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Drainage Statement

Proposed Residential Development at

Stakers Farm, North End Road, Yapton

On behalf of

Piers Bucknell

January 2025

Document History and Status

Project Number 23452

Date	Version	Prepared By	Reviewed By	Approved By
7 Nov 2024	1.0	Stuart Magowan IEng MICE	Steve Doughty Director	Stuart Magowan Director
16 Jan 2025	1.1	Stuart Magowan IEng MICE	Steve Doughty Director	Stuart Magowan Director

CONTENTS

1 Non Technical Summary

1.1 This Drainage Statement has been undertaken on behalf of Piers Bucknell in support of a Planning Application for the conversion of existing barns to three residential properties with associated access roads, car parking and landscaping on land at Stakers Farm, North End Road, Yapton.

1.2 The proposed development will incorporate a sustainable drainage system which will discharge surface water at a suitably restricted rate to the public sewer beneath North End Road using the existing on-site surface water connection and provide betterment when compared to the existing / do-nothing scenario.

1.3 The surface water drainage system will provide storage for all storm return periods up to and including the 1:100 year rainfall event with an allowance for climate change.

1.4 Southern Water have confirmed acceptance of a restricted discharge of surface water to the public foul sewer beneath North End Road using the existing private surface water connection.

1.5 Foul water will be discharged by gravity to the public foul sewer located beneath North End Road using the existing connection.

1.6 This report concludes that a suitable surface water and foul water drainage system have been designed to accommodate the anticipated flows from the proposed development.

2 Planning Policy Context

2.1 National Planning Policy Framework

2.1.1 The National Planning Policy Framework was last updated on 12 December 2024.

2.1.2 With regard to planning and flood risk the National Planning Policy Framework states that *'when determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment[63]. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:*

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;

c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.'

2.2 Non-Technical Standards for SuDS

2.2.1 The Non-Technical Standards for SuDS dated March 2015 are intended to be used in conjunction with the National Planning Policy Framework.

2.2.2 With regard to peak runoff **Non-Statutory Standard S3** states that *'for developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.'*

2.2.3 **Non-Statutory Standard S6** states that *'where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.'*

2.2.4 **Non Statutory Standard S7** states that *'the drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.'*

2.2.5 **Non Statutory Standard S8** states that *'the drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.'*

2.3 Lead Local Flood Authority

2.3.1 West Sussex County Council became a Lead Local Flood Authority under the Flood and Water Management Act 2010 and was given a series of new responsibilities including the role of statutory consultee for surface water management for Major Planning Applications.

2.3.2 As part of their role West Sussex County Council updated their Policy for the Management of Surface Water in November 2018.

2.3.3 That document has been reviewed in the preparation of this report.

2.4 Local Planning Policy

2.4.1 The Arun Local Plan 2011 - 2031 was adopted in July 2018.

2.4.2 **Policy W SP1 - Water** states that *'Arun District Council will encourage water efficiency measures in order to protect the District's water resources and enhance the quality of the water environment which supports a range of habitats and ecosystems. Development will be encouraged to make active use of surface water as a design feature and permitted where it identifies measures to improve and enhance waterbodies, coastal habitats or provides additional flood relief.*

The Council will also support development that:

a) is appropriately located, taking account of flood risk and promotes the incorporation of appropriate mitigation measures into new development, particularly Sustainable Drainage Systems that reduces the creation and flow of surface water and improves water quality;

b) *reduces the risk to homes and places of work from flooding whilst increasing biodiversity;*

c) *delvers a range of community benefits including enhancing the quality of life and providing greater resistance to the impact of climate change.'*

2.4.3 **Policy W DM1 - Water Quality** states:

'2. Water quality

To ensure good water quality in the District, all major developments must:

a) *Illustrate, where necessary, how they have contributed to the protection and enhancement of waterbodies identified by the South East River Basin Management Plan objectives; and*

b) *Demonstrate, where it will materially increase foul and/or surface water discharges, adequate drainage capacity exists or can be provided as part of the development. Where adequate capacity does not exist, there will be a requirement that facilities are adequately upgraded prior to the completion and occupation of development. In sewered areas, there will be a general presumption against the use of non mains foul water drainage.*

3. Lidsey Wastewater Treatment Works Catchment Area

Major development in this area must be accompanied by a full Drainage Impact Assessment which must take account of surface water disposal and foul water disposal.

Although minor developments are unlikely to raise significant flood risk due to the cumulative impact all development within this area must be accompanied by a Drainge Impact Assessment that must take account of both the individual and cumulative impact upon foul water disposal; flood storage capacity and surface water drainage of flood flows within the Lidsey Wastewater Treatment Works Catchment Area.

Where surface water and foul water drainage systems are approved as part of the consideration of a planning application, conditions may be imposed upon the permission relating to dates for implementation or other detailed technical requirements. In order to discharge conditions, the developer will be required to submit a statement from a suitably qualified and experienced engineer that the measures have been adequately and satisfactorily implemented.'

2.4.4 **Policy W DM2 - Flood Risk** states:

'Development in areas at risk from flooding, identified on the latest Environment Agency flood risk maps and the Council's Strategic Flood Risk Assessment (SFRA) will only be permitted where all of the following criteria have been satisfied:

a) The sequential test in accordance with the National Planning Policy Guidance has been met.

b) A site specific Flood Risk Assessment demonstrates that the development will be safe, including access and egress, without increasing flood risk elsewhere and reduce flood risk overall.

c) The sustainability benefits to the wider community are clearly identified.

d) The scheme identifies adaptation and mitigation measures.

e) Appropriate flood warning and evacuation plans are in place; and

f) New site drainage systems are designed to take account of events which exceed the normal design standard i.e. consideration of flood flow routing and utilising temporary storage areas.

The reports prepared as part of the criteria above must take into account contingency allowances, taking climate change into account as set out in Flood Risk Assessments: climate change allowances section of the NPPG.

In locations where strategic flood defence or resilient and resistant construction measures are necessary within the site itself, proposals will be required to demonstrate how measures have been incorporated as an intrinsic part of the scheme in a manner which is compatible with the latest Strategic Flood Risk Assessment.

All development proposals must take account of relevant Surface Water Management Plans, Catchment Flood Management Plans and related Flood Defence Plans and strategies such as the Lower Tidal River Arun Strategy. The council may require financial contributions from development on sites where measures to address flood risk or to improve the environmental quality of watercourses have been identified by these Plans and Strategies.'

2.4.5 **Policy W DM3 - Sustainable Urban Drainage Systems** states:

'To increase the levels of water capture and storage and improve water quality, all development must identify opportunities to incorporate a range of Sustainable Urban Drainage Systems (SUDS), appropriate to the size of development, at an early stage of the design process.

Proposals for both major and minor development proposals must incorporate SUDS within the private areas of the development in order to provide source control features to the overall SUDS design. These features include:

- *Green roofs*
- *Permeable driveways and parking*
- *Soakaways*
- *Water harvesting and storage features including water butts.*

Proposals for major development must also integrate SUDS within public open spaces and roads, reflecting discussion with the appropriate bodies. SUDS must therefore be integrated into the overall design of a development and must:

a) Contribute positively to the appearance of the area, integrating access to allow maintenance of existing watercourses and the system.

b) Effectively manage water (including its quality)

c) Accommodate and enhance biodiversity by making connections to existing Green Infrastructure assets and

d Provide amenity for local residents (ensuring a safe environment)

e) Retain the existing drainage network of the site and the wider area,

f) Be maintained in perpetuity, supported through a Maintenance and Management Plan/Regime, including its financing, agreed with the Local Planning Authority.

In order to ensure that SUDS discharge water from the development at the same or lesser rate, as prior to construction, developers must:

f) Follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations and the SUDS manual produced by CIRIA.

g) Undertake up to six months groundwater monitoring within the winter period.

h) Undertake winter percolation testing in accordance with BRE365.

i) *The proposed drainage system must be designed to ensure that there is no flooding on a 1 in 30 year storm event.*

j) *The design must also take account of the 1 in 100 year storm event plus 30% allowance for climate change, on stored volumes, to ensure that there is no flooding of properties or the public highway or inundation of the foul sewerage system. Any excess flows must be contained within the site boundary, and within designated storage areas.'*

2.5 Best Practice Guidance

2.5.1 CIRIA report C753 The SuDS Manual-v6 provides guidance on the redevelopment of brownfield sites. The aim for surface water runoff is to match pre-development greenfield runoff rates and volumes where reasonably achievable.

2.6 Previous Planning Permission

2.6.1 The site was granted Planning Permission dated 30 July 2020 with conditions by Arun District Council under reference Y/105/19/PL, this permission has now lapsed.

Planning Condition 5 of that approval was related to the site drainage scheme and stated:

'Development shall not commence, other than works of site survey and investigation, until full details of the proposed surface water drainage scheme have been submitted to and approved in writing by the Local Planning Authority. The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations, and the recommendations of the SuDS Manual produced by CIRIA. Winter groundwater monitoring to establish highest annual ground water levels and winter Percolation testing to BRE 365, or similar approved, will be required to support the design of any Infiltration drainage. No building / No part of the extended building shall be occupied until the complete surface water drainage system serving the property has been implemented in accordance with the agreed details and the details so agreed shall be maintained in good working order in perpetuity.

Reason: To ensure that the proposed development is satisfactorily drained in accordance with policies W SP1, W DM1, W DM2 and W DM3 of the Arun Local Plan. This is required to be a pre-commencement condition because it is

necessary to implement the surface water drainage system prior to commencing any building works.'

3 Legislation

3.1 Water Industries Act 1991

3.1.1 The Water Industries Act 1991 provides the legislative framework that sets out the powers and duties of water and sewerage companies together with the rights of communication for the disposal of foul and surface water from premises.

3.1.2 Legislation is above all subsidiary guidance, whether that guidance is written in the SuDS Manual, in the Lead Local Authority's guidance or District Council guidance.

3.2 Section 106 of the Water Industries Act 1991

3.2.1 Section 106 (Right to Communicate with Public Sewers) of the Water Industries Act 1991 states:

'(1) Subject to the provisions of this section -

(a) the owner or occupier of any premises in the area of a sewerage undertaker; or

(b) the owner of any private sewer draining premises in the area of any such undertaker, shall be entitled to have his drains or sewer communicate with the public sewers of that undertaker and thereby to discharge foul water and surface water from those premises or that private sewer.

(2) Subject to the provisions of Chapter III of this Part, nothing in subsection (1) above shall entitle any person

(a) to discharge directly or indirectly into any public sewer -

(i) any liquid from a factory, other than domestic sewage or surface or storm water, or any liquid from a manufacturing process; or

(ii) any liquid or other matter the discharge of which into public sewers is prohibited by or under any enactment; or

(b) where separate public sewers are provided for foul water and for surface water, to discharge directly or indirectly -

(i) foul water into a sewer provided for surface water; or

(ii) except with the approval of the undertaker, surface water into a sewer provided for foul water;'

4 Catchment Management Plan and Local Flood History

4.1 Lidsey Wastewater System Plan

4.1.1 The site is within the Lidsey Foul Water Treatment Catchment Area.

4.1.2 Southern Water published their Drainge and Wastewater Management Plan for the Lidsey Wastewater System Plan in August 2021 which was updated in 2023.

4.1.3 The report notes for 2020 a 1 in 1 year rainfall event placed 13 properties across the whole Lidsey catchment, of approximately 400 properties, at risk from hydraulic overload (foul sewer flooding).

4.2 West Sussex County Council Report on June 2012 Flood Event

4.2.1 West Sussex County Council published the West Sussex County Council Report on June 2012 Flood Event in November 2012.

4.2.2 The report only identified one location in Yapton affected by flooding.

4.2.3 The flood location in Yapton was on Bilsham Road approximately 650m to the southeast of the proposed site.

4.2.4 The report notes the event in June 2012 was in excess of a 1 in 200 year event.

4.2.5 Both the Lidsey Foul Water Treatment Catchment Area report and West Sussex Report on the June 2012 flooding confirm the wider catchment area has a foul water flooding issue.

4.2.6 Neither confirm specific flooding in the immediate vicinity of the site or regular foul water flooding the wider area of Yapton.

4.3 West Sussex Highways

4.3.1 West Sussex Highways have confirmed the highway drainage often floods at the junction of North End Road and Main Road. This matches the surface water flood details on the available surface water flood map for the area as follows:

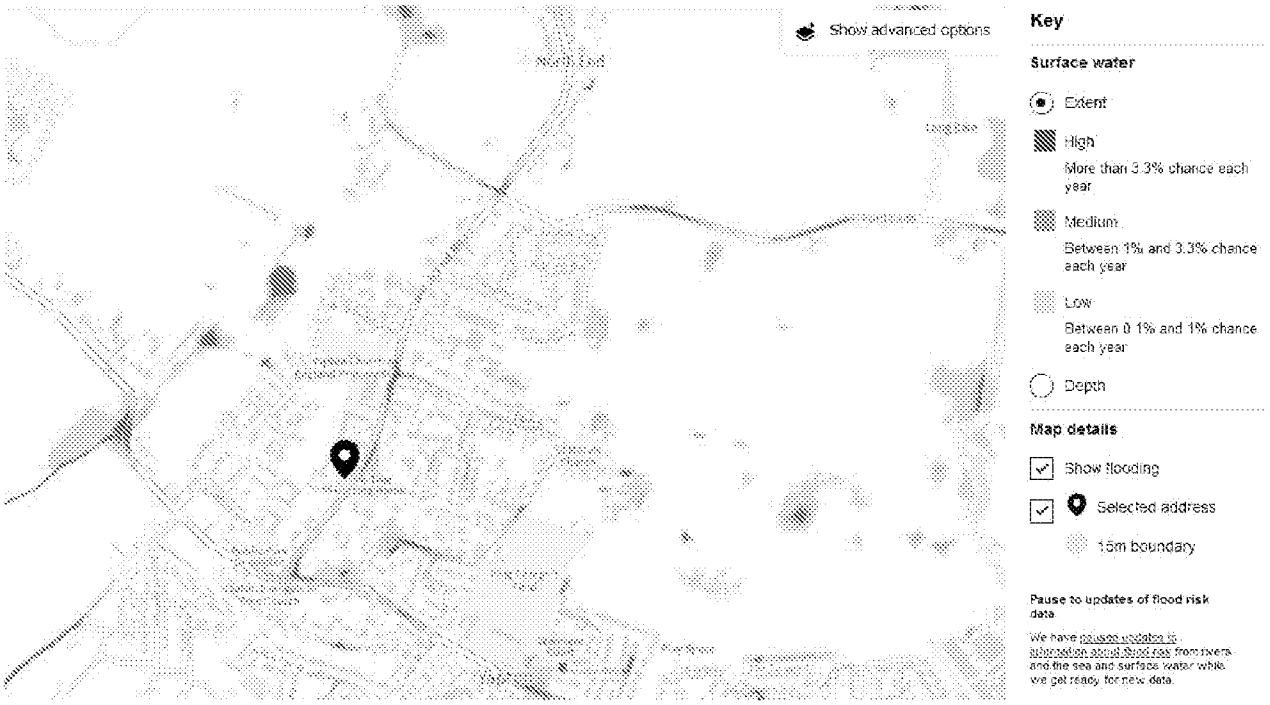


Image 1: Surface Water Flood Map

5 Existing Site

5.1 Site Location

5.1.1 The development site is located on the land west of B2132 North End Road, Yapton at Ordnance Survey reference SU 977 035. The nearest postcode is BN18 0DU.

Image 2: Site Location

5.1.2 The site is bounded to the north by residential properties, the east by B2132 North End Road, the south by open fields and to the west by agricultural buildings.

5.1.3 A copy of the site location plan is located in Appendix 1 at the rear of this report.

5.2 Site Description

5.2.1 The site is approximately 2,900m^2 in area and comprises two single storey outbuildings and a two storey agricultural barn with associated hardstanding.

5.2.2 There is approximately 2,000m² of impermeable area on site of which 1,465m^2 is positively discharged into the existing onsite drainage system. The surface water discharge from the remaining impermeable area is not positively drained and is discharged to the soft landscaped areas on site.

5.2.3 Existing ground levels are highest at the northwest corner of the site at approximately 6.6m AOD. The site falls towards its southeast boundary to a level of approximately 5.4m AOD.

5.2.4 The closest watercourses to the site are approximately 550m west of the site to the northwest of Yapton Scout Hut and 650m southwest of the site adjacent to Bitten Avenue.

5.2.5 A copy of the existing site layout plan is located in Appendix 2 at the rear of this report.

5.3 Existing Drainage and Recent Repairs

5.3.1 Surface and foul water are currently discharged in an unrestricted manner via the existing adopted 150mm diameter lateral drain (a part of the public sewer network) which connects to the 175mm diameter public foul water sewer beneath North End Road to the southeast of the site.

5.3.2 There is also a 150mm highway drain located on the east side of North End Road.

5.3.3 West Sussex County Council as Highway Authority have confirmed the 150m drain connects to a 225mm drain at the junction of North End Road and Main Road and then to a culverted watercourse some 450m to the west.

5.3.4 West Sussex Highways have noted the highway drain is not in very good condition (email dated 8 November 2022) and confirmed the junction of North End Road and Main Road often floods (email 9 December 2022).

5.3.5 The Highway Authority noted that without a significant upgrade of the highway drain the possibility of a private connection was very limited (email 9 December 2022).

5.3.6 The Highway Authority also confirmed a connection to the highway drain had been denied to the adjacent Stakers Farm Development (email 8 November 2022).

5.3.7 The Highway Authority were further consulted in January 2025 and confirmed the following in regarding the local highway drains (email 6 January 2025):

- *From the access to 'Stakers Farm' to its outfall, the system is piped and approx. 950m long.*
- *The system is made up of 150mm pipe in North End Road. 225mm pipe along the B2233 Main Road, and 225/300mm pipe below the existing ditch line and under the old canal. The system discharges into open ditch approx. 200m from the old canal.*
- *The 150mm system along North End Road is generally around 1.2-1.5m deep and is not in the best condition due mainly to root infestation.*

- *The system along the B2233 Main Road is generally in good condition, but is very deep, generally between 3-3.5m. The system is prone to siltation, very likely because of the poor gradient.*
- *The system below the existing ditch line and under the old canal we understand was laid because of health and environmental reasons, as the pipe once took waste from the old Yapton abattoir. The pipe was laid in the bottom of the old ditch line and is not in the best condition, open joints and laid to poor levels.*
- *The piped system follows the 'blue dotted' line on the North End Road plan.*
- *The 'Green Pond Corner' plan shows what we know about the systems in this area.*

5.3.8 A CCTV survey of the existing onsite drains and adopted lateral connection to the public sewer was undertaken in April 2023 which identified a blockage to the adopted public lateral connection to the public sewer in North End Road. Southern Water have competed a repair to that drain. A further CCTV survey dated 30 August 2024 was undertaken to confirm the lateral was repaired and the connection to the public sewer was functioning.

5.3.9 Causeway Flow calculations of the existing / do nothing scenario on-site drainage network have been undertaken and indicate the following flows:

Storm return period	Discharge Rate
1 year	17.9 l/s
2 year	27.0 l/s
10 year	44.6 l/s

Table 1: Existing Surface Water Discharge Rate

5.3.10 A copy of the existing drainage plan, existing drained areas plan together with Causeway Flow calculations for the existing drainage system are located in Appendix 3 at the rear of this report.

5.3.11 A copy of the sewer records, highway drainage records and correspondence with the Highway Authority are located in Appendix 4 at the rear of this report.

5.3.12 Copies of the CCTV survey drainage reports are located in Appendix 5 at the rear of this report.

5.4 Geology and Site Investigation

5.4.1 British Geological Survey maps and borehole information identify the site as being located within an area underlain by Superficial River Terrace Deposits (a clayey sand layer) overlying Lewes Nodular Chalk.

5.4.2 Site investigations were undertaken by Ashdown Site Investigation Limited (report reference R14124) between 13-14 February 2020 and confirmed made ground to depths approximately between 0.25m-0.6m below ground level, which is underlain by slightly gravelly, slightly sandy CLAY classified as River Terrace Deposits to depths up to 4.0m below ground level.

5.5 Groundwater Monitoring

5.5.1 Groundwater monitoring was undertaken between 14 February to 3 April 2020 by Ashdown Site investigation. Groundwater was encountered in two boreholes at 0.38m-0.58m below ground level.

5.5.2 Arun District Council Engineers queried the results of the groundwater monitoring submitted under an application to discharge drainage conditions on the previous Planning Consent Reference Y/107/21/PL noting they believed the high groundwater results could be a result of surface water ingress into the monitoring locations.

5.5.3 Ashdown Site Investigation provided comments on their report dated March 2020 to confirm the spikes in groundwater were not due to surface water ingress.

5.5.4 Further groundwater monitoring was undertaken over winter period 2023 / 24 by Ground and Water Limited who installed new boreholes adjacent to the previously installed boreholes provided by Ashdown Site Investigation and monitored both sets of boreholes.

5.5.5 Groundwater was encountered in both sets of boreholes between 0.2m and 4.04m below ground level. With the highest levels of groundwater recorded in WS1 (Ground and Water borehole) at 0.2m and WS01 (Ashdown borehole) at 0.3m below ground and in WS2 (Ground and Water borehole) 0.8m below ground and WS02 (Ashdown borehole) at 0.2 below ground level.

5.6 Soakage Testing

5.6.1 Infiltration testing was also undertaken in accordance with BRE Digest 365 methodology by Ashdown Site Investigation Limited at a depth of 0.6m below existing ground level and concluded that the underlying ground has moderate to poor infiltration with infiltration rates varying from $3.2x10^{-5}$ m/s to $6.5x10^{-7}$ m/s.

5.6.2 The online "Magic Map" available from Defra confirms that the site is located above a major aquifer classified as having an intermediate vulnerability.

5.6.3 A copy of the borehole records, site investigation information detailing the soakage testing and groundwater monitoring data together with the site investigation correspondence emails between The Civil Engineering Practice and Ashdown Site Investigation on the 31 July 2023 are located in Appendix 6 at the rear of this report.

6 Surface Water Drainage Guidance and Design Rationale

6.1 C753 The SuDS Manual

6.1.1 CIRIA report C753 The SuDS Manual-v6 provides guidance on surface water drainage. The aim for surface water runoff is to match greenfield runoff rates and volumes where reasonably achievable.

6.1.2 For surface water discharge, the drainage hierarchy notes the following list of drainage options in order of preference:

1 Infiltration to ground

2 Discharge to surface waters (watercourse or body of water)

3 Discharge to a surface water sewer

4 Discharge to a combined sewer

6.2 Infiltration to Ground

6.2.1 The soakage testing has confirmed soakage rates of between $3.2x10^{-5}$ m/s and $6.5x10^{-7}$ m/s across the site, which suggests some soakage may be possible on site however groundwater monitoring on site has confirmed seasonal groundwater levels over two winter periods where ground water has been recorded at a maximum level of 200mm below ground level across the site.

6.2.2 Groundwater at 200m below ground does not provide sufficient depth to allow shallow soakage on site without the risk of groundwater inundation to the soakage structure nor does it allow 1m of freeboard below the base of any soakage structure to the recorded groundwater level as required by Arun District Councils Infiltration Drainge Design Guidance.

6.2.3 Infiltration to ground has therefore been discounted as a means of surface water disposal for this site.

6.3 Discharge to Surface Waters

6.3.1 There are no watercourse or suitable water bodies located adjacent or near the site.

6.3.2 This option is therefore discounted as a means of discharging surface water from the site.

6.4 Discharge to a Surface Water Sewer / Drain

6.4.1 Public Surface Water Sewers

6.4.1.1 There are no public surface water sewers within the vicinity of the site.

6.4.2 Highway Drain

6.4.2.1 There is a West Sussex County Council highway drain located on the east side of in North End Road and which connects to a culverted watercourse approximately 450m west of the junction of North End Road and Main Road. West Sussex as Highway Authority have confirmed the drain is in poor condition and floods often and without significant upgrade the possibility of a private connection was very limited.

6.4.2.2 There is no legal right of connection to a highway drain, West Sussex County Council Highways have refused a connection to the adjacent site (email 8 November 2022, located in Appendix 4).

6.4.2.3 A connection to the highway drain has not been granted and any additional flow to the highway drain would increase existing local flooding.

6.4.2.4 A connection to the highway drain is unavailable as a means of disposing surface water from the site.

6.5 Discharge to a Combined Sewer

6.5.1 There are no combined sewers or sewers officially classified as combined sewers in the local area and therefore no option to connect surface water to a combined sewer.

6.6 Compliance with National Planning Policy Frameworks and Non-Technical Standards for SuDS

6.6.1 The Drainage Hierarchy has been followed and none of the preferred options provide a suitable method for discharging surface water from the site.

6.6.2 The surface water discharge from the site will therefore need to follow the requirements of NPPF and the Non-Technical Standards for SuDS.

6.6.3 The proposal is therefore to maintain the existing surface water connection to the foul sewer and in accordance with NPPF Section 167 (c) to use the opportunity provided by new development to reduce the causes and impacts of flooding by limiting the discharge rate to a lesser rate than the existing / do nothing scenario.

6.7 Arun District Council

6.7.1 It is noted that Arun District Council's current Surface Water Design Checklist notes '***Engineers cannot support any proposed connection of surface water to the foul sewer.***' This statement appears to seeks to obstruct a legal right of connection by the applicant afforded by Section 106 of the Water Industries Act 1991.

6.8 Legislation

6.8.1 Section 106 of the Water Industries Act is clear that *'the owner of any private sewer draining premises in the area of any such undertaker, shall be entitled to have his drains or sewer communicate with the public sewers of that undertaker and thereby to discharge foul water and surface water from those premises or that private sewer'.*

6.8.2 Section 106 of the Water Industries Act confirms the right to connect surface water to a public sewer.

7 Development Proposals

7.1 Description

7.1.1 The development proposals are for the redevelopment and conversion of the existing agricultural barns and two outbuildings to three residential dwellings at Stakers' Farm Barns.

7.1.2 The areas of the various positively drained elements of the proposed development are summarised as follows:

• Roof Areas	719m^2
• 10% Potential Future Urban Creep to Roof Areas	72m^2
• Paving, Access Road and Parking Areas	1087m^2
Total	1,878m^2

Table 2: Proposed Development Positively Drained Areas

7.1.3 A copy of the Proposed Site Layout Plan together with a Proposed Drained Areas Plan is located in Appendix 7 at the rear of this report.

7.2 Surface Water Design

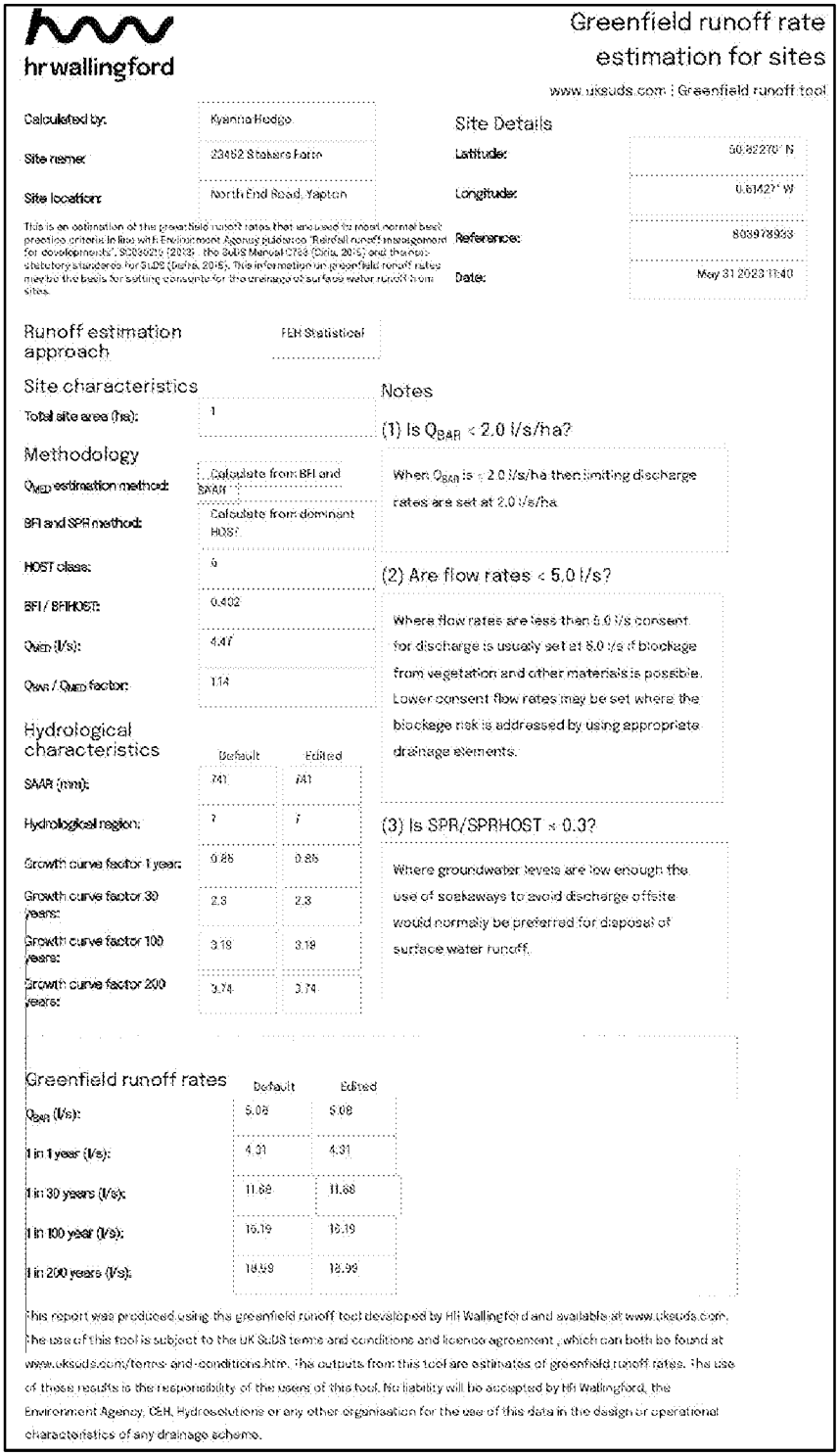
7.2.1 The surface water drainage system has been designed incorporating permeable with a 30% voided stone subbase sized to provide sufficient storage for all design rainfall events up to and including the 100 year plus 45% climate change event. Roof water collected from the converted buildings will be discharged via distribution tanks into the voided subbase beneath the permeable paving areas.

7.2.2 Surface water will be discharged to the existing onsite sewer connection at a restricted rate.

7.2.3 The voided subbase beneath 1,000m² of permeable paving will provide 212m³ of storage in total.

7.2.4 The voided subbase system will be lined with an impermeable membrane to prevent groundwater ingress to the storage system and to prevent groundwater ingress from the site to the public sewer.

7.2.5 In compliance with the Non-Technical Standards for SuDS S3 and S6 the pre-developed greenfield runoff rates for the site have been established using the HR Wallingford tool for Greenfield runoff estimation based on the FEH Statistical method for rainfall estimation.



hr wallingford

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Kyanna Hodge
Site name:	23462 Stokers Farm
Site location:	North End Road, Yapton

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance 'Rainfall runoff management for developments', SC030220 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	50.82270° N
Longitude:	0.61427° W
Reference:	803978933
Date:	May 31 2023 11:40

Runoff estimation approach: FEH Statistical

Site characteristics

Total site area (ha): 1

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Calculate from dominant HOST
HOST class:	6
BFI / BFIHOST:	0.402
Q_{MED} (l/s):	4.47
Q_{BAR} / Q_{MED} factor:	1.14

Hydrological characteristics

	Default	Edited
SAAR (mm):	741	741
Hydrological region:	7	7
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	5.08	5.08
1 in 1 year (l/s):	4.31	4.31
1 in 30 years (l/s):	11.68	11.68
1 in 100 year (l/s):	16.19	16.19
1 in 200 years (l/s):	18.99	18.99

Notes

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

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

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

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

(3) Is SPR/SPRHOST ≤ 0.3?

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

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

Image 3: Pre-Developed Greenfield Runoff Calculation

7.2.6 The Hydrology of Soil Type (HOST) has been confirmed by the National Soil Resources Institute at Cranfield University as soil type 6 which is classified as *'free draining permeable soils in unconsolidated loams or clays with low permeability and storage capacity.'*

7.2.7 The total positively drained area of the site will be 2,670m^2 and the equivalent greenfield runoffs are as follows:

• 1:1 year	at 4.31 l/s/ha	1.15 l/s
• Q_{bar} (approximate 1:2 year)	at 5.18 l/s/ha	1.38 l/s
• 1:30 year	at 11.68 l/s/ha	3.11 l/s
• 1:100 year	at 16.19 l/s/ha	4.32 l/s

Table 3: Pre-Developed Greenfield Runoff Rates

7.2.8 HR Wallingford guidance recommends a maximum restriction of 2l/s. Rates of 1l/s are however now achievable for discharges from permeable paving systems.

7.2.9 The development proposes to use a surface water of 1l/s for all storm events which provides a reduction to the predevelopment greenfield run off rate for a year return period and uses the opportunity afforded by the development to reduce the flood risk from the site to the downstream catchment.

7.2.10 Calculations based on a maximum discharge rate of 1l/s during the 1:100 year plus climate change event have been prepared in order to demonstrate that surface water drainage can be adequately accommodated within the site without any increased flood risk elsewhere.

7.2.11 The calculations confirm surface water discharge rates as follows:

Return Period	Proposed Surface Water Discharge
1:1 year	0.8 l/s
1:10 year	0.9 l/s
1:30 year	0.9 l/s
1:100 year	0.9 l/s
1:100+ 45% climate change	1.0 l/s

Table 4: Proposed Surface Water Discharge Rates

7.2.12 The calculations confirm runoff from the proposed development will not exceed the pre-developed greenfield runoff rates noted above for the equivalent return periods during any design storm duration in accordance with Standard S3 and S6 of the Non-Technical Standards for SuDS and will provide a significant reduction over the existing / do-nothing scenario run-off rates.

7.2.13 The calculations confirm the surface water drainage system is capable of containing both the 30 year and 100 year plus 45% Climate Change event on site in accordance with S7 and S8 of the Non-Technical Standards for SuDS and goes beyond those requirements by storing all water below ground level.

7.2.14 There are three proposed areas of permeable paving which are identified on the Drainage Strategy Plan, subase area 1 is required to be a minimum of 370mm in depth of 30% voided subbase and subbase areas 2 and 3, which are interconnected, required a minimum 720mm depth of 30% voided subbase.

7.2.15 The half drain time of 1,470 minutes (approximately 24.5 hours) for the 100 year plus Climate Change event is considered suitable to allow sufficient capacity within the system for any subsequent storm event.

7.3 Foul Water Design

7.3.1 The anticipated peak foul water discharge from the site has been calculated in accordance with Sewerage Sector Guidance Design and Construction Guidance as 0.14 l/s.

7.3.2 The existing gravity connection to the public foul sewer located beneath North End Road will be reused for the proposed development.

7.4 Betterment to the Public Sewer

7.4.1 The total proposed discharge to the public sewer from the site is a combination of the proposed peak foul water flow and the restricted surface water flows from design rainfall events.

7.4.2 The proposed combined site discharge to the public sewer for all design rainfall events is as follows:

Return Period	Proposed Surface Water Discharge	Peak Foul Discharge	Total Combined Peak Discharge
1:1 year	0.8 l/s	0.14 l/s	0.94 l/s
1:10 year	0.9 l/s	0.14 l/s	1.04 l/s
1:30 year	0.9 l/s	0.14l l/s	1.04 l/s
1:100 year	0.9 l/s	0.14 l/s	1.04 l/s
1:100+ 45% climate change	1.0 l/s	0.14 l/s	1.14 l/s

Table 5: Proposed Combined Peak Discharge to Public Sewer

7.4.3 The proposed combined peak discharge from the site during a 100 year plus 45% climate change rainfall event is 1.14l /s. This is lower than the predevelopment 1 in 1 year greenfield run off from the site calculated as 1.15l/s.

7.4.4 The proposed combined peak discharge from the site for the 100 year plus 45% climate change event of 1.14l/s is also significantly lower than the existing / do nothing 1 year return period rainfall discharge from the site calculated as 17.9l/s.

7.4.5 The peak discharge from the proposed 1 year return period event is 0.94 l/s which is a reduction in discharge rate of 16.96l/s when compared to the same 1 year return period event for the existing site / do nothing scenario.

7.4.6 The development proposals will provide significant betterment for all storm events up to and including the 100 year plus climate change event and will hold the additional flow during those events up to the 100 year plus climate change event within the proposed SuDS system, preventing overland flow leaving the site during those events, further reducing the flood risk to the downstream catchment when compared to the existing/ do nothing scenario.

7.4.7 A copy of the Drainage Strategy Plan and Construction Details Plans together with Causeway Flow Calculations for the proposed drainage system are located in Appendix 8 at the rear of this report.

7.5 Southern Water Consultation

7.5.1 Southern Water have been consulted under Section 106 of the Water Industry Act 1991 on the above proposals and their planning and technical team have agreed to accept a surface water discharge of 1l/s to the public foul sewer (email 7 January 2025) as follows:

S106 Sewer Connections Application Reference – 18493

Site: Stakers Farm, North End Road, Yapton, West Sussex, BN18 0DU

I am emailing in regards to an update for one of your sites, whereby a S106 application has been submitted, for Stakers Farm.

I have had an in depth meeting and conversations with planning on your behalf and I am pleased to confirm that planning are to allow the connection of surface water to the public foul sewer asset as per your submitted plans. Therefore, Southern Water will now accept a surface water flow rate of the 1L/S which is a betterment of the existing 17.9L/S. The reason for this, it that you have clearly explored every other option available. You have submitted all the evidence detailing every conversation with relevant third parties.

As you are aware, Southern Water are no longer accepting any surface water into foul drainage networks. However, in this isolated instance every other avenue has been explored via the agreed Part H3 process of the building regulations.

As discussed on the phone, I have conducted a fully comprehensive technical review of your application and kindly require the below to be confirmed / clarified before approval can be given:

1. *The approved copy of the planning consent for this development, including details of any conditions that have been imposed by the Planning Authority.*

Once the above has been received, your S106 application will be approved and I will complete and upload the approval letter as a priority.

7.5.2 Copies of the correspondence with Southern Water are located in Appendix 9 at the rear of this report.

7.6 Water Quality

7.6.1 The proposed development is for residential use. In accordance with CIRIA SuDS Manual 2015 (Report C753), the pollution hazard level for this type of development is between very low and low.

7.6.2 The surface water scheme will include mitigation to ensure that surface water is suitably treated and any pollution risk adequately managed prior to discharge.

7.6.3 Table 26.2 in Chapter 26 of CIRIA report C753 The SuDS Manual provides Pollution Hazard Indices for varying land types. Those of relevance to the development proposals are as follows:

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car park, low-traffic roads	Low	0.5	0.4	0.4

Table 6: Pollution Hazard Indices

7.6.4 The proposed use of permeable paving will meet the target treatment level required for runoff with very low to low risk of pollution hazard thus demonstrating that the surface water drainage system for the site can be designed to adequately mitigate against the risk of pollution.

SuDS Type	Total suspended solids (TSS)	Metals	Hydro-carbons
Permeable pavement	0.7	0.6	0.7

Table 7: Pollution Mitigation Indices

7.6.5 A Draft Drainage Maintenance and Management Schedule is located in Appendix 10 at the rear of this report.

7.7 Risk to Others

7.7.1 The proposed surface water drainage system has been designed to current standards incorporating SuDS elements providing attenuation and storage which will minimise runoff leaving the site during times of heavy rain.

7.7.2 Allowance has been made for a 45% increase in rainfall intensities which accords with the latest figures published by the Environment Agency and in accordance with the requirements under the National Planning Policy Framework.

7.7.3 The proposed drainage system will incorporate sufficient treatment prior to final discharge thus mitigating the risk of pollution from the site.

7.7.4 The foul and surface water discharge to the public foul sewer from the site has been reduced to a maximum of 1.14l.s under all rainfall events up to and including the 100 year plus 45% climate change event.

7.7.5 This reduction in discharge rate and provision of on site storage to cater for the 100 year plus climate change event reduces the downstream risk of flooding from the existing site for all storm events when compared against the do nothing scenario.

7.7.6 Impact on Lidsey Wastewater Treatment Works

7.7.6.1 The current site discharges unrestricted surface water to the public sewer at a calculated rate of 17.9l/s for the 1 year return period rainfall event as noted earlier in the report. In the existing / do-nothing scenario this discharge remains active.

7.7.6.2 The proposed development will reduce the total peak discharge to the public sewer to a maximum of 1.14l/s (surface water and peak foul flow) thereby reducing the discharge to the Lidsey Wastewater Treatment Works by at least 16.76 l/s for all design storms and therefore provides a benefit to the operation of the existing sewer network, the downstream foul water catchment and Lidsey Wastewater Treatment Works.

7.7.7 The proposed development reduces the risk of sewer flooding from this development for the foreseeable future.

7.8 Surface Water Exceedance Routes

7.8.1 In the event that part of the onsite surface water drainage network was to become blocked or suffer a failure due to lack of maintenance surface water would migrate overland towards North End Road mimicking the existing surface water exceedance route.

7.8.2 In the event of a storm return period in excess of the 100 year +45% design standard surface water surface water would flow overland to North End Road then via the local highway network towards the coast.

7.8.3 There is no increase in flood risk to the downstream catchment for the development proposals.

7.8.4 Copies of the Existing and Proposed Exceedance Routes Plans are located in Appendix 11 at the rear of this report.

8 Conclusions

8.1 A suitable SuDS drainage system is proposed which accords with the requirements of Non-Technical Standard for SuDS S3, S6, S7 and S8 and NPPF.

8.2 Southern Water have agreed surface water will be discharged at a restricted rate of 1l/s to the existing public foul sewer beneath North End Road using the existing on-site surface water connection, providing benefit to their public sewer network.

8.3 Calculations confirm that surface water runoff generated by the proposed development can be attenuated on site for all rainfall events up to the 1:100 year event including an allowance for climate change.

8.4 The proposal will implement a restricted discharge to reduce the peak run off to that sewer for all storm events up to and including the 100 year plus 45% Climate Change event in accordance with S3 and S6 of the Non-Statutory Standards for SuDS.

8.5 Surface water storage will also be provided within the proposed onsite system to ensure there is no flooding of the drainage system or site for the 30 year and 100 year plus 45% climate change rainfall events in accordance with S7 and S8 of the Non-Technical Standards for SuDS.

8.6 Water quality improvement will be provided to mitigate against any pollution risk to the downstream catchment.

8.7 Foul water will be discharged to the existing public foul sewer located beneath North End Road using the existing onsite connection.

8.8 The total combined (foul and surface water) peak discharge from the site to the public sewer will be a maximum of 1.14l/s for all scenarios up to and included the 100 year plus 45% Climate Change rainfall event providing a minimum betterment 16.76 l/s when compared against the existing / do nothing scenario for an average annual rainfall event.

8.9 The proposed peak discharge rates all provide significant betterment when compared to the existing / do nothing discharge rates and will therefore also reduce flood risk to the downstream sewer network and Lidsey Wastewater Treatment Plant.

8.10 A suitable surface water and foul water drainage system has been designed to accommodate the anticipated flows from the proposed development and in terms of drainage the development proposals are suitable at this location.

9 List of Appendices, Images and Tables

Appendix 1

Site Location Plan

N

West Barnham

Barnham

Barnham

Lower Farm

North End

Long Barn

Education Facility

SITE LOCATION

Yapton

-100m 0 100m 200m 300m 400m

Guildford
Reigate
Farnham
Godalming
Alton
Basingstoke
Crawley
Horsham
Petersfield
Billingshurst
South Downs National Park
Burgess Hill
Arundel
CHICHESTER
Littlehampton
BRIGHTON AND HO
Sea

TITLE
Site Location Plan - Stakers Farm, Yapton
BN18 0DU - OS Ref: SU 797 035

SCALE	PROJECT No.
1:10000 @ A3	23452
REPORT TYPE	DRG. No.
DS	01 -

ARUN DISTRICT COUNCIL Y15/25/PL

Appendix 2

Existing Site Layout Plan

TITLE
Existing Site Layout Plan

SCALE	PROJECT. No.
1:500 @ A3	22452
REPORT TYPE	DRG. No.
DS	02 -

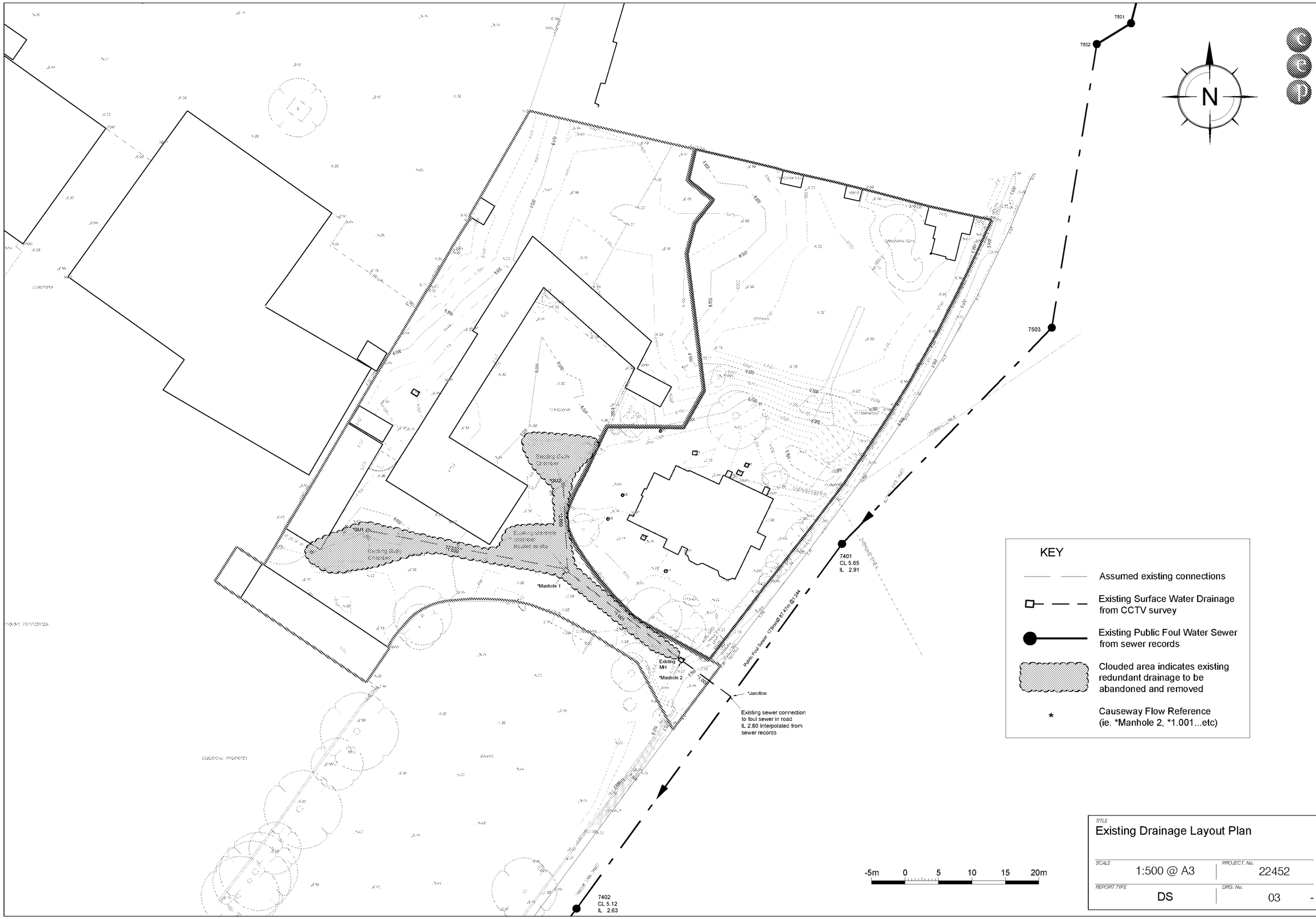
ARUN DISTRICT COUNCIL Y/15/25/PL

Appendix 3

Existing Drainage Plan, Existing Drained Areas Plan

and

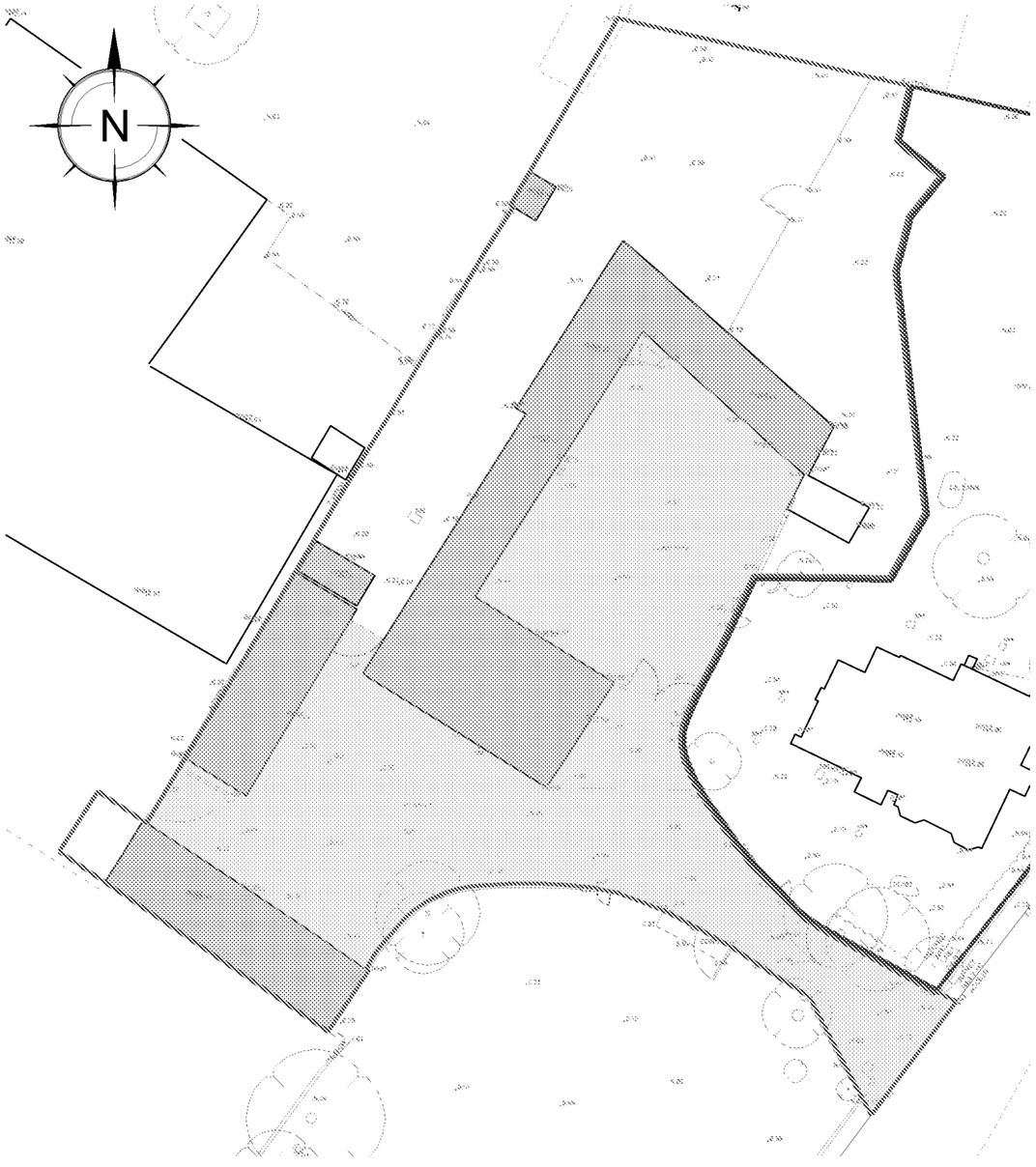
Calculations



TITLE
Existing Drainage Layout Plan

SCALE	PROJECT. No.
1:500 @ A3	22452
REPORT TYPE	DRG. No.
DS	03 -

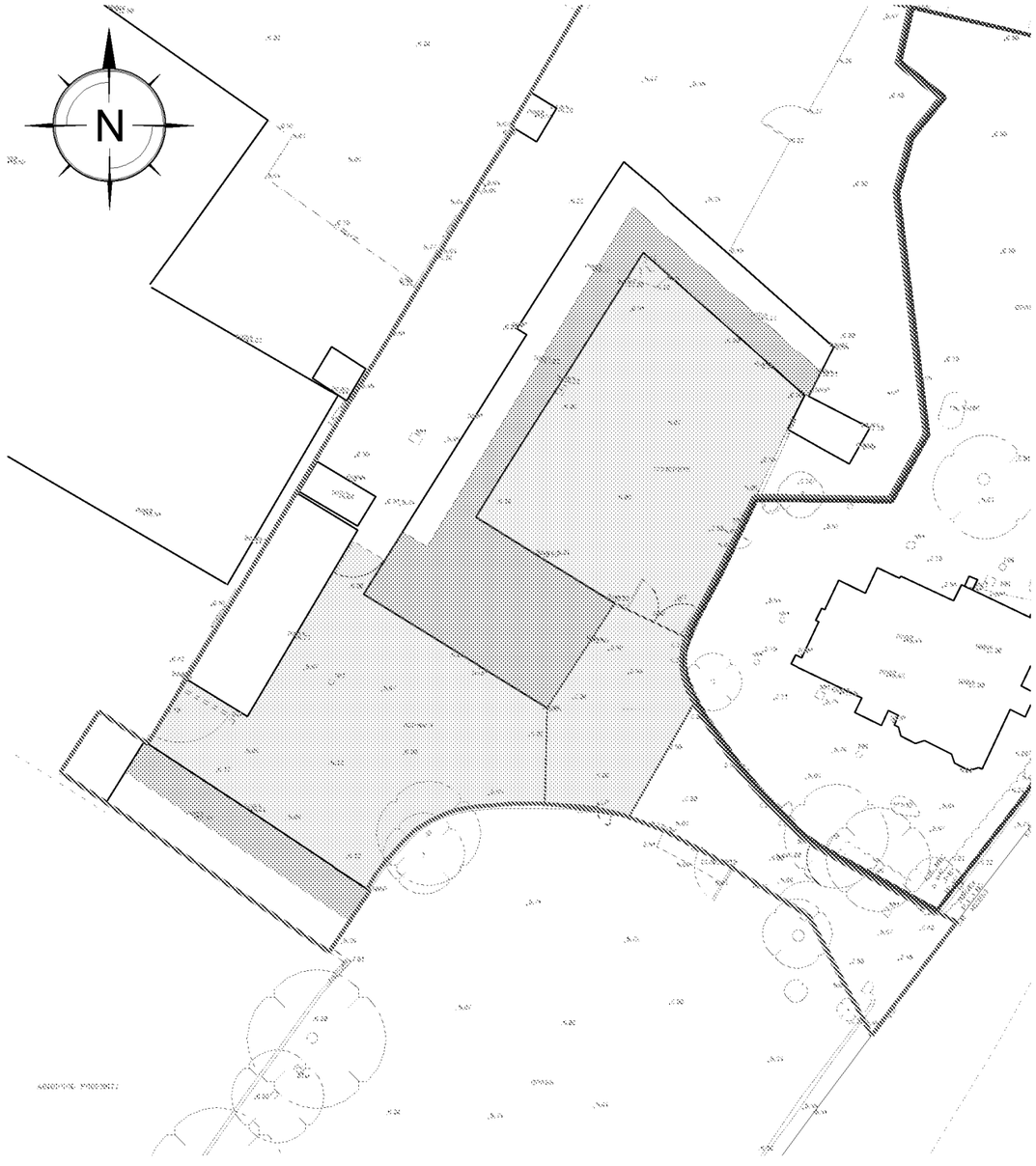
ARUN DISTRICT COUNCIL Y/15/25/PL



EXISTING SITE PLAN
(Scale 1:500)

Key

- Existing Roofs 705m²
- Existing Impermeable surfaces 1318m²
- Red Line Boundary 5611m²



AREAS TO EXISTING DRAINAGE NETWORK
(Scale 1:500)

Key

- Existing Roofs 367m²
- Existing Impermeable surfaces 1098m²
- Red Line Boundary 5611m²

-5m 0 5 10 15 20m

TITLE
Existing Drainage Areas Plan

SCALE	PROJECT. No.
1:500 @ A3	23452
REPORT TYPE	DRG. No.
DS	04 -

ARUN DISTRICT COUNCIL Y/15/25/FL

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	1	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	1.000
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	150.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
GU1	0.065	5.00	5.977	900	675	497681.675	103485.639	0.900
GU2	0.066	5.00	5.838	900	675	497709.037	103492.829	0.900
1	0.016	5.00	5.921	1200		497709.740	103479.819	1.200
2			5.635	900	900	497726.716	103466.642	2.685
Junction			5.400			497734.079	103461.162	2.600

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	GU1	1	28.662	0.600	5.077	4.721	0.356	80.5	150	5.43	26.9
2.000	GU2	1	13.029	0.600	4.938	4.721	0.217	60.0	150	5.17	37.6
1.001	1	2	21.490	0.600	4.721	2.950	1.771	12.1	150	5.55	36.5
1.002	2	Junction	9.179	0.600	2.950	2.800	0.150	61.2	150	5.67	26.2

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.121	19.8	8.7	0.750	1.050	0.065	0.0	69	1.084
2.000	1.300	23.0	9.0	0.750	1.050	0.066	0.0	65	1.218
1.001	2.908	51.4	19.4	1.050	2.535	0.147	0.0	64	2.703
1.002	1.288	22.8	19.2	2.535	2.450	0.147	0.0	106	1.440

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	28.662	80.5	150	Circular	5.977	5.077	0.750	5.921	4.721	1.050
2.000	13.029	60.0	150	Circular	5.838	4.938	0.750	5.921	4.721	1.050
1.001	21.490	12.1	150	Circular	5.921	4.721	1.050	5.635	2.950	2.535
1.002	9.179	61.2	150	Circular	5.635	2.950	2.535	5.400	2.800	2.450

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
1.000	GU1	900	675	Manhole	Adoptable	1	1200		Manhole	Adoptable
2.000	GU2	900	675	Manhole	Adoptable	1	1200		Manhole	Adoptable
1.001	1	1200		Manhole	Adoptable	2	900	900	Manhole	Adoptable
1.002	2	900	900	Manhole	Adoptable	Junction			Junction	

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
10	0	0	0
30	0	0	0
100	0	0	0
100	45	0	0

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	GU1	10	5.146	0.069	8.1	0.0419	0.0000	OK
15 minute summer	GU2	10	5.003	0.065	8.2	0.0395	0.0000	OK
15 minute summer	1	10	4.782	0.061	18.1	0.0694	0.0000	OK
15 minute summer	2	11	3.056	0.106	18.0	0.0857	0.0000	OK
15 minute summer	Junction	11	2.900	0.100	17.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	GU1	1.000	1	8.0	1.092	0.404	0.2101	
15 minute summer	GU2	2.000	1	8.1	1.157	0.354	0.0917	
15 minute summer	1	1.001	2	18.0	1.787	0.350	0.2151	
15 minute summer	2	1.002	Junction	17.9	1.391	0.788	0.1183	7.9

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	GU1	10	5.165	0.088	12.2	0.0538	0.0000	OK
15 minute summer	GU2	10	5.021	0.083	12.3	0.0505	0.0000	OK
15 minute summer	1	10	4.799	0.078	27.3	0.0877	0.0000	OK
15 minute summer	2	11	3.189	0.239	27.1	0.1936	0.0000	SURCHARGED
15 minute summer	Junction	11	2.941	0.141	27.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	GU1	1.000	1	12.1	1.205	0.608	0.2865	
15 minute summer	GU2	2.000	1	12.2	1.274	0.532	0.1250	
15 minute summer	1	1.001	2	27.1	1.865	0.527	0.2878	
15 minute summer	2	1.002	Junction	27.0	1.531	1.185	0.1596	11.9

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	GU1	12	5.656	0.579	23.7	0.3520	0.0000	SURCHARGED
15 minute summer	GU2	12	5.450	0.512	24.1	0.3115	0.0000	SURCHARGED
15 minute summer	1	12	5.246	0.525	47.9	0.5935	0.0000	SURCHARGED
15 minute summer	2	12	3.620	0.670	44.9	0.5428	0.0000	SURCHARGED
15 minute summer	Junction	8	2.942	0.142	44.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	GU1	1.000	1	20.3	1.266	1.025	0.5046	
15 minute summer	GU2	2.000	1	22.0	1.382	0.958	0.2294	
15 minute summer	1	1.001	2	44.9	2.558	0.874	0.3783	
15 minute summer	2	1.002	Junction	44.6	2.531	1.958	0.1600	23.5

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	GU1	10	5.977	0.900	30.7	0.5472	1.4172	FLOOD
15 minute summer	GU2	11	5.838	0.900	31.1	0.5472	0.6274	FLOOD
15 minute summer	1	11	5.591	0.870	53.6	0.9844	0.0000	SURCHARGED
15 minute summer	2	12	3.722	0.772	47.9	0.6254	0.0000	SURCHARGED
15 minute summer	Junction	8	2.942	0.142	47.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	GU1	1.000	1	21.8	1.241	1.103	0.5046	
15 minute summer	GU2	2.000	1	24.2	1.372	1.051	0.2294	
15 minute summer	1	1.001	2	47.9	2.724	0.933	0.3783	
15 minute summer	2	1.002	Junction	47.8	2.715	2.101	0.1600	28.2

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	GU1	9	5.977	0.900	38.4	0.5472	3.7929	FLOOD
30 minute summer	GU2	17	5.838	0.900	35.8	0.5472	2.7095	FLOOD
15 minute summer	1	10	5.618	0.897	57.3	1.0144	0.0000	SURCHARGED
15 minute summer	2	11	3.732	0.782	48.2	0.6333	0.0000	SURCHARGED
15 minute summer	Junction	7	2.942	0.142	48.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	GU1	1.000	1	22.6	1.282	1.139	0.5046	
30 minute summer	GU2	2.000	1	23.7	1.386	1.033	0.2294	
15 minute summer	1	1.001	2	48.2	2.740	0.939	0.3783	
15 minute summer	2	1.002	Junction	48.1	2.732	2.113	0.1600	31.2

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	GU1	15	5.977	0.900	51.2	0.5472	10.0729	FLOOD
15 minute summer	GU2	9	5.838	0.900	56.5	0.5472	9.4525	FLOOD
15 minute summer	1	10	5.669	0.948	61.0	1.0722	0.0000	FLOOD RISK
15 minute summer	2	11	3.747	0.797	48.6	0.6453	0.0000	SURCHARGED
15 minute summer	Junction	6	2.942	0.142	48.5	0.0000	0.0000	OK

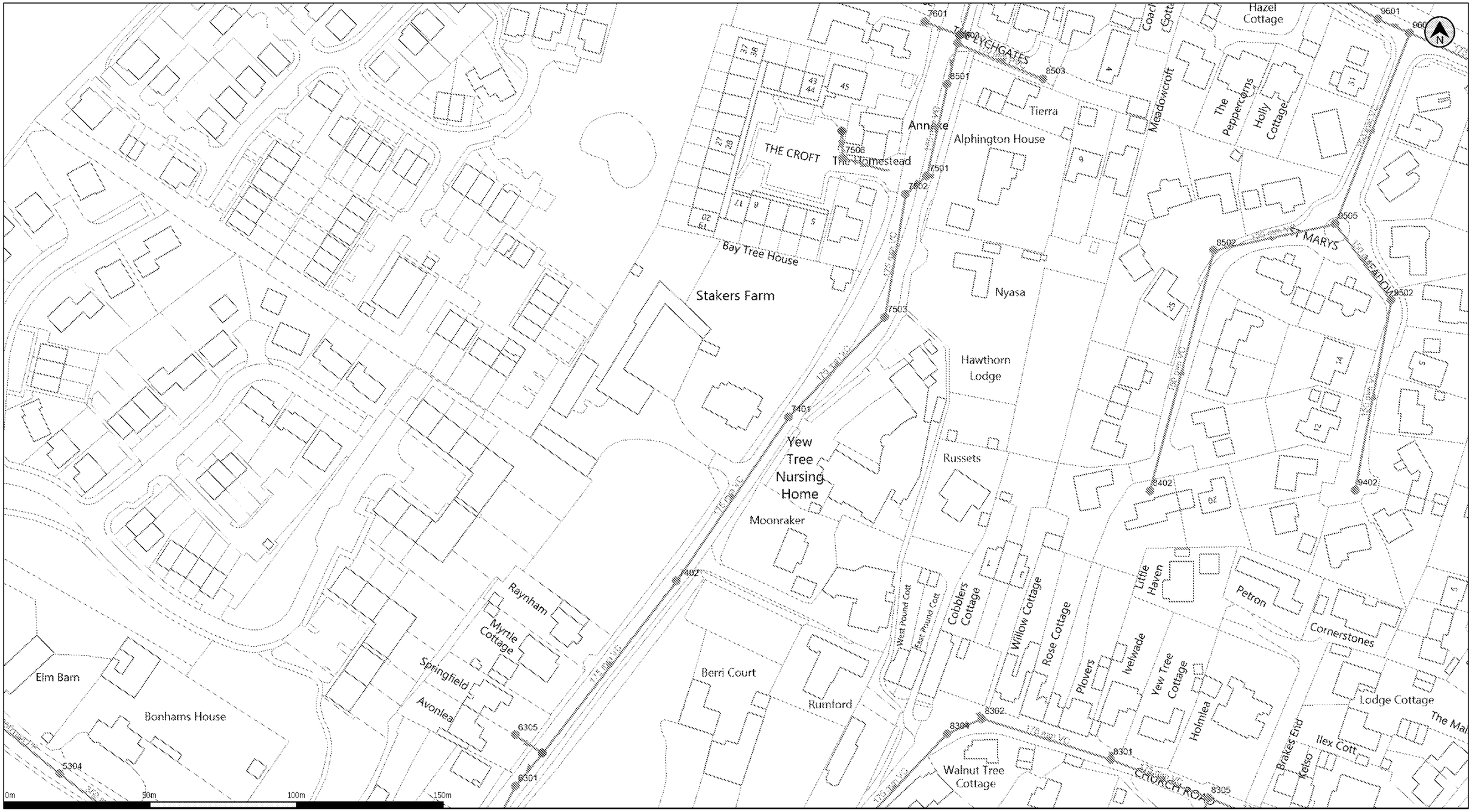
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	GU1	1.000	1	23.1	1.311	1.165	0.5046	
15 minute summer	GU2	2.000	1	26.9	1.531	1.173	0.2294	
15 minute summer	1	1.001	2	48.6	2.763	0.947	0.3783	
15 minute summer	2	1.002	Junction	48.5	2.758	2.133	0.1600	36.3

Appendix 4

Sewer Records, Highway Drainage Records

And

Correspondence with the Highway Authority

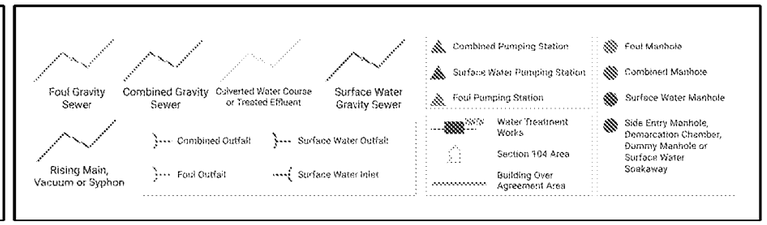


(c) Crown copyright and database rights 2024 Ordnance Survey AC0000808122 | Date: 01/11/24 | Scale: 1:1250 | Map Centre: 497731,103487 | Data updated: 28/10/24 | Our Ref: 1609915 - 1 | Wastewater Plan A3 Powered by digdat

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. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2024 Ordnance Survey AC0000808122 .This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

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



mat@civil.co.uk

23452 Stakers

Water for Life

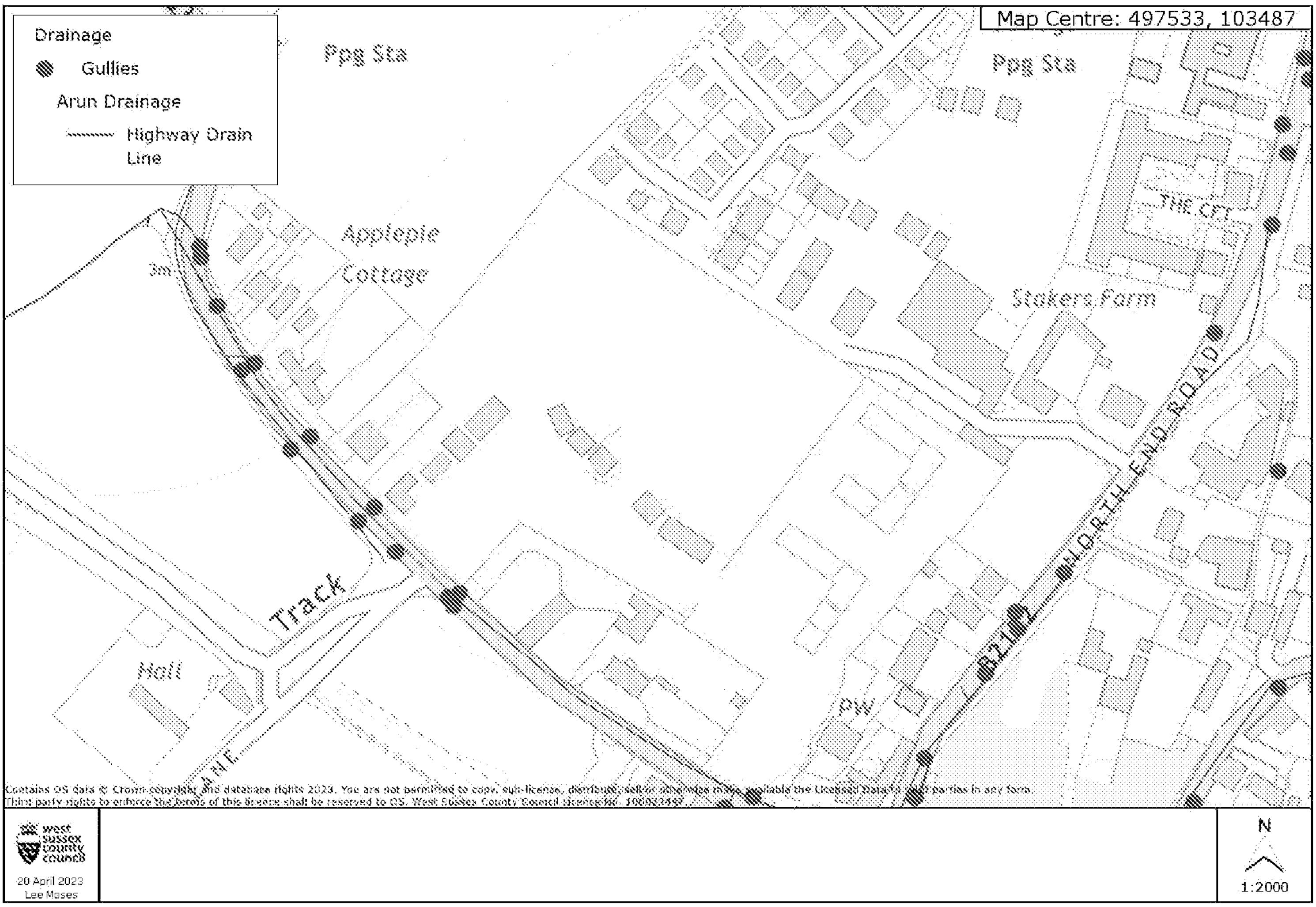
Southern Water

ARUN DISTRICT COUNCIL Y/15/25/PL

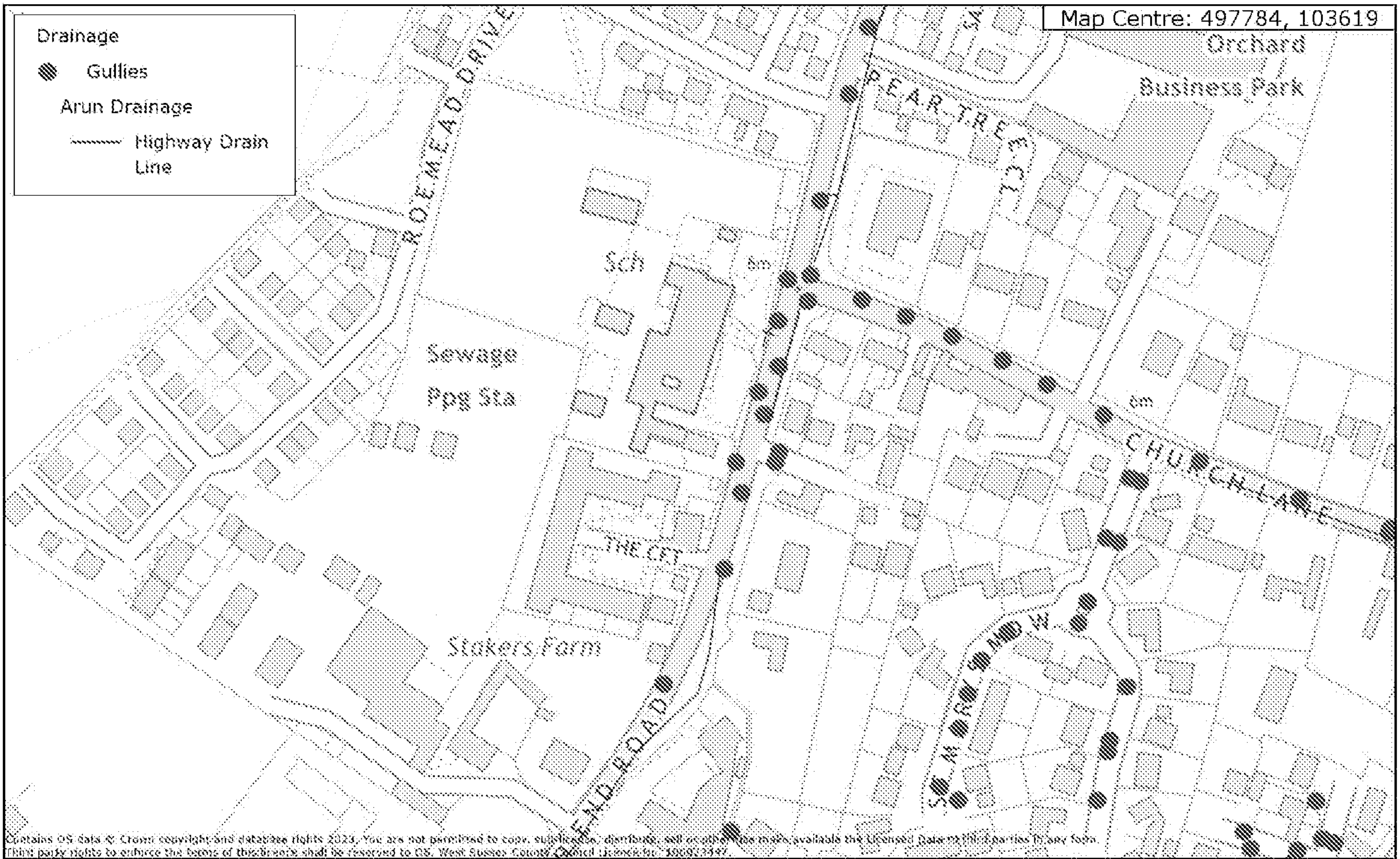
Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
5304	F	5.33	1.81	
6301	F	4.63	2.37	
6305	F	0.00	0.00	
7401	F	5.65	2.91	
7402	F	5.12	2.63	
7501	F	5.75	3.23	
7502	F	5.58	3.22	
7503	F	5.47	3.02	
7506	F	0.00	0.00	
7601	F	0.00	0.00	
8301	F	4.97	3.82	
8302	F	5.26	3.63	
8304	F	5.39	3.58	
8305	F	5.20	3.92	
8402	F	7.33	6.07	
8501	F	5.80	3.32	
8502	F	6.98	5.16	
8503	F	6.83	5.47	
8603	F	6.03	3.67	
9402	F	6.99	5.79	
9502	F	6.93	5.05	
9505	F	7.03	0.00	
9601	F	6.25	3.98	
9603	F	6.29	0.00	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

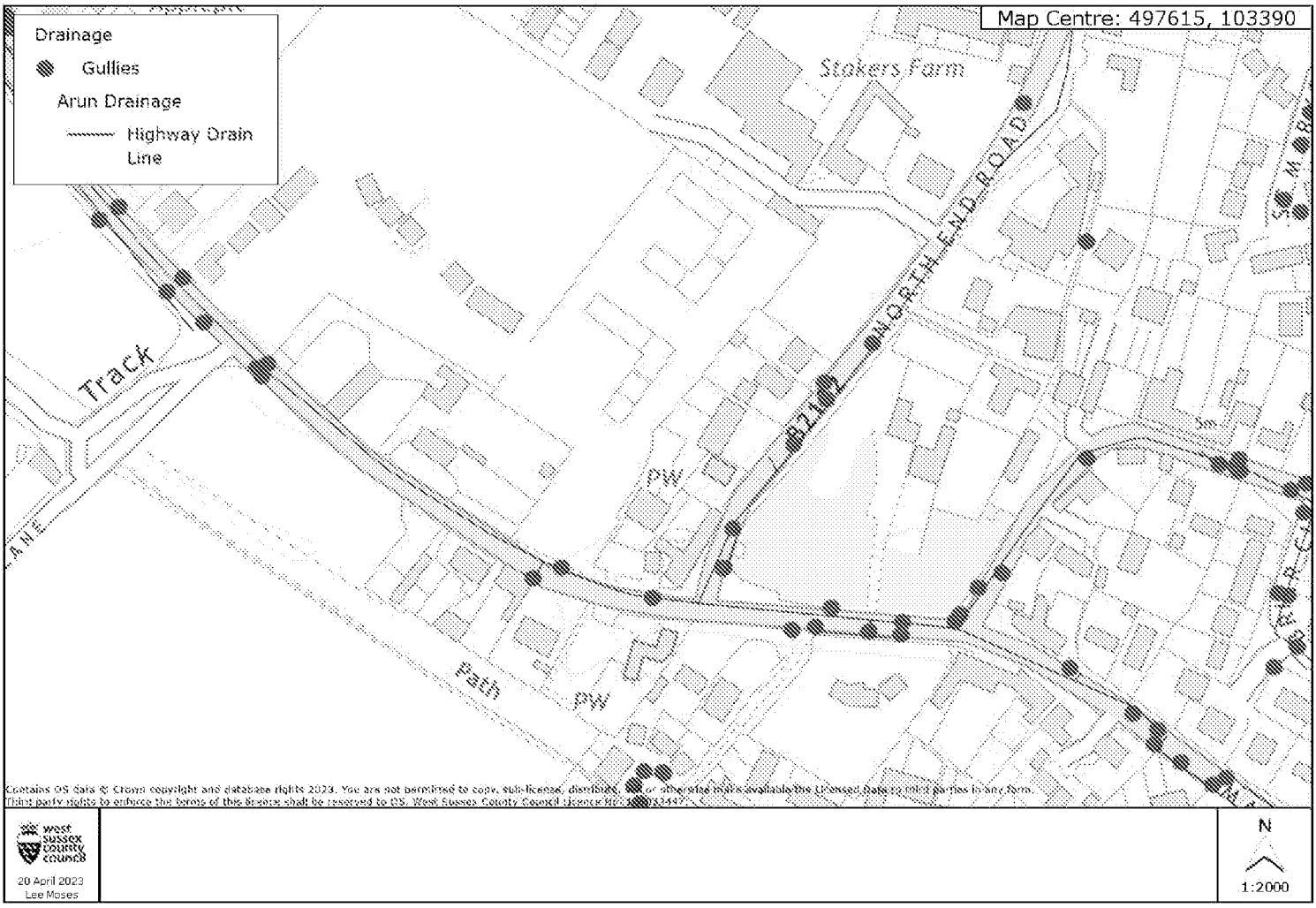


Map Centre: 497533, 103487
Drainage
Gullies
Arun Drainage
Highway Drain Line
Ppg Sta
Ppg Sta
Applepie Cottage
Stokers Farm
THE CFT
Track
Hall
PW
B2132
NORTH END ROAD
3m
Contains OS data © Crown copyright and database rights 2023.
West Sussex County Council
20 April 2023
Lee Moses
N
1:2000



west sussex county council
20 April 2023
Lee Moses

N
1:2000


Map Centre: 497615, 103390
Drainage
Gullies
Arun Drainage
Highway Drain Line
Stokers Farm
NORTH END ROAD
B2132
Track
Path
PW
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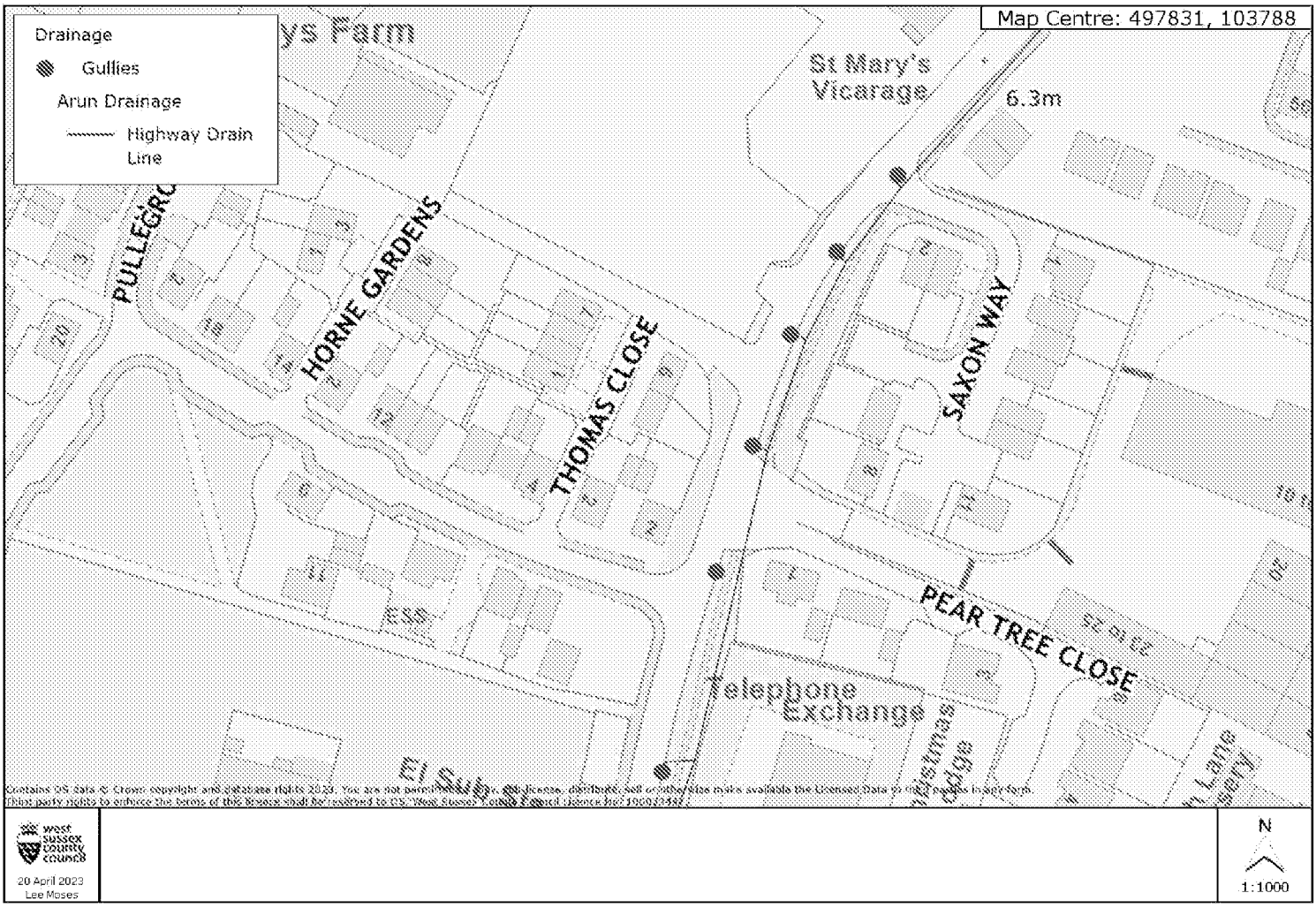
Third party rights to enforce the terms of this licence shall be reserved to OS. West Sussex County Council Licence No. 100053447.
west sussex county council
20 April 2023
Lee Moses
N
1:2000


Drainage
Gullies
Arun Drainage
Highway Drain Line
Map Centre: 497831, 103788
St Mary's Vicarage
6.3m
HORNE GARDENS
THOMAS CLOSE
SAXON WAY
PEAR TREE CLOSE
Telephone Exchange
Contains OS data © Crown copyright and database rights 2023. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS. West Sussex County Council licence no. 100031443
20 April 2023
Lee Moses
N
1:1000

From: Lee Moses <Lee.Moses@westsussex.gov.uk>
Sent: 08 November 2022 16:14
To: Kyanna Hodge; Kevin Macknay
Cc: CEP | Reception
Subject: FW: 23452 Stakers Farm, Yapton
Attachments: 101_Site Location Plan A3.pdf; 102_Existing Site Layout Plan A3.pdf; YAP-S278-04C Section 278 Drainage Layout.pdf

Hi Kyanna,
Thank you for the email,

I have attached a drawing (YAP-S278-04c) from the Dandara development that has just been built at Stakers Farm, The existing surface water network is not in very good condition so we did not allow Dandara to connect to existing, instead they had to build a soakaway on the their land to take the highways surface water.

I have copied in Kevin Macknay who is the WSCC drainage lead, he may allow a connection if the existing system can be improved somewhere.

Kind regards

Lee Moses

Engineer, Highway Agreements,
Planned Delivery,
West Sussex County Council.

CALL IM EMAIL
Location: Ground Floor Northleigh, County Hall, Chichester, West Sussex, PO19 1RH
Contact: Internal: 22088 | External: +44 (0)330 2222088 | E-mail: lee.moses@westsussex.gov.uk

From: Kyanna Hodge <[redacted]
Sent: 08 November 2022 15:46
To: Lee Moses <Lee.Moses@westsussex.gov.uk>
Cc: CEP | Reception <rec[redacted]
Subject: 23452 Stakers Farm, Yapton

****EXTERNAL****

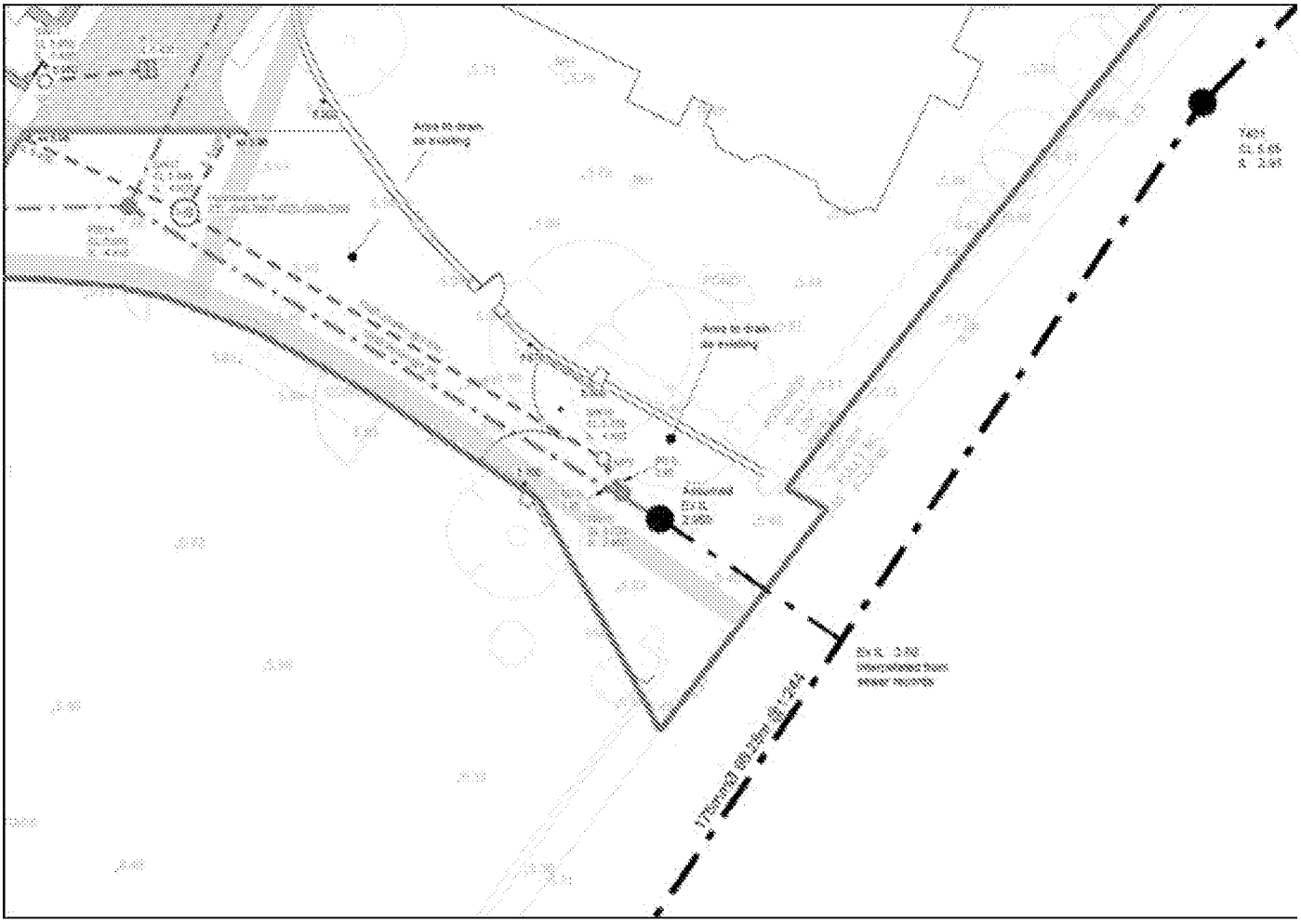
Hi Lee

Stuart has asked me to contact you in relation to the above site.

Attached is the site location plan and existing site layout.

We are exploring the potential of connecting to any West Sussex existing drainage network within the area.

Would you be able provide us with a plan showing the existing highway drain near our site and may we connect to any existing highway drain?
We are proposing to discharge surface water at 2l/s via a hydrobrake at the proposed access. See image below (surface water currently being discharged into the public foul sewer)



Look forward to hearing from you regarding this or if you can suggest someone who might be able to help, this will also be greatly appreciated.

Kind Regards,
Kyanna

Kyanna Hodge

[redacted]

The Civil Engineering Practice
11 Tungsten Building
George Street
Fishersgate
Sussex
[redacted]

From: Kevin Macknay <kevin.macknay@westsussex.gov.uk>
Sent: 09 December 2022 15:19
To: Kyanna Hodge
Cc: CEP | Reception; Lee Moses; Stuart Magowan
Subject: RE: 23452 Stakers Farm, Yapton - Existing Drainage Network

Kyanna,

The existing highway drainage along North End Road is only 150mm and as you say not in the best condition. It joins a 225mm dia. network that runs west at the junction of North End Road with Main Road and then discharges into a culverted watercourse some 450m west. The junction of North End Road with Main Road often floods. Therefore, the possibility of a private connection to the existing highway drainage network will be very limited without a significant upgrade of the existing highway system.

Regards,

Kevin

Kevin Macknay
Drainage and Flooding Lead Professional
Highways, Transport and Planning
Place Services
West Sussex County Council

CALL IM EMAIL
Location: West Sussex County Council, 1st Floor, Northleigh, County Hall, Chichester PO19 1RQ
Contact: Internal: 26429 | External: +44 (0)330 222 6429 | Mobile: +44 (0)7540 641819
E-mail: kevin.macknay@westsussex.gov.uk

Report a problem with a road or pavement or raise a highways related enquiry
Follow us at @WSHighways

From: Kyanna Hodge <[redacted]
Sent: 09 December 2022 13:40
To: Kevin Macknay <kevin.macknay@westsussex.gov.uk>
Cc: CEP | Reception <[redacted]Lee Moses <Lee.Moses@westsussex.gov.uk>; Stuart Magowan [redacted]
Subject: RE: 23452 Stakers Farm, Yapton - Existing Drainage Network

****EXTERNAL****

Hi Kevin

Following the email from Lee Moses below, Arun District Council is insisting on making sure we provide all possible options; i.e exploring if a connection can be made to the existing highway drain despite the network in that area not being in good condition.

Can you please provide us with a response on whether or not a connection to the existing network is possible ?

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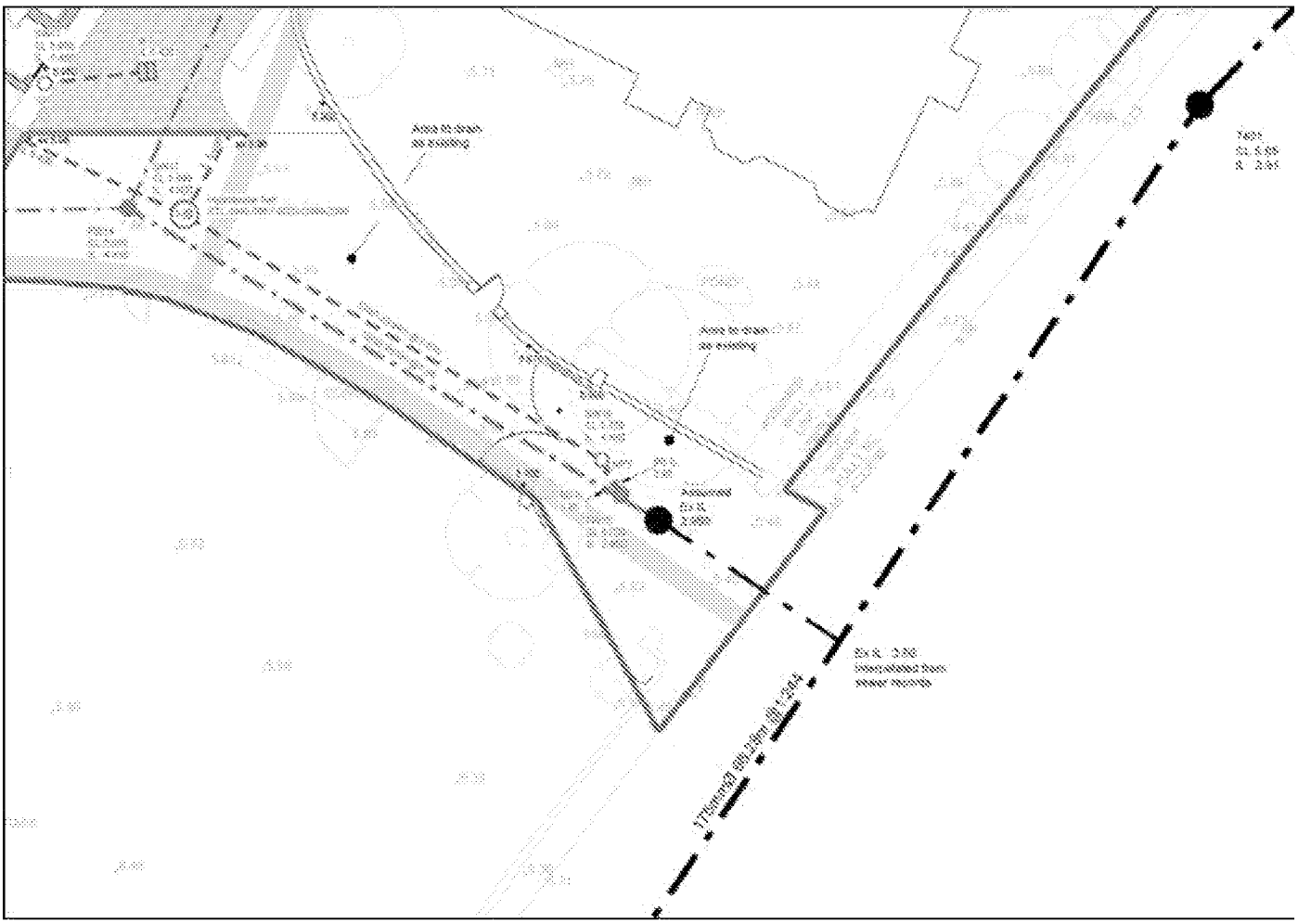

Hope to hear from you soon regarding this.

Kind Regards,
Kyanna

Kyanna Hodge
C
K

The Civil Engineering Practice
11 Tungsten Building
George Street
Fishersgate
Sussex
BN41 1RA
T

All communications to the Civil Engineering Practice must be via telephone, email or letter. We do not monitor or respond to messages received by any other means.

From: Kevin Macknay
To: Stuart Magowan
Cc: CEP | Reception; Lee Moses
Subject: RE: 23452 Stakers Farm, Yapton - Existing Drainage Network
Date: 06 January 2025 15:24:22
Attachments: image002.gif
image003.gif
image004.gif
image007.png
image006.jpg
image009.jpg
image010.jpg
Green Pond Corner.pdf
North End Road.pdf

Stuart,

What we know about the existing highway system in North End Road:

- From the access to 'Stakers Farm' to its outfall, the system is piped and approx. 950m long.
- The system is made up of 150mm pipe in North End Road. 225mm pipe along the B2233 Main Road, and 225/300mm pipe below the existing ditch line and under the old canal. The system discharges into open ditch approx. 200m from the old canal.
- The 150mm system along North End Road is generally around 1.2-1.5m deep and is not in the best condition due mainly to root infestation.
- The system along the B2233 Main Road is generally in good condition, but is very deep, generally between 3-3.5m. The system is prone to siltation, very likely because of the poor gradient.
- The system below the existing ditch line and under the old canal we understand was laid because of health and environmental reasons, as the pipe once took waste from the old Yapton abattoir. The pipe was laid in the bottom of the old ditch line and is not in the best condition, open joints and laid to poor levels.
- The piped system follows the 'blue dotted' line on the North End Road plan.
- The 'Green Pond Corner' plan shows what we know about the systems in this area.

Hope this information is helpful.

Regards,

Kevin

Kevin Macknay
Drainage and Flooding Lead Professional
Highways, Transport and Planning
Place Services
West Sussex County Council

Location: West Sussex County Council, 1st Floor, Northleigh, County Hall, Chichester PO19 1RQ
Contact: Internal: 25429 | External: +44 (0)330 222 5429 | Mobile: +44 (0)7540 641819
E-mail: kevin.macknay@westsussex.gov.uk

Report a problem with a road or pavement or raise a highways related enquiry
Follow us at @WSHighways

From: Stuart Magowan <[redacted]
Sent: Monday, January 6, 2025 10:32 AM
To: Kevin Macknay <kevin.macknay@westsussex.gov.uk>
Cc: CEP | Reception <[redacted]>; Lee Moses <Lee.Moses@westsussex.gov.uk>
Subject: RE: 23452 Stakers Farm, Yapton - Existing Drainage Network

****EXTERNAL****

Hi Kevin

Happy New Year to you.

We are still working on a surface water drainage solution for this site and need to exhaust all possible surface water options.

Further to your email below to Kyanna, who has since left the practice, we understand that the highway drain in the area floods regularly and that a connection without significant upgrades to the network would not be accepted.

Are you able to confirm if the Highway Authority has undertaken any works to identify what upgrades would be required to prevent the current regular flooding of the network?

Whilst this would not confirm capacity for this site it may give an indication of the likely scale of works required and we may then be able to work with yourselves and Southern Water to provide some further uplift to the scheme that could potentially provide a wider benefit.

If no works / plans to resolve the current flooding of the highway drainage network has been undertaken by the Highway Authority I would be grateful if you would confirm as such.

Regards

Stuart

Stuart Magowan

[redacted]

From: Kevin Macknay <kevin.macknay@westsussex.gov.uk>
Sent: 09 December 2022 15:19
To: Kyanna Hodge <[redacted]
Cc: CEP | Reception <[redacted]; Lee Moses <Lee.Moses@westsussex.gov.uk>; Stuart Magowan <[redacted]
Subject: RE: 23452 Stakers Farm, Yapton - Existing Drainage Network

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Kevin Macknay
Drainage and Flooding Lead Professional
Highways, Transport and Planning
Place Services
West Sussex County Council

Location: West Sussex County Council, 1st Floor, Northleigh, County Hall, Chichester PO19 1RQ
[redacted]
Report a problem with a road or pavement or raise a highways related enquiry
Follow us at [redacted]@WSHighways

From: Kyanna Hodge <kyanna@civil.co.uk>
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To: Kevin Macknay <kevin.macknay@westsussex.gov.uk>
Cc: CEP | Reception [redacted]; Lee Moses <Lee.Moses@westsussex.gov.uk>; Stuart Magowan [redacted]
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Hope to hear from you soon regarding this.

Kind Regards,
Kyanna

Kyanna Hodge

[redacted]

From: Lee Moses <Lee.Moses@westsussex.gov.uk>
Sent: 08 November 2022 16:14
To: Kyanna Hodge <[redacted] Kevin Macknay <kevin.macknay@westsussex.gov.uk>
Cc: CEP | Reception[redacted]
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Kind regards

Lee Moses

Engineer, Highway Agreements,
Planned Delivery,
West Sussex County Council,

Location: Ground Floor Northleigh, County Hall, Chichester, West Sussex, PO19 1RH
Contact: Internal: 22088 | External: +44 (0)330 2222088 | E-mail: lee.moses@westsussex.gov.uk

---

From: Kyanna Hodge [redacted]
Sent: 08 November 2022 15:46
To: Lee Moses <Lee.Moses@westsussex.gov.uk>
Cc: CEP | Reception <[redacted]
Subject: 23452 Stakers Farm, Yapton

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Look forward to hearing from you regarding this or if you can suggest someone who might be able to help, this will also be greatly appreciated.

Kind Regards,
Kyanna

Kyanna Hodge

[redacted]

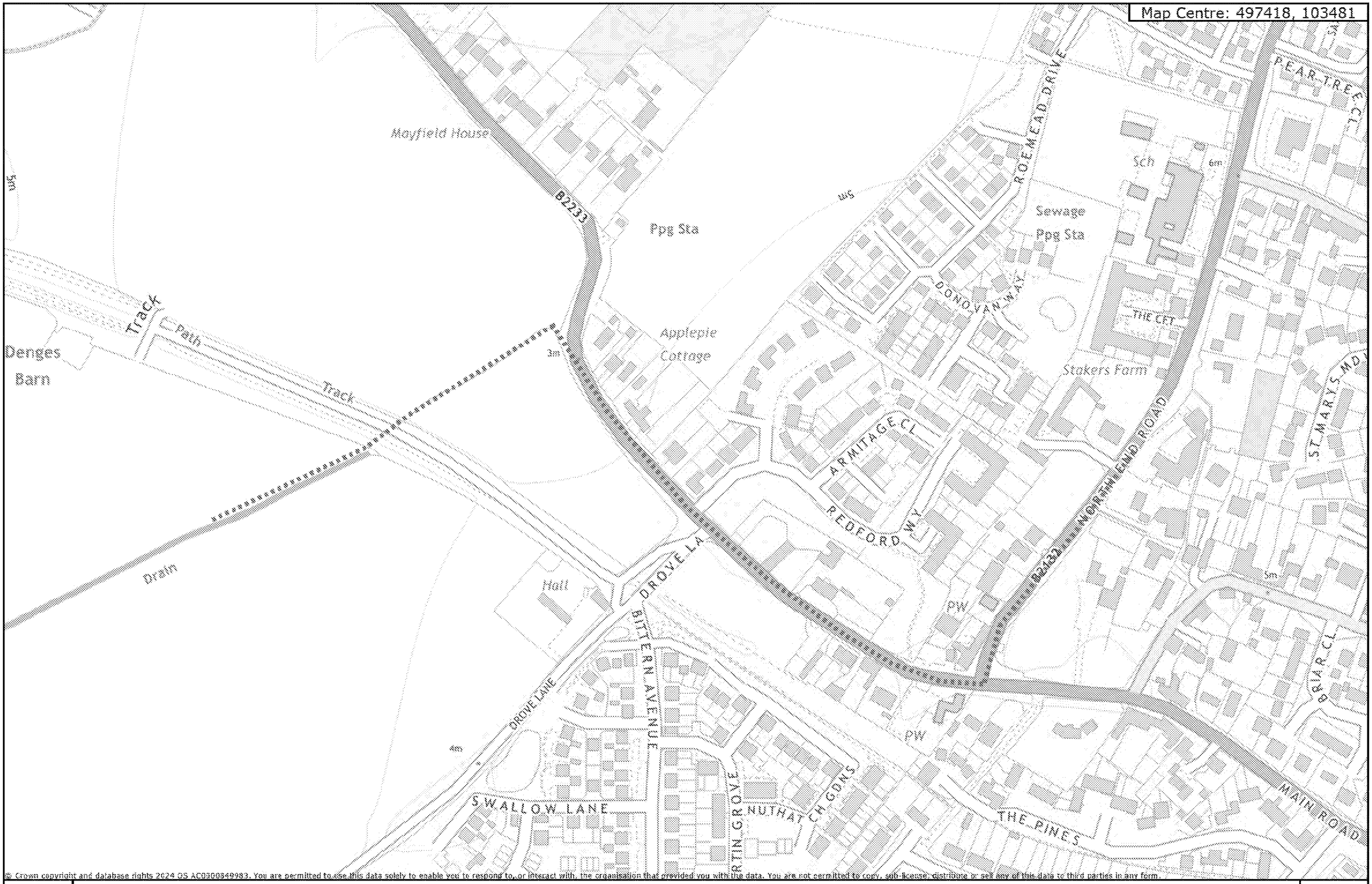
out your own checks before opening any attachment.

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Avening
Brantley
Fairways
Silverdale
Pump House
MH8
MH9
MH10
MH11
MH12
MH13
MH14
2 x 150ø pipes passing over foul sewer
Mill Lane
Mill Lane
To MH's 15, 16 & 17
To MH 13
Culvert
Culvert
Westcote Cottage
Border Cottage
Cornerways
Applepie Cottage
The Cottage
Cosy Cot
Perrymans
3.0m
225ø
300

Map Centre: 497418, 103481



west sussex county council

06 January 2025
Earthlight Internal

North End Road, Yapton
Approx line of existing highway drainage.

N

1:2500
Page Size: A3

Appendix 5

CCTV Survey Drainage Reports

COMPLETE DRAINAGE SOLUTIONS

21 Silent Garden Road
Liphook
Hampshire
GU30 7GU

Stakers Farm, North End Road, Yapton

Date 28/04/2023

Zac,

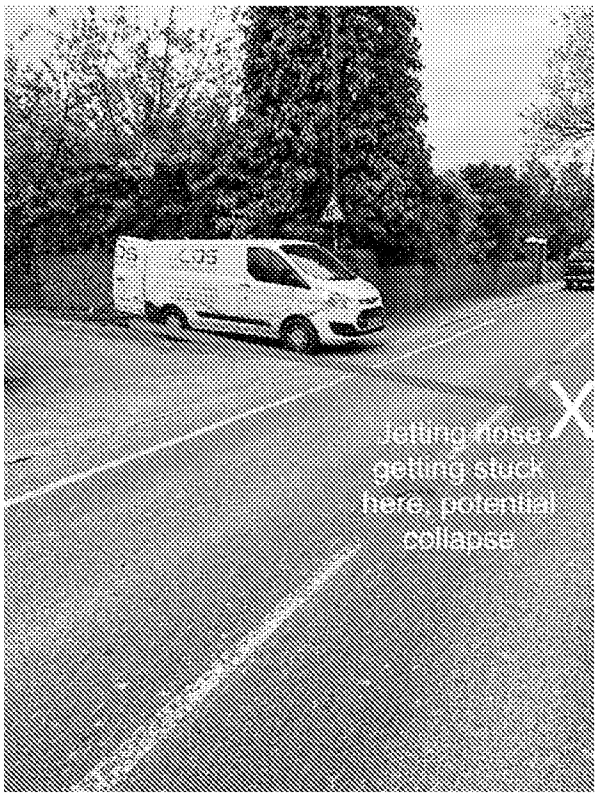
Following the ½ day investigation works at this property, we carried out intensive jetting works, mainly downstream from the last manhole on site, we are getting under the highway just past the white lines in the middle of the road as long as it runs straight. We are not able to see anything due to the dirty water within the drain. We have established that this drain does pick up the yard gullies within the site as we jetted back up from this manhole and found another manhole approximately 25m up stream, from this chamber we can confirm that the yard gully shown in the picture does run through to the same manhole.

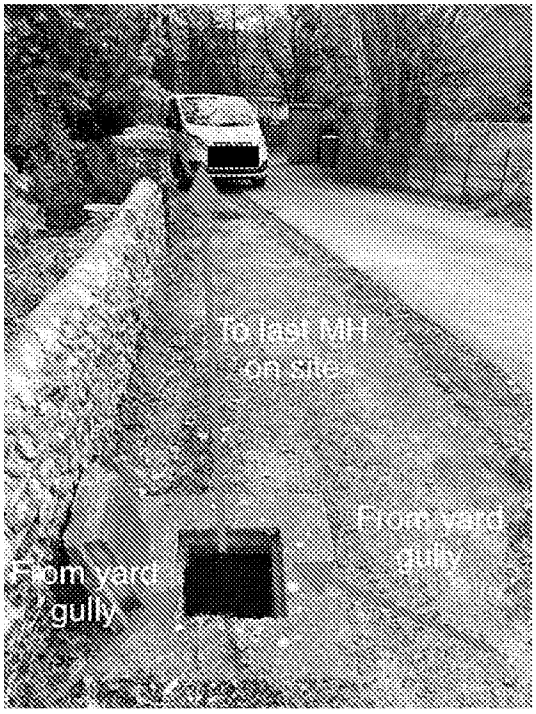
I asked the property owner to contact southern water as the defect section is within their demise under the road. I can confirm that it is a 150mm clay drain and that it feels fine up to the area of defect, just passed the middle of the road.

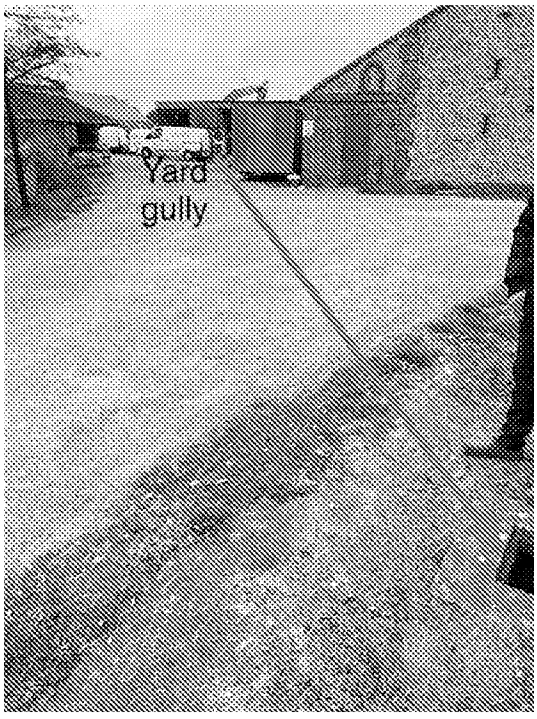
See pictures below and please don't hesitate to contact me for any further information or assistance.

No footage was taken due to the drains being full of muddy water with no outlet due to the collapse.

COMPLETE DRAINAGE SOLUTIONS







Kind regards

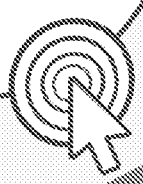
Craig Feargrieve
Managing Director
07931079097

COMPLETE DRAINAGE SOLUTIONS

CCTV Inspection Report

View via iTouch Live

Your full report, including the video is only a click away download or view online now.



STAKERS FARM
YAPTON

30/08/2024

Job Number: 300824

Complete Drainage Solutions Ltd

21 Silent Garden Road, Liphook, Hampshire, GU30 7GU

[redacted]

Project Information

Complete Drainage Solutions Ltd
21 Silent Garden Road
Liphook
Hampshire
GU30 7GU

Job Number	Surveyed by (Operator)	Base Unit	Date
300824	**CHRIS**	**AJPGVKN1R9**	**30/08/2024**

Client Details:

PIERS BUCKNELL

Site Details:

STAKERS FARM
YAPTON

Contractor Details:

Complete Drainage Solutions Ltd
21 Silent Garden Road
Liphook
Hampshire
GU30 7GU

Office Contact Number: 01428 481227

Purpose of Survey:

Complete Drainage Solutions Ltd
21 Silent Garden Road
Liphook
Hampshire
GU30 7GU

Job Number	Surveyed by (Operator)	Base Unit	Date
300824	**CHRIS**	**AJPGVKN1R9**	**30/08/2024**

Report Contents

Complete Drainage Solutions Ltd
21 Silent Garden Road
Liphook
Hampshire
GU30 7GU

Report Summary

Job Number	Surveyed by (Operator)	Base Unit	Date
300824	**CHRIS**	**AJPGVKN1R9**	**30/08/2024**

Job Information

Total Distance Surveyed: **10.57 meters**
Engineer: **CHRIS**
Number of Surveys: **1**
Number of Surveys grade 4 or above: **1**

Section 1 Overview (30/08/2024)

Manholes: **MH 1 to MAIN RUN IN ROAD**
Pipe Length: **10.57 metres**
Structural Grade: **4**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **150mm**
Use: **Foul**

Complete Drainage Solutions Ltd
21 Silent Garden Road
Liphook
Hampshire
GU30 7GU

CCTV Inspection Report

Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
CHRIS	**300824**	**MH 1 X**	**30/08/2024**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/4**	**AJPGVKN1R9**	**1**

Road **STAKERS FARM**
Place **YAPTON**
Location

Division
District
Location Details

Purpose
Duty **Foul**
Catchment

Shape/Size **150mm**
Material **Vitrified clay**
Category

Start Node **MH 1**
End Node **MAIN RUN IN ROAD**
Total length **10.57 metres**

Scale **1:0.55**
Direction **Downstream**

View via iTouch Live | Download

Start Node Ref:MH 1 | I/L :mm

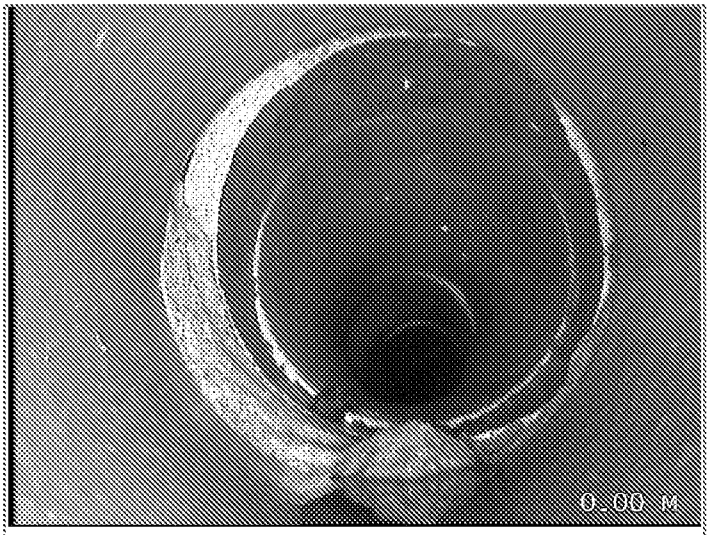
Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference MH 1	10270462	Comment / 0
0.00	WL	Water level 0% height/diameter	10270470	Comment / 0
0.55	JD	Joint displaced 20mm:	10270474	Structural / 4
0.69	CN	Connection other than junction at 10 o'clock, diameter 150mm	10270477	Comment / 0
10.57	BRF	Finish node type, major connection without manhole, reference JOINS MAIN RUN IN ROAD	10270482	Comment / 0

End Node Ref:MAIN RUN IN ROAD | I/L :mm

Complete Drainage Solutions Ltd
21 Silent Garden Road
Liphook
Hampshire
GU30 7GU

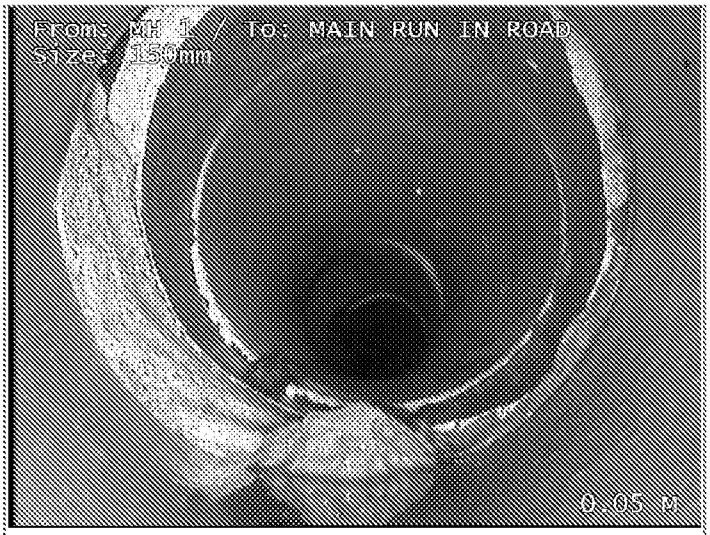
CCTV Inspection Photos

Job Number	Surveyed by (Operator)	Base Unit	Date
300824	**CHRIS**	**AJPGVKN1R9**	**30/08/2024**

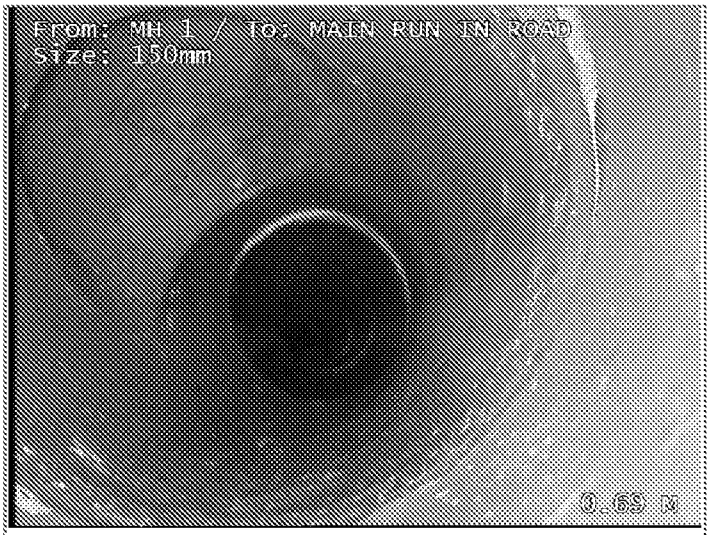


Start node type, manhole, reference MH 1

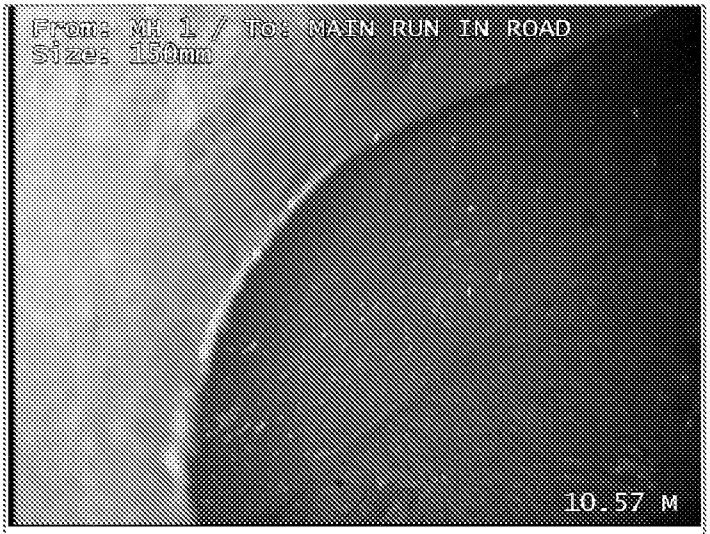
Water level 0% height/diameter



Joint displaced 20mm



Connection other than junction at 10 o'clock, diameter 150mm



Finish node type, major connection without manhole, reference JOINS MAIN RUN IN ROAD

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Defect Grade Descriptions

Job Number	Surveyed by (Operator)	Base Unit	Date
300824	**CHRIS**	**AJPGVKN1R9**	**30/08/2024**

1: Occurences without damage. For example, laterals, joints,etc.

NO DEFECTS WERE DETECTED.

2: Constructional deficiencies or occurences with insignificant influence to tightness, hydraulic or static pressure or pipe: Eg. wide joints, badly torched intakes, minor deformation of plastic pipes, minor erosions etc.

REHABILITATION CAN BE SCHEDULED LONG-TERM.

3: Constructional deficiencies diminishing static, hydraulic and tightness: Eg. untorched intakes, cracks, minor drainage obstructions such as calcite build ups, protruding laterals, minor damages to pipe wall, individual root penetrations, corroded pipe walls etc.

REHABILITATION IS NECESSARY MEDIUM-TERM WITHIN 3 TO 5 YEARS.

4: Constructional damages with insufficent static safety, hydraulic or tightness: Eg. axial/radial pipe bursts, pipe deformations, visually noticeable infiltration/exfiltration, cavities in pipe-wall, severe protruding, laterals severe root penetrations, severe corrosion of pipe wall etc.

REHABILITATION PROCEDURE IS URGENT AND HAS TO BE COMPLETED WITHIN 1 TO 2 YEARS.
NECESSITY FOR EMERGENCY OPERATIONS HAS TO BE EXAMINED.

5: Pipe is already or will shortly be impermeable: Eg. collapsed pipe, deeply rooted pipe or other drainage obstructions. Pipe loses water or danger of backwater in basements etc.

REHABILITATION IS URGENT AND SHORT-TERM. IN ORDER TO PREVENT FURTHER DAMAGE, NECESSARY TEMPORARY SPOT REPAIR HAS TO BE CONDUCTED ON EMERGENCY LEVEL.