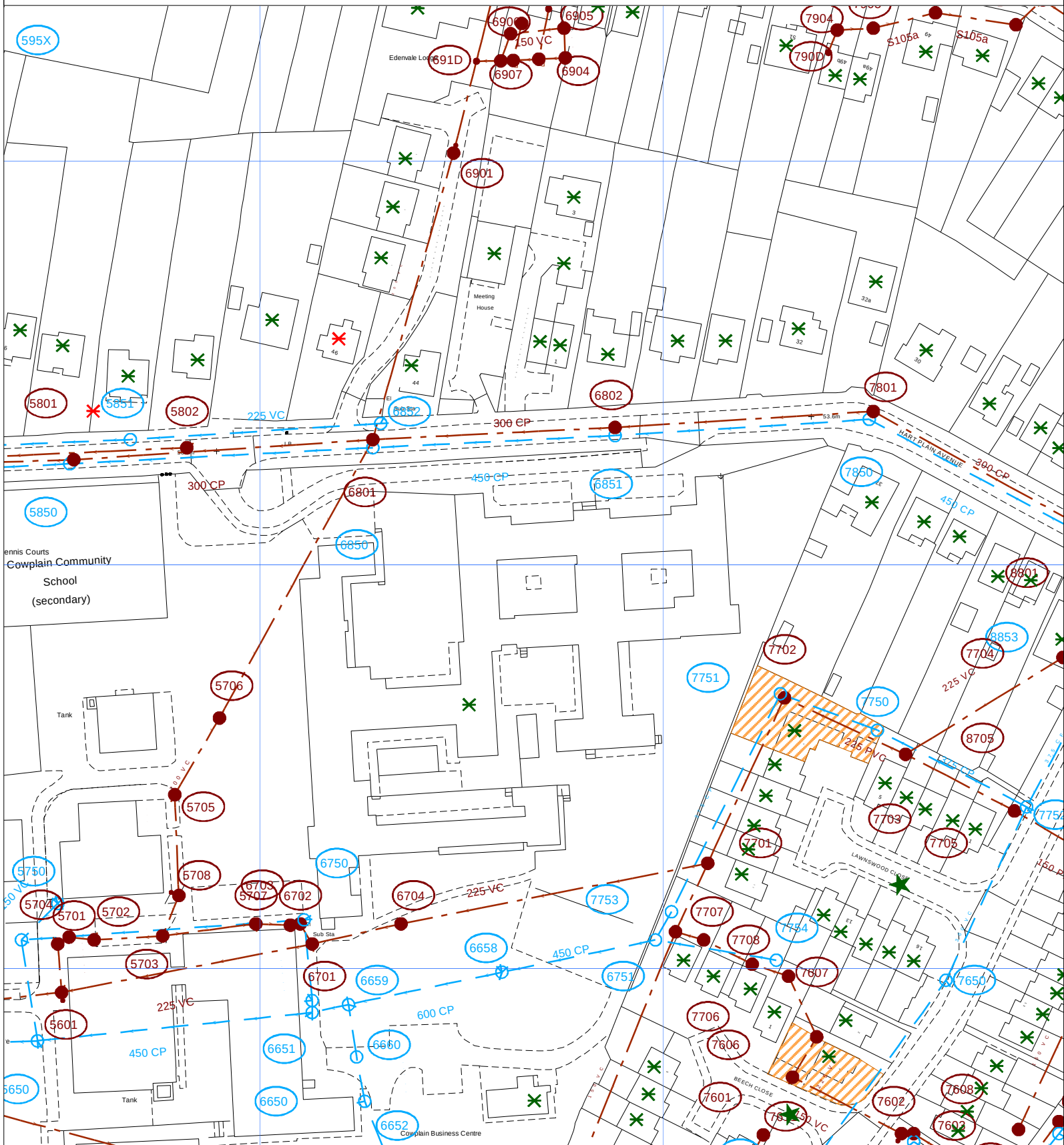
Date: 12-4-2017

Southern Water MapGuide Browser

Requested By:

N

SOUTHERN WATER



The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site.

Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530

O.S. REF: SU6810NE

Scale: 1:1250

Screen Print

WARNING: BAC pipes are constructed of Bonded Asbestos Cement

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement



Printed By: kishoku

Date: 11-10-2019

Southern Water MapGuide Browser

Requested By:

APPENDIX D

SOUTHERN WATER CAPACITY CHECK RESULTS



Kazys Narbutas
Kazys Narbutas Consulting
Unit 5B, Tanners Court
Tanners Lane
East Wellow
Romsey
Hampshire
SO51 6DP

Your ref

Our ref
DS_CC_PPE-155564

Date
30 June 2021

Contact
Tel 0330 303 0119

Dear Mr Narbutas,

Level 1 Capacity Check Enquiry: Cowplain School, Hart Plain Avenue, Waterlooville, Hampshire, PO8 8RZ.

We have completed the capacity check for the above development site and the results are as follows:

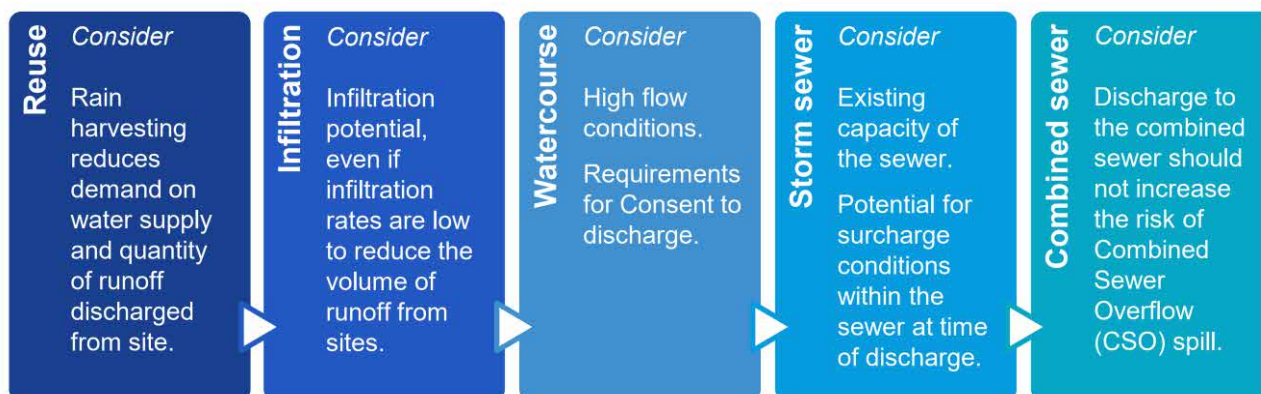
Foul Water

There is currently adequate capacity in the local sewerage network to accommodate a foul flow of **0.79 l/s** for the above development at manhole reference SU6810**4804**. Please note that no surface water flows (existing or proposed) can be accommodated within the existing foul sewerage system unless agreed by the Lead Local Flood Authority in consultation with Southern Water, after the hierarchy Part H3 of Building Regulations has been complied with.

Surface Water

There is currently adequate capacity in the local surface water network to accommodate a surface water flow of **3 l/s** for the above development at manhole reference SU6810**4750**.

Although capacity in the surface water network has been identified, in all situations where surface water is being considered for discharge to our network, we require the below hierarchy for surface water to be followed which is reflected in part H3 of the Building Regulations. Whilst reuse does not strictly form part of this hierarchy, Southern Water would encourage the consideration of reuse for new developments.



Guidance on Building Regulations is here: [gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h](https://www.gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h)

We would welcome the opportunity to engage with you on the design for disposal of surface water, with a particular focus on the potential for incorporating Sustainable Drainage Systems (SuDS), for this development at the earliest opportunity and we recommend that civil engineers and landscape architects work together and with Southern Water.

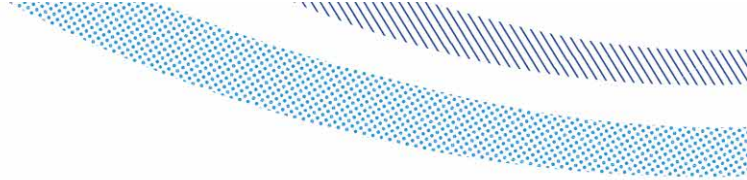
Where a surface water connection to the foul or combined sewer is being considered, this should be agreed by the Lead Local Flood Authority, in consultation with Southern Water.

It should be noted that although the above assessment indicates that there is capacity available for your proposed surface water flows the LLFA (Local Lead Flood Authority) may impose/request that a lower flow is discharged to the public surface water sewer.

If the excess surface water flows are to be attenuated on site, it could have a significant effect on any proposed Sewer Adoption (S104) Agreements. Any attenuation proposals should be agreed before any works are implemented on site. Where capacity is limited/restricted, agreement should be sought if you are to include any highway drainage within your proposals as Southern Water is not obligated to accept highway flows.

Connecting to our network

It should be noted that this information is only a hydraulic assessment of the existing sewerage network and does not grant approval for a connection to the public sewerage system. A formal Sewer Connection (S106) application is required to be completed and approved by Southern Water Services. To make an application visit: [Developer Services Portal \(southernwater.co.uk\)](https://southernwater.co.uk/Developer-Services-Portal)



Please note the information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

Should it be necessary to contact us please quote our above reference number relating to this application by email at southernwaterplanning@southernwater.co.uk

Yours sincerely,

Growth Planning Team
Business Channels

southernwater.co.uk/developing-building/planning-your-development



Kazys Narbutas
Kazys Narbutas Consulting
Unit 5B, Tanners Court
Tanners Lane
East Wellow
Romsey
Hampshire
SO51 6DP

Your ref

Our ref

DS_CC_PPE-155568

Date

28 June 2021

Contact

Tel 0330 303 0119

Dear Mr Narbutas,

Level 1 Capacity Check Enquiry: Cowplain School, Hart Plain Avenue, Waterlooville, Hampshire, PO8 8RY.

We have completed the capacity check for the above development site and the results are as follows:

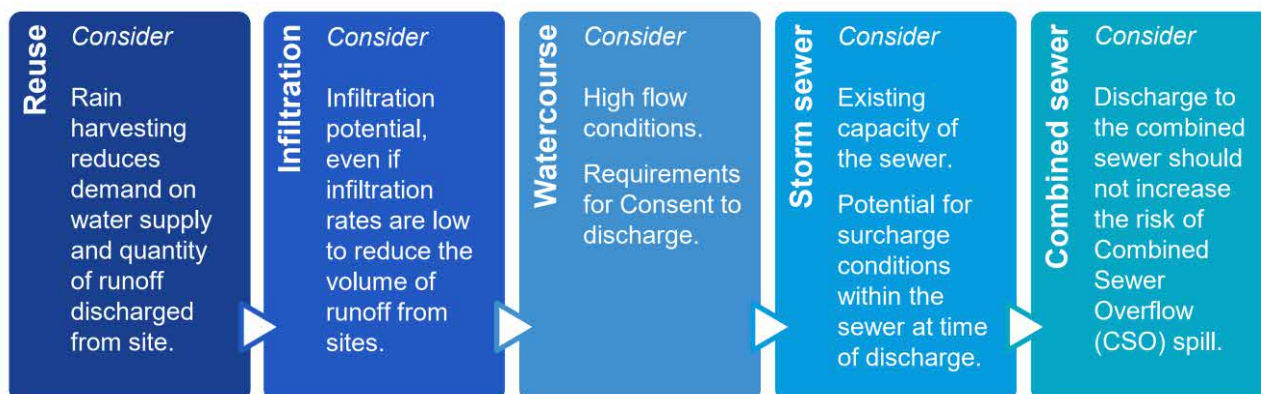
Foul Water

There is currently adequate capacity in the local sewerage network to accommodate a foul flow of **0.05 l/s** for the above development at manhole reference SU6810**5801**. Please note that no surface water flows (existing or proposed) can be accommodated within the existing foul sewerage system unless agreed by the Lead Local Flood Authority in consultation with Southern Water, after the hierarchy Part H3 of Building Regulations has been complied with.

Surface Water

There is currently adequate capacity in the local surface water network to accommodate a surface water flow of **10 l/s** for the above development at manhole reference SU6810**5850**.

Although capacity in the surface water network has been identified, in all situations where surface water is being considered for discharge to our network, we require the below hierarchy for surface water to be followed which is reflected in part H3 of the Building Regulations. Whilst reuse does not strictly form part of this hierarchy, Southern Water would encourage the consideration of reuse for new developments.



Guidance on Building Regulations is here: [gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h](https://www.gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h)

We would welcome the opportunity to engage with you on the design for disposal of surface water, with a particular focus on the potential for incorporating Sustainable Drainage Systems (SuDS), for this development at the earliest opportunity and we recommend that civil engineers and landscape architects work together and with Southern Water.

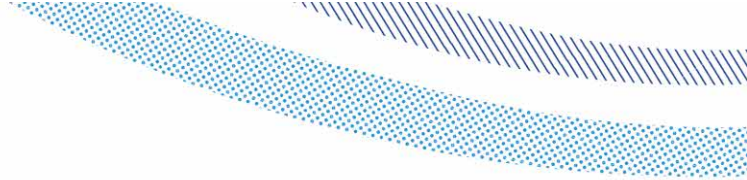
Where a surface water connection to the foul or combined sewer is being considered, this should be agreed by the Lead Local Flood Authority, in consultation with Southern Water.

It should be noted that although the above assessment indicates that there is capacity available for your proposed surface water flows the LLFA (Local Lead Flood Authority) may impose/request that a lower flow is discharged to the public surface water sewer.

If the excess surface water flows are to be attenuated on site, it could have a significant effect on any proposed Sewer Adoption (S104) Agreements. Any attenuation proposals should be agreed before any works are implemented on site. Where capacity is limited/restricted, agreement should be sought if you are to include any highway drainage within your proposals as Southern Water is not obligated to accept highway flows.

Connecting to our network

It should be noted that this information is only a hydraulic assessment of the existing sewerage network and does not grant approval for a connection to the public sewerage system. A formal Sewer Connection (S106) application is required to be completed and approved by Southern Water Services. To make an application visit: [Developer Services Portal \(southernwater.co.uk\)](https://southernwater.co.uk/Developer-Services-Portal)



Please note the information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

Should it be necessary to contact us please quote our above reference number relating to this application by email at southernwaterplanning@southernwater.co.uk

Yours sincerely,

Growth Planning Team
Business Channels

southernwater.co.uk/developing-building/planning-your-development

APPENDIX E

SURFACE WATER CALCULATIONS

Kazys Narbutas Consulting Limited		Page 1
Unit 5B Tanners Court Tanners Lane, East Wellow Romsey S051 6DP	Cowplain School Waterlooville Playfield Run Off	
Date June 2021 File Playfield Run Of...	Designed by KN Checked by	
Micro Drainage	Source Control 2013.1.1	

IH 124 Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	50.000	Urban	0.000
SAAR (mm)	800	Region Number	Region 7

Results **VS**

QBAR Rural	256.8
QBAR Urban	256.8
Q100 years	819.2
Q1 year	218.3
Q2 years	226.2
Q5 years	328.7
Q10 years	416.0
Q20 years	514.4
Q25 years	551.6
Q30 years	582.0
Q50 years	672.8
Q100 years	819.2
Q200 years	963.0
Q250 years	1009.2
Q1000 years	1325.1

©1982-2013 Micro Drainage Ltd

Kazys Narbutas Consulting Limited		Page 1
Unit 5B Tanners Court Tanners Lane, East Wellow Romsey S051 6DP	Cowplain School Waterlooville Playground Discharge	
Date June 2021 File Existing Flow fr...	Designed by KN Checked by	
Micro Drainage	Network 2013.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.400	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.181	4-8	0.009

Total Area Contributing (ha) = 0.190

Total Pipe Volume (m³) = 0.771

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	Base Flow (ls)	k (mm)	HYD SECT	DIA (mm)
1.000	19.400	0.340	57.0	0.190	4.00	0.0	0.600	0	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/L (m)	Σ Area (ha)	Σ Base Flow (ls)	Foul (ls)	Add Flow (ls)	Vel (m/s)	Cap (ls)	Flow (ls)
1.000	50.00	4.19	47.650	0.190	0.0	0.0	0.0	1.74	69.0	25.7

Residential dwellings

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:		



Catchment Area

Type : Catchment Area

Area (ha) 0.008

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	10



Catchment Area (1)

Type : Catchment Area

Area (ha) 0.006

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	10

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:		



Catchment Area (2)

Type : Catchment Area

Area (ha) 0.006

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	10



Catchment Area (3)

Type : Catchment Area

Area (ha) 0.006

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	10

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:		



Catchment Area (4)

Type : Catchment Area

Area (ha) 0.006

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	10



Catchment Area (5)

Type : Catchment Area

Area (ha) 0.008

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	10

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:			



Catchment Area (6)

Type : Catchment Area

Area (ha) 0.002

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	0



Catchment Area (7)

Type : Catchment Area

Area (ha) 0.002

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	0

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:			



Catchment Area (8)

Type : Catchment Area

Area (ha) 0.002

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	0



Catchment Area (9)

Type : Catchment Area

Area (ha) 0.002

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	0

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:		



Catchment Area (10)

Type : Catchment Area

Area (ha) 0.002

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	0



Catchment Area (11)

Type : Catchment Area

Area (ha) 0.002

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	0

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:			



Catchment Area (12)

Type : Catchment Area

Area (ha) 0.011

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	0



Catchment Area (13)

Type : Catchment Area

Area (ha) 0.011

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	0

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:			



Catchment Area (14)

Type : Catchment Area

Area (ha)	0.011
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Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric	0.750
Winter Volumetric Runoff	0.840
Time of Concentration	5
Percentage Impervious	100
Urban Creep (%)	0

Project:				Date: 01/03/2022			
				Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Junctions Storm Phase: Phase				Company Address:			

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked	Access Required	Easting (m)	Northing (m)
2	Manhole	468529.276	110814.519	0.000	1.350	-1.350	Circular	1.200	☐	☐		
3	Manhole	468546.269	110815.311	0.000	1.520	-1.520	Circular	1.200	☐	☐		
4	Manhole	468552.255	110815.636	0.000	1.580	-1.580	Circular	1.200	☐	☐		
7	Manhole	468551.820	110825.043	0.000	1.674	-1.785	Circular	1.200	☐	☐		
6	Manhole	468563.245	110816.059	0.000	1.335	-1.335	Circular	1.200	☐	☐		

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	
Report Details: Type: Junctions Storm Phase: Phase	Company Address:		

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
2	Inlet	Catchment Area	(None)	No Restriction
	Inlet (1)	Catchment Area (12) Catchment Area (1) Catchment Area (11) Catchment Area (10)	(None)	No Restriction
3	Inlet	Catchment Area (13) Catchment Area (8) Catchment Area (3)	(None)	No Restriction
	Inlet (1)	1.001 Catchment Area (2) Catchment Area (9)	(None)	No Restriction
4	Inlet	1.002	(None)	No Restriction
	Inlet (1)	2.001	(None)	No Restriction
7	Inlet	1.003	(None)	No Restriction
6	Inlet	Catchment Area (4) Catchment Area (5) Catchment Area (7)	(None)	No Restriction
	Inlet (1)	Catchment Area (14)	(None)	No Restriction
	Inlet (2)	Catchment Area (6)	(None)	No Restriction

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Company Address:		



Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
2	Outlet	1.001	Free Discharge
3	Outlet	1.002	Free Discharge
4	Outlet	1.003	Hydro-Brake®
	Invert Level (m)	-1.580	
	Design Depth (m)	1.580	
	Design Flow (L/s)	7.5	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☒	
	Unit Reference	SHE-0119-7500-1580- 7500	
6	Outlet	2.001	Free Discharge

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	
Report Details: Type: Network Design Criteria Storm Phase: Phase	Company Address:		

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:x)	500.00
Max. Slope (1:x)	40.00
Min. Backdrop (m)	0.000
Max. Backdrop (m)	0.000
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Manhole Options

Apply Offset	☐
Synchronise Manhole Invert Levels	☐

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	Company Address:			

Runoff Type	Dynamic
Output Interval (mins)	1
Time Step	Shortest
Urban Creep	Use Catchment Values
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	
Report Title: Rainfall Analysis Criteria	Company Address:		

FSR

Type: FSR

Region	England and Wales
M5-60 (mm)	19.6
Ratio R	0.337
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0
30.0	0
100.0	0
100.0	40

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		




FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
2	FSR: 1 years: +0 %: 15 mins: Winter	0.000	-1.350	-1.293	0.057	4.1	0.064	0.000	4.1	1.825	OK
3	FSR: 1 years: +0 %: 15 mins: Winter	0.000	-1.520	-1.295	0.225	7.8	0.255	0.000	4.8	3.580	OK
4	FSR: 1 years: +0 %: 15 mins: Winter	0.000	-1.580	-1.295	0.285	8.3	0.323	0.000	6.9	5.424	Surcharged
7	FSR: 1 years: +0 %: 15 mins: Winter	0.000	-1.785	-1.739	0.045	6.9	0.000	0.000	6.9	5.419	OK
6	FSR: 1 years: +0 %: 15 mins: Winter	0.000	-1.335	-1.290	0.045	4.0	0.051	0.000	3.9	1.814	OK

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		




FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
2	FSR: 30 years: +0 %: 30 mins: Winter	0.000	-1.350	-1.048	0.302	7.9	0.342	0.000	4.5	6.127	OK
3	FSR: 30 years: +0 %: 30 mins: Winter	0.000	-1.520	-1.048	0.472	11.3	0.534	0.000	6.2	11.787	OK
4	FSR: 30 years: +0 %: 30 mins: Winter	0.000	-1.580	-1.048	0.532	11.3	0.602	0.000	7.5	17.856	Surcharged
7	FSR: 30 years: +0 %: 15 mins: Winter	0.000	-1.785	-1.738	0.047	7.5	0.000	0.000	7.5	11.043	OK
6	FSR: 30 years: +0 %: 30 mins: Winter	0.000	-1.335	-1.048	0.287	7.8	0.325	0.000	5.3	6.025	OK

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		




FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
2	FSR: 100 years: +0 %: 30 mins: Winter	0.000	-1.350	-0.896	0.454	10.3	0.514	0.000	4.8	8.010	OK
3	FSR: 100 years: +0 %: 30 mins: Winter	0.000	-1.520	-0.896	0.624	14.2	0.706	0.000	6.8	15.310	OK
4	FSR: 100 years: +0 %: 30 mins: Winter	0.000	-1.580	-0.896	0.684	13.1	0.774	0.000	7.5	23.080	Surcharged
7	FSR: 100 years: +0 %: 30 mins: Summer	0.000	-1.785	-1.738	0.047	7.5	0.000	0.000	7.5	20.801	OK
6	FSR: 100 years: +0 %: 30 mins: Winter	0.000	-1.335	-0.896	0.439	10.1	0.497	0.000	6.4	7.874	OK

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		




FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
2	FSR: 100 years: +40 %: 60 mins: Winter	0.000	-1.350	-0.162	1.188	10.0	1.343	0.000	4.5	14.563	Flood Risk
3	FSR: 100 years: +40 %: 60 mins: Winter	0.000	-1.520	-0.162	1.358	13.6	1.536	0.000	6.7	27.848	Flood Risk
4	FSR: 100 years: +40 %: 60 mins: Winter	0.000	-1.580	-0.162	1.418	12.7	1.604	0.000	7.5	42.182	Flood Risk
7	FSR: 100 years: +40 %: 30 mins: Summer	0.000	-1.785	-1.738	0.047	7.5	0.000	0.000	7.5	23.315	OK
6	FSR: 100 years: +40 %: 60 mins: Winter	0.000	-1.335	-0.162	1.173	9.8	1.326	0.000	6.0	14.297	Flood Risk

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		




FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	2	3	0.0	-1.293	0.073	1.825	0.4	0.01	4.1	OK
1.002	FSR: 1 years: +0 %: 30 mins: Summer	Pipe	3	4	0.0	-1.311	0.215	4.282	0.4	0.01	5.2	OK
1.003	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	4	7	0.0	-1.295	0.047	5.419	1.2	0.09	6.9	Surcharged
2.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	6	4	0.0	-1.290	0.053	1.814	0.4	0.01	3.9	OK

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		




FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.001	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	2	3	0.0	-1.102	0.265	3.997	0.4	0.01	6.7	OK
1.002	FSR: 30 years: +0 %: 30 mins: Summer	Pipe	3	4	0.0	-1.083	0.443	10.524	0.4	0.01	6.7	OK
1.003	FSR: 30 years: +0 %: 30 mins: Winter	Pipe	4	7	0.0	-1.048	0.048	17.852	1.2	0.1	7.5	Surcharged
2.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	6	4	0.0	-1.062	0.284	4.323	0.5	0.01	6.8	OK

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		




FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.001	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	2	3	0.0	-0.944	0.423	4.742	0.4	0.01	6.0	OK
1.002	FSR: 100 years: +0 %: 15 mins: Summer	Pipe	3	4	0.0	-1.000	0.526	7.836	0.4	0.01	7.5	OK
1.003	FSR: 100 years: +0 %: 30 mins: Summer	Pipe	4	7	0.0	-0.959	0.048	20.801	1.2	0.1	7.5	Surcharged
2.001	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	6	4	0.0	-0.944	0.402	5.050	0.5	0.01	7.9	OK

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		




FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.001	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	2	3	0.0	-0.798	0.569	5.164	0.4	0.01	7.0	OK
1.002	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	3	4	0.0	-0.798	0.728	8.426	0.4	0.02	8.6	OK
1.003	FSR: 100 years: +40 %: 30 mins: Summer	Pipe	4	7	0.0	-0.669	0.048	23.315	1.2	0.1	7.5	Surcharged
2.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	6	4	0.0	-0.675	0.671	6.147	0.5	0.02	10.3	OK

Care Home

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:			



Catchment Area

Type : Catchment Area

Area (ha) 0.08

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100
Urban Creep (%)	0



Catchment Area (1)

Type : Catchment Area

Area (ha) 0.089

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100
Urban Creep (%)	0

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:			



Catchment Area (2)

Type : Catchment Area

Area (ha)	0.015
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Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100
Urban Creep (%)	0



Catchment Area (3)

Type : Catchment Area

Area (ha)	0.008
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Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100
Urban Creep (%)	0

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:			



Catchment Area (4)

Type : Catchment Area

Area (ha)	0.009
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Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100
Urban Creep (%)	0



Catchment Area (5)

Type : Catchment Area

Area (ha)	0.005
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Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100
Urban Creep (%)	0

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:			



Catchment Area (6)

Type : Catchment Area

Area (ha)	0.024
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Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100
Urban Creep (%)	0



Catchment Area (7)

Type : Catchment Area

Area (ha)	0.013
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Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100
Urban Creep (%)	0

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address:			



Catchment Area (8)

Type : Catchment Area

Area (ha)	0.018
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Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100
Urban Creep (%)	0

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Company Address:		



Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked	Access Required	Easting (m)	Northing (m)
5	Manhole	468433.086	110754.962	0.000	1.300	-1.300	Circular	1.200	☐	☐		
7	Manhole	468442.588	110744.297	0.000	1.890	-1.890	Circular	1.200	☐	☐		
8	Manhole	468457.206	110736.551	0.000	1.515	-1.985	Circular	1.200	☐	☐		
6	Manhole	468453.208	110755.854	0.000	1.300	-1.300	Circular	1.200	☐	☐		
1	Manhole	468468.954	110793.763	0.000	1.484	-1.484	Circular	1.200	☐	☐		
2	Manhole	468463.540	110770.304	0.000	1.635	-1.635	Circular	1.200	☐	☐		
3	Manhole	468459.028	110749.551	0.000	1.768	-1.768	Circular	1.200	☐	☐		
4	Manhole	468449.442	110748.987	0.000	1.828	-1.828	Circular	1.200	☐	☐		

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
5	Inlet	Catchment Area	(None)	No Restriction
7	Inlet	1.005	(None)	No Restriction
8	Inlet	1.006	(None)	No Restriction
6	Inlet	Catchment Area (1)	(None)	No Restriction
1	Inlet	Catchment Area (6) 1.000	(None)	No Restriction
2	Inlet	1.001 2.000	(None)	No Restriction
	Inlet (1)	Catchment Area (7)	(None)	No Restriction
3	Inlet	1.002 4.000	(None)	No Restriction
	Inlet (1)	Catchment Area (8) 3.000	(None)	No Restriction
4	Inlet	1.003	(None)	No Restriction

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Company Address:		



Outlets			
Junction	Outlet Name	Outgoing Connection	Outlet Type
5	Outlet	5.000	Free Discharge
	Outlet	1.006	Hydro-Brake®
	Invert Level (m)	-1.875	
	Design Depth (m)	1.800	
	Design Flow (L/s)	2.6	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
7	Sump Available	☒	
	Unit Reference	SHE-0067-2600-1800-2600	
6	Outlet	6.000	Free Discharge
1	Outlet	1.001	Free Discharge
2	Outlet	1.002	Free Discharge
3	Outlet	1.003	Free Discharge
4	Outlet	1.004	Free Discharge

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details:	Company Address:			
Type: Network Design Criteria Storm Phase: Phase				

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:x)	500.00
Max. Slope (1:x)	40.00
Min. Backdrop (m)	0.000
Max. Backdrop (m)	0.000
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Manhole Options

Apply Offset	☐
Synchronise Manhole Invert Levels	☐

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	Company Address:			

Runoff Type	Dynamic
Output Interval (mins)	1
Time Step	Shortest
Urban Creep	Use Catchment Values
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FSR

Type: FSR

Region	England and Wales
M5-60 (mm)	19.6
Ratio R	0.337
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0
30.0	0
100.0	0
100.0	40

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		




FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
5	FSR: 1 years: +0 %: 15 mins: Winter	0.000	-1.300	-1.254	0.046	10.5	0.052	0.000	10.4	4.846	OK
7	FSR: 1 years: +0 %: 360 mins: Winter	0.000	-1.890	-1.641	0.250	1.9	0.282	0.000	1.9	46.277	Surcharged
8	FSR: 1 years: +0 %: 360 mins: Winter	0.000	-1.985	-1.949	0.036	1.9	0.000	0.000	1.9	46.261	OK
6	FSR: 1 years: +0 %: 15 mins: Winter	0.000	-1.300	-1.244	0.056	11.6	0.064	0.000	11.5	5.351	OK
1	FSR: 1 years: +0 %: 15 mins: Winter	0.000	-1.484	-1.443	0.041	3.1	0.047	0.000	3.0	1.509	OK
2	FSR: 1 years: +0 %: 15 mins: Winter	0.000	-1.635	-1.584	0.051	4.7	0.058	0.000	4.7	2.437	OK
3	FSR: 1 years: +0 %: 360 mins: Winter	0.000	-1.768	-1.640	0.128	1.9	0.144	0.000	1.8	17.537	OK
4	FSR: 1 years: +0 %: 360 mins: Winter	0.000	-1.828	-1.640	0.188	1.8	0.212	0.000	1.7	17.529	OK

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		




FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
5	FSR: 30 years: +0 %: 15 mins: Winter	0.000	-1.300	-1.221	0.079	25.7	0.089	0.000	25.6	11.858	OK
7	FSR: 30 years: +0 %: 360 mins: Winter	0.000	-1.890	-1.233	0.657	2.0	0.743	0.000	1.9	66.999	Surcharged
8	FSR: 30 years: +0 %: 120 mins: Summer	0.000	-1.985	-1.948	0.037	1.9	0.000	0.000	1.9	22.519	OK
6	FSR: 30 years: +0 %: 15 mins: Winter	0.000	-1.300	-1.200	0.100	28.4	0.113	0.000	28.2	13.078	OK
1	FSR: 30 years: +0 %: 360 mins: Winter	0.000	-1.484	-1.233	0.251	1.9	0.284	0.000	1.9	16.544	Surcharged
2	FSR: 30 years: +0 %: 360 mins: Winter	0.000	-1.635	-1.232	0.402	3.0	0.455	0.000	2.6	25.233	Surcharged
3	FSR: 30 years: +0 %: 360 mins: Winter	0.000	-1.768	-1.232	0.535	3.9	0.605	0.000	3.7	37.216	Surcharged
4	FSR: 30 years: +0 %: 360 mins: Winter	0.000	-1.828	-1.232	0.595	3.7	0.673	0.000	3.6	36.510	Surcharged

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		




FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
5	FSR: 100 years: +0 %: 360 mins: Winter	0.000	-1.300	-0.451	0.849	5.2	0.960	0.000	5.2	44.402	Surcharged
7	FSR: 100 years: +0 %: 360 mins: Winter	0.000	-1.890	-0.452	1.438	2.8	1.627	0.000	2.3	70.231	Surcharged
8	FSR: 100 years: +0 %: 360 mins: Winter	0.000	-1.985	-1.945	0.040	2.3	0.000	0.000	2.3	70.188	OK
6	FSR: 100 years: +0 %: 360 mins: Winter	0.000	-1.300	-0.451	0.849	5.7	0.960	0.000	5.7	49.040	Surcharged
1	FSR: 100 years: +0 %: 360 mins: Winter	0.000	-1.484	-0.452	1.033	2.5	1.168	0.000	2.4	20.854	Surcharged
2	FSR: 100 years: +0 %: 360 mins: Winter	0.000	-1.635	-0.451	1.184	3.8	1.339	0.000	3.3	31.668	Surcharged
3	FSR: 100 years: +0 %: 360 mins: Winter	0.000	-1.768	-0.451	1.317	5.0	1.489	0.000	4.9	47.187	Surcharged
4	FSR: 100 years: +0 %: 360 mins: Winter	0.000	-1.828	-0.451	1.377	4.9	1.557	0.000	4.7	45.983	Surcharged

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		




FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
5	FSR: 100 years: +40 %: 480 mins: Winter	0.000	-1.300	-0.144	1.156	5.9	1.308	0.000	5.7	66.620	Flood Risk
7	FSR: 100 years: +40 %: 480 mins: Winter	0.000	-1.890	-0.144	1.746	4.4	1.975	0.000	2.5	112.402	Flood Risk
8	FSR: 100 years: +40 %: 480 mins: Winter	0.000	-1.985	-1.943	0.042	2.5	0.000	0.000	2.5	112.361	OK
6	FSR: 100 years: +40 %: 480 mins: Winter	0.000	-1.300	-0.144	1.156	6.5	1.308	0.000	6.3	73.586	Flood Risk
1	FSR: 100 years: +40 %: 480 mins: Winter	0.000	-1.484	-0.144	1.340	5.7	1.516	0.000	2.6	54.047	Flood Risk
2	FSR: 100 years: +40 %: 480 mins: Winter	0.000	-1.635	-0.144	1.491	6.1	1.687	0.000	4.0	74.121	Flood Risk
3	FSR: 100 years: +40 %: 480 mins: Winter	0.000	-1.768	-0.143	1.624	10.8	1.837	0.000	6.0	107.702	Flood Risk
4	FSR: 100 years: +40 %: 480 mins: Winter	0.000	-1.828	-0.143	1.684	9.6	1.905	0.000	5.8	102.848	Flood Risk

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:			

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.006	FSR: 1 years: +0 %: 360 mins: Winter	Pipe	7	8	0.0	-1.641	0.037	46.261	0.6	0.13	1.9	Surcharged
1.005	FSR: 1 years: +0 %: 240 mins: Winter	Pipe	Cellular Storage	7	0.0	-1.643	0.225	36.653	0.2	0.05	1.9	Surcharged
1.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	1	2	0.0	-1.443	0.046	1.509	0.5	0.07	3.0	OK
1.002	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	2	3	0.0	-1.584	0.059	2.437	0.6	0.11	4.7	OK
1.003	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	3	4	0.0	-1.701	0.066	3.627	0.7	0.17	6.9	OK
1.004	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	4	Cellular Storage	0.0	-1.761	0.082	3.499	0.9	0.16	6.8	OK
3.000	FSR: 1 years: +0 %: 960 mins: Winter	Pipe	Porous Paving (1)	3	0.0	-0.446	0.002	1.075	0.0	0	0.0	OK
4.000	FSR: 1 years: +0 %: 60 mins: Winter	Pipe	Porous Paving	3	0.0	-0.475	0.008	0.793	1.2	0.01	0.5	OK
2.000	FSR: 1 years: +0 %: 60 mins: Winter	Pipe	Porous Paving (3)	2	0.0	-0.476	0.008	0.748	1.3	0	0.4	OK
1.000	FSR: 1 years: +0 %: 60 mins: Winter	Pipe	Porous Paving (2)	1	0.1	-0.470	0.010	1.291	1.5	0.01	0.7	OK
5.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	5	Cellular Storage	0.0	-1.254	0.043	4.846	2.5	0.16	10.4	OK
6.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	6	Cellular Storage	0.0	-1.244	0.054	5.351	2.0	0.26	11.5	OK

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		



Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.006	FSR: 30 years: +0 %: 120 mins: Summer	Pipe	7	8	0.0	-1.390	0.037	22.519	0.6	0.13	1.9	Surcharged
1.005	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	Cellular Storage	7	0.0	-1.606	0.225	2.816	0.4	0.06	2.5	Surcharged
1.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	1	2	0.0	-1.419	0.073	4.670	0.7	0.18	7.5	OK
1.002	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	2	3	0.0	-1.554	0.101	7.379	0.7	0.28	11.5	OK
1.003	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	3	4	0.0	-1.606	0.192	10.234	0.8	0.41	16.9	OK
1.004	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	4	Cellular Storage	0.0	-1.606	0.225	9.647	1.0	0.4	16.3	OK
3.000	FSR: 30 years: +0 %: 360 mins: Winter	Pipe	Porous Paving (1)	3	0.0	-0.401	0.150	1.497	0.1	0	0.1	OK
4.000	FSR: 30 years: +0 %: 30 mins: Winter	Pipe	Porous Paving	3	0.0	-0.455	0.069	1.543	1.2	0.02	1.6	OK
2.000	FSR: 30 years: +0 %: 30 mins: Winter	Pipe	Porous Paving (3)	2	0.0	-0.456	0.013	1.437	1.9	0.02	1.5	OK
1.000	FSR: 30 years: +0 %: 30 mins: Winter	Pipe	Porous Paving (2)	1	0.1	-0.446	0.017	2.466	2.2	0.03	2.4	OK
5.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	5	Cellular Storage	0.0	-1.221	0.075	11.858	3.0	0.4	25.6	OK
6.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	6	Cellular Storage	0.0	-1.200	0.094	13.078	2.4	0.64	28.2	OK

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details:	Company Address:			
Type: Connections Summary Storm Phase: Phase				



FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		



Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.006	FSR: 100 years: +0 %: 360 mins: Winter	Pipe	7	8	0.0	-0.452	0.041	70.188	0.6	0.16	2.3	Surcharged
1.005	FSR: 100 years: +0 %: 360 mins: Winter	Pipe	Cellular Storage	7	0.0	-0.451	0.225	70.962	0.2	0.07	2.8	Surcharged
1.001	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	1	2	0.0	-1.409	0.085	6.301	0.7	0.24	9.7	OK
1.002	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	2	3	0.0	-1.523	0.179	9.461	0.7	0.37	15.0	OK
1.003	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	3	4	0.0	-1.523	0.225	13.119	0.9	0.53	21.6	Surcharged
1.004	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	4	Cellular Storage	0.0	-1.523	0.225	12.411	1.0	0.49	20.3	Surcharged
3.000	FSR: 100 years: +0 %: 360 mins: Winter	Pipe	Porous Paving (1)	3	0.0	-0.375	0.150	2.033	0.1	0	0.4	OK
4.000	FSR: 100 years: +0 %: 30 mins: Winter	Pipe	Porous Paving	3	0.0	-0.446	0.128	2.102	1.0	0.03	2.1	OK
2.000	FSR: 100 years: +0 %: 30 mins: Winter	Pipe	Porous Paving (3)	2	0.0	-0.448	0.061	1.971	2.1	0.02	2.2	OK
1.000	FSR: 100 years: +0 %: 30 mins: Winter	Pipe	Porous Paving (2)	1	0.1	-0.434	0.020	3.369	2.4	0.04	3.5	OK
5.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	5	Cellular Storage	0.0	-1.205	0.116	15.344	3.2	0.52	33.2	OK
6.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	6	Cellular Storage	0.0	-1.175	0.119	16.914	2.5	0.83	36.5	OK

Project:	Date: 01/03/2022			
	Designed by: tomclark	Checked by:	Approved By:	
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:			



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

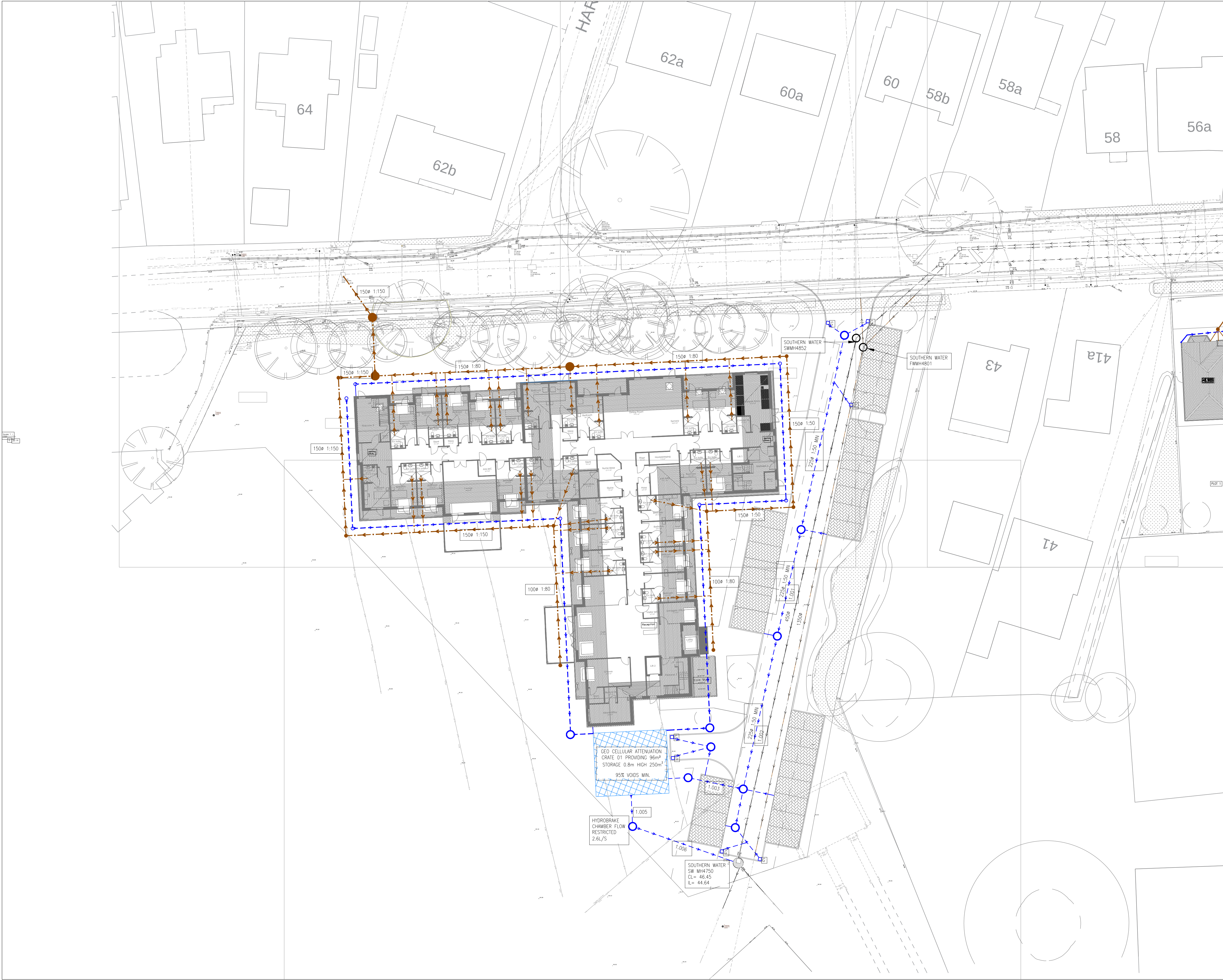
Project:	Date: 01/03/2022		
	Designed by: tomclark	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		



Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.006	FSR: 100 years: +40 %: 480 mins: Winter	Pipe	7	8	0.0	-0.144	0.043	112.361	0.6	0.17	2.5	Flood Risk
1.005	FSR: 100 years: +40 %: 120 mins: Winter	Pipe	Cellular Storage	7	0.0	-0.292	0.225	30.339	0.3	0.16	6.5	Surcharged
1.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	1	2	0.0	-1.374	0.186	8.864	0.8	0.33	13.5	OK
1.002	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	2	3	0.0	-1.373	0.225	12.971	0.8	0.51	20.9	Surcharged
1.003	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	3	4	0.0	-1.373	0.225	18.378	0.9	0.71	29.0	Surcharged
1.004	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	4	Cellular Storage	0.0	-1.430	0.225	15.583	1.0	0.65	26.5	Surcharged
3.000	FSR: 100 years: +40 %: 60 mins: Winter	Pipe	Porous Paving (1)	3	0.0	-0.320	0.150	0.703	0.0	0.01	0.4	Surcharged
4.000	FSR: 100 years: +40 %: 30 mins: Winter	Pipe	Porous Paving	3	0.0	-0.431	0.150	3.038	0.9	0.04	3.1	OK
2.000	FSR: 100 years: +40 %: 30 mins: Winter	Pipe	Porous Paving (3)	2	0.0	-0.435	0.150	2.827	1.8	0.03	3.0	OK
1.000	FSR: 100 years: +40 %: 30 mins: Winter	Pipe	Porous Paving (2)	1	0.1	-0.418	0.091	4.925	2.4	0.06	5.3	OK
5.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	5	Cellular Storage	0.0	-1.174	0.150	21.469	3.3	0.73	46.4	OK
6.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	6	Cellular Storage	0.0	-0.840	0.150	23.636	2.8	1.13	49.6	Surcharged

APPENDIX F

BEL OW GROUND DRAINAGE STRATEGY



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DRAWING NOTES:

LEGEND

	SITE BOUNDARY
	PRIVATE FOUL DRAIN
	PRIVATE S.W. DRAIN
	EXISTING SEWER
	EXISTING MANHOLE/ GULLY
	MANHOLE
	PRIVATE MANHOLE/INSPECTION CHAMBER depth > 600mm - 450 DIA (SEE PLAN FOR TYPE)
	ACCESS CHAMBER
	SOIL AND VENT PIPE
	RAINWATER PIPE
	ROAD GULLY
	GEO CELLULAR CRATE STORAGE
	PERMEABLE PAVING - MIN 500mm DEPTH OF 30% VOIDS NO FINE AGGREGATES WITH UNDER DRAIN

INITIAL ISSUE	03/02/2022	RML
REV DESCRIPTION	DATE	DRAWN



PARTNERSHIP HOUSE
MOORSIDE ROAD
WINCHESTER
SO23 7RX

TEL: 01962 834400
WWW.RIDGE.CO.UK

CLIENT:
FRONTIER ESTATES

IN ASSOCIATION WITH:

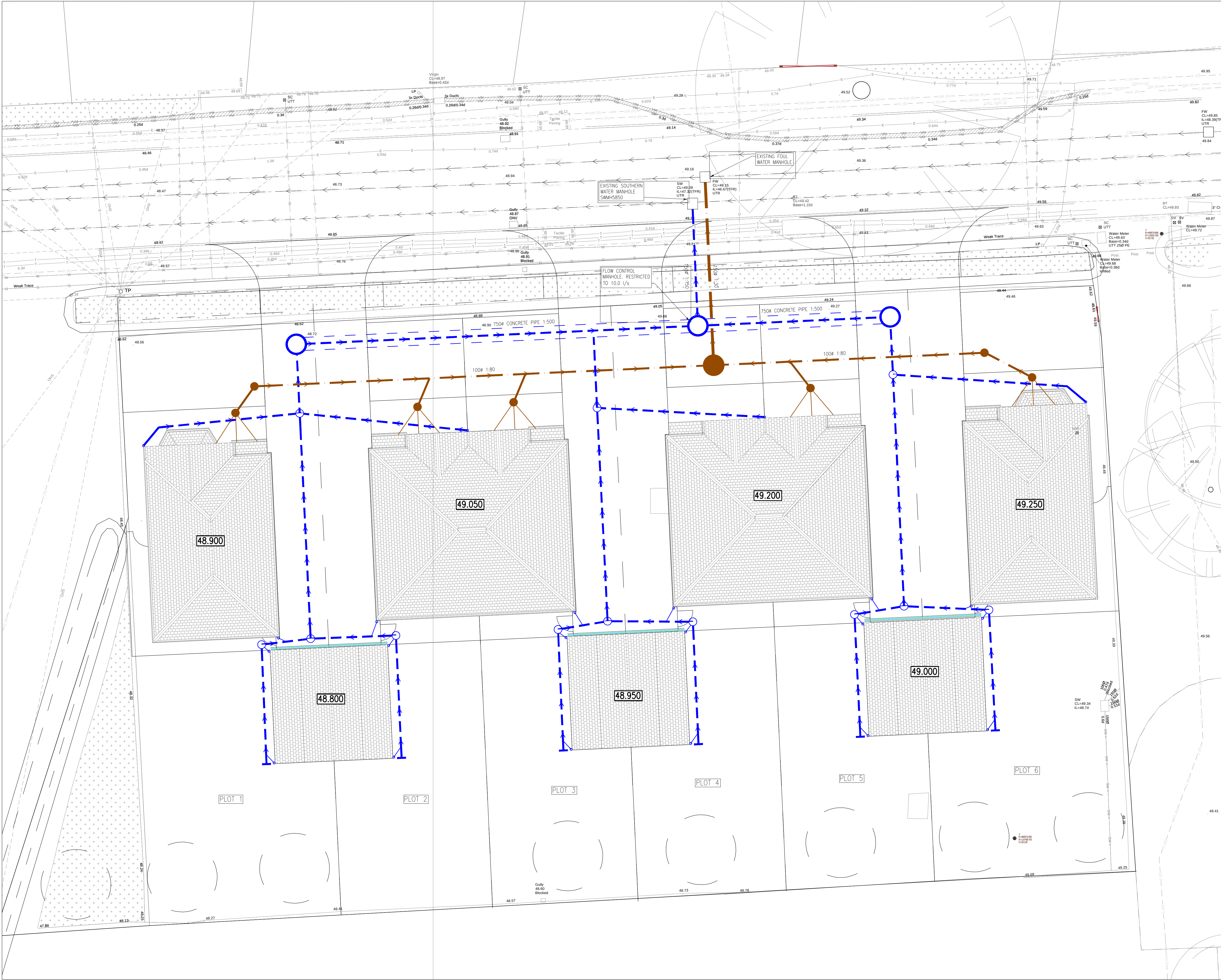
PROJECT:
COWPLAIN SCHOOL

TITLE:
**PROPOSED DRAINAGE LAYOUT
SHEET 1 of 2**

ENG: RML	CSE:	ICSE:	SCALE: 1:250	@ A1
INITIAL ISSUE:			02/03/2022	

STATUS:
PRELIMINARY

DRAWING No:	PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
	5017735	RDG	XX	ST	DR	C	0500	-



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DRAWING NOTES:

LEGEND

- EXISTING SURFACE WATER DRAIN
- EXISTING FOUL WATER DRAIN
- PROPOSED SURFACE WATER DRAIN
- PROPOSED FOUL WATER DRAIN
- PROPOSED MANHOLE CHAMBER (1.2m DIA.)
- PROPOSED INSPECTION CHAMBER DEPTH > 600mm-450mm DIA.
- PROPOSED RODDING EYE
- PROPOSED RAIN WATER PIPE
- PROPOSED LINEAR CHANNEL DRAIN
- PROPOSED FINISHED FLOOR LEVEL

49.200

INITIAL ISSUE	XX/02/2022	JM
REV DESCRIPTION	DATE	DRAWN

RIDGE

PARTNERSHIP HOUSE
MOORSIDE ROAD
WINCHESTER
SO23 7RX

TEL: 01962 834400
WWW.RIDGE.CO.UK

CLIENT:
FED3 PROJECTS LIMITED

IN ASSOCIATION WITH:

PROJECT:
**FRONTIER ESTATES
COWPLAIN SCHOOL**

TITLE:
**PROPOSED DRAINAGE LAYOUT
SHEET 2 of 2**

TECH: JM	CSE:	ICSE:	SCALE: 1:100	@ A1
STATUS:			INITIAL ISSUE: XX/02/2022	

DRAWING No:	PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
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