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Flood Risk Assessment

Proposed Residential
Development

Wood Street,
Hinckley,
Leicestershire

March 2019



Author: **Bhavin Parmar**

JMS Project Code & Reference: **CO19/039/02**

Revision: Preliminary Issue

Revision	Date	Changes
-	18/03/19	Initial Issue

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1. INTRODUCTION

- 1.1.1 JMS Midlands have been appointed to prepare a Flood Risk Assessment to comply with the planning requirements for a new residential development at a site located at land off Wood Street in Hinckley.
- 1.1.2 The purpose of this report is to review the existing site and the extents of the proposed development and consider the most sustainable methods of surface water drainage to alleviate any risks of flooding and to ensure compliance with the Leicestershire County Council SuDS requirements.

2. LOCATION & EXISTING CONDITIONS

- 2.0.1 The site which forms the subject of the planning application is located at the land off Wood Street, Hinckley. A Site Location plan can be found in **Appendix A**.
- 2.0.2 The site is bounded to the North by the Wood street, and is bound in other directions by existing residential and commercial property.
- 2.0.3 The application site is centred on an Ordnance Survey grid reference of 443031E and 294024N. The application boundary occupies an area circa 2,360 m².
- 2.0.4 The site is occupied by industrial buildings together with car parking courtyard and access. A detailed topographical survey has been undertaken which can be found in **Appendix B**.

2.1. Site Proposals

- 2.1.1 Planning permission is being sought to construct 35 dwellings as a combination of houses, flats and duplexes with associated parking and access.
- 2.1.2 The proposed site layout, prepared by Hayward Architects is included in **Appendix C**.
- 2.1.3 The proposed layout provides an impermeable area of 1,070 m².

3. PLANNING POLICY CONTEXT

- 3.1 The National Planning Policy Framework (NPPF) includes government policy on development and particular in this case meeting the challenge of climate change and flood risk. The policy states; *"Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change, taking full account of flood risk..."*

- 3.2 The location of new developments should take into account climate change by planning to avoid increasing the vulnerability on development from the impacts of climate change. Where locations are considered vulnerable from the impacts of climate change, these risks should be managed and where possible mitigated to limit the risk.
- 3.3 Development in areas at risk of flooding should be made safe without increasing the flood risk elsewhere. Local Plans should be based on evidence, through a Sequential Test, in selecting the appropriate location for new development within the plan period and thus avoiding where possible flood risk to people and property.
- 3.4 Where the Sequential Test identifies a development is not appropriate to be located in a zone of lower probability of flooding, in context to the wider sustainability objectives, then an Exception Test can be applied. For a development to be allocated or permitted two elements will have to be passed, these being:
- “it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by the Strategic Flood Risk Assessment where one has been prepared; and a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk”.*
- 3.5 To this extent, planning authorities should ensure the risk of flooding elsewhere is not increased and only consider development appropriate in areas at risk of flooding where a site-specific flood risk assessment has been carried out, following the Sequential Test, and if required the Exception Test, it can demonstrate the following:
- “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; and development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems”.*
- 3.6 Development priorities are based on the specific flood risk zones outlined within Table 1 of the technical guidance, as per *Figure 1* below. For Flood Zone 1 – Low probability. Land assessed as having a less than 1 in 1,000 year annual probability of river and sea flooding (<0.1%) in any year.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Figure 1 - Flood Zone Definitions

- 3.7 The Environment Agency (EA) website confirms the site location to be within Flood Zone 1. The EA report can be found in **Appendix D**.
- 3.8 Further guidance in NPPF classifies residential development schemes to be a 'more vulnerable' land class use in terms of flood risk.

More vulnerable

- Hospitals
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.
- Non-residential uses for health services, nurseries and educational establishments.
- Landfill* and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

Figure 2 - Flood Risk Vulnerability Classifications

- 3.9 Table 3 of the technical guidance determines the appropriate uses by flood zone, in this case a less vulnerable use for buildings used for shops are appropriate for a Zone 1.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	x	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	x	x	x	✓*

Key:

✓ Development is appropriate

x Development should not be permitted.

Figure 3 - Flood Risk Vulnerability and Flood Zone 'Compatibility'

- 3.10 The EA mapping indicates the proposed developable area of the site is located within Flood Zone 1 and therefore is located to meet the requirements of NPPF.

4 FLOODING ASSESSMENT

4.1 Flood Risk

- 4.1.1 Fluvial flooding is a result of the capacity of rivers being exceeded by the river flow. In general, rivers have a natural flood plain, which can sometimes be encroached upon by development.
- 4.1.2 Tidal flooding is a result from the sea where high tides and storm surges raise the level of tidal waters above the level of the shore or river bank. These can be sudden and severe.
- 4.1.3 The site is located within Flood Zone 1 as indicated in the flood mapping as illustrated in **Appendix D**. The flood zone 1 categorization is defined as a site having a low probability (land having less than 1 in 1,000 annual probability) of river or sea flooding.

4.2 Flooding from Surface Water

- 4.2.1 Surface water over land flood mapping has been consulted at the development site, as shown in Figure 5. The risk of flooding is indicated as being very low.



Figure 5 – Surface Water Flood risk

4.3 Existing Drainage Regime

- 4.3.1 The existing site is occupied by industrial buildings and a car park courtyard. The car parking areas show the presence of gullies and inspection chamber covers, in the topographical survey which is thought to discharge to the combined sewer in Wood Street.
- 4.3.2 The pre-development surface water runoff rate has been calculated at 16.3 l/s based on the site area of 1,175m² and using a rainfall intensity of 50 mm/hr.
- 4.3.3 There are existing Severn Trent combined water sewers in Wood Street which can be seen in Appendix E.

4.4 SuDS Considerations

- 4.4.1 Consideration of SuDS is a planning requirement for major developments. SuDS are designed to replicate the natural course of drainage as closely as possible with a view to reducing the impact of flooding, removing pollutants at source and combining water management with green space.

Developments should utilise SuDS where possible and ensure that surface water run-off is managed as close to its source as possible in line with the following hierarchy:

1. Into ground (infiltration).
2. To a surface water body.
3. To a surface water sewer.
4. To a combined sewer.

5 SURFACE WATER DRAINAGE

5.1 SuDS Incorporation

- 5.1.1 It is assumed that the surface water from the existing roofs and hard paved areas discharge into the combined sewer in Wood Street at an unrestricted rate.
- 5.1.2 The use of infiltration has been considered for this site. In the absence of intrusive testing, the British Geological Survey data has been consulted to obtain Borehole information from the nearest available site approximately 20m to the south of the development site. A copy of this has been appended as per **Appendix F**. The extract shows that the ground is comprised of cohesive Clay material with poor infiltration properties, and so infiltration is considered highly unlikely.
- 5.1.3 The impermeable areas to be discharged to the sewers is 1,070m².
- 5.1.4 It proposed to restrict the surface water flows to a total of 5.0 l/s. This will provide a reduction of over 70% of the pre-developed runoff rate from the Brownfield site.
- 5.1.6 Owing to the site layout and the extent of parking area provided the site lends itself to permeable paving which would satisfy the requirement of an 'at source' SuDS measure. In the conventional sense, permeable paving is used to dispose of surface water via infiltration but this is entirely dependent on the ground strata available and the subsequent infiltration rate. As mentioned in 5.1.2, the ground strata is generally cohesive clay, and the use of infiltration is considered highly unlikely.
- 5.1.7 Despite the ground conditions, permeable paving can still be utilised in conjunction with an impermeable geomembrane at the base for form a tanked system and a flow control to attenuate surface water flows accordingly. Permeable paving is proposed to be incorporated for the access drive and car park for the block of apartments.

- 5.1.8 The attenuation for the surface water shall be stored within below ground cellular tank systems. The attenuation tank size has been calculated using Microdrainage software which utilises the HR Wallingford procedure. The cellular tank has been sized as 20m x 4m x 0.8m to ensure that no flooding occurs for the development up to the 1 in 100 year plus 40% climate change storm event. The calculations can be found in **Appendix G**. The proposed Drainage Strategy Plan can be found in **Appendix H**.
- 5.1.9 In accordance with Table 26.2 of CIRIA Report C753, the pollution hazard level can be classified as 'Low'. Using table 26.3 of the same document, the mitigation indices values for permeable paving exceed the pollution hazard values taken from the previous table. This ensures that proposals offer sufficient pollution risk mitigation.
- 5.1.10 The use of Permeable paving will provide a treatment to the surface water runoff increasing the water quality. Research by CIRIA shows that 60-95% level of suspended solids and 70-90% of hydrocarbons can be removed by permeable pavements in this way.
- 5.1.11 The above proposals ensure that an 'at source' SuDS measure is applied and betterment is provided in terms of surface water runoff quantity and quality.

5.2 Preliminary Surface Water Drainage Maintenance Schedule

- 5.2.1 This section of the report gives guidance on the maintenance of the drainage system and outline who will be responsible for this. The proposed development comprises of site clearance, formation of access, landscaping, parking, drainage and supporting infrastructure. By necessity the available SuDS systems will control outfall flow, store, and slow down rainwater.
- 5.2.2 Storage and Attenuation - Outfall from the site is to be piped into the existing Griff Brook and stored within upstream attenuation. Surface water is to be directed to the sub-base before discharging into the watercourse via flow control. Maintenance of the permeable paving and attenuation tank will be the responsibility of a private management company set up by the developer see **Table 1 & 2** below.

Table 1- PERMEABLE PAVING SYSTEM STORAGE OPERATION AND MAINTENANCE REQUIREMENTS

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Sweeping. [NOTE: Any jointing material between the blocks that is lost or displaced as a result of sweeping must be replaced. New jointing material must be the same type as that removed or a suitable replacement]	3 no. times a year: - - At the end of Winter; - Mid-summer; and - After autumn leaf fall. Also as required based on site specific observations
Occasional Maintenance	Stabilise and mow contributing and adjacent areas to prevent excess sediment being washed into the paving	As required
Remedial actions	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users	As required
	Rehabilitation of surface and underlying sand a geo-textile	As required (if local distortion or settlement occurs as a result of wash out of bedding)
Monitoring	Inspect for evidence for weed growth or deposits affecting run off. If required take remedial action	Monthly for 3 no. months after installation, then during regular maintenance visits

Table 2- ATTENUATION TANK SYSTEM STORAGE OPERATION AND MAINTENANCE REQUIREMENTS

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for three months, then annually
	Remove any debris from the catchment surface	Monthly
	Remove sediment from pre-treatment structures and/or internal forebays	Annually / As required
Remedial actions	Repair/rehabilitate inlets, outlet overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every five years or as required

5.2.3 Flow Control – This is a proprietary system which is designed to control the surface water discharge from the site to restricted rates. Some proposed flow control systems may be prone to blocking and should be monitored closely. Maintenance of the system will be the responsibility of the private management company set up by the developer, see **Table 3** below.

Table 3 – FLOW CONTROL SYSTEM OPERATION AND MAINTENANCE REQUIREMENTS

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Remove litter and debris and grass cuttings from upstream to prevent being washed into the flow control. Inspection of the flow control chamber and the removal of any sediment/debris when required.	Quarterly or as required following monitoring

Remedial Actions	Check drain down doors are operational, check vortex flow control fixings to manhole chamber and access into the chamber is functional	Quarterly or as required following monitoring
Monitoring	Inspect flow control and check flows are not impeded	Monthly or after periods of heavy rainfall

- 5.2.4 The rainwater from the roofs is collected via rainwater pipes, and will be carried to the sub-base. The maintenance of the collection system is the responsibility of a private management company set up by the developer, see **Table 4** below.

Table 4 – RAINWATER PIPES & CHAMBERS SYSTEM OPERATION AND MAINTENANCE REQUIREMENTS

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Inspection of silt trap chamber and removal of debris when necessary	Quarterly or as required following monitoring
Remedial Actions	Check for blockages in manholes and pipes. Rodding and jetting of pipes to be carried out. CCTV survey can be carried out to inspect condition of pipework.	Quarterly or as required following monitoring
Monitoring	Inspect collection apparatus for debris and litter. Remove where necessary to prevent blockages in the system.	Monthly or after periods of heavy rainfall

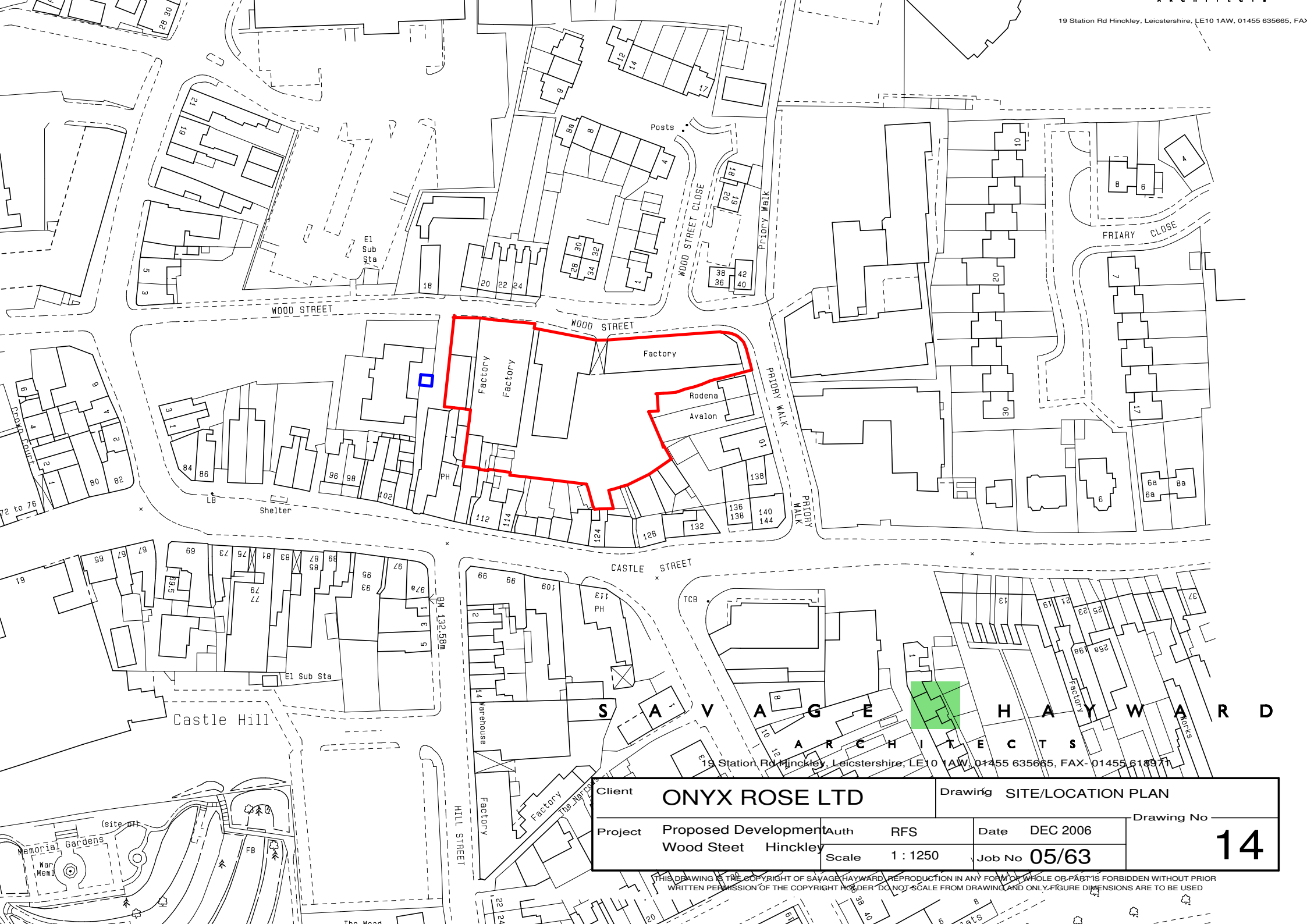
- 5.2.5 The design life of the development is likely to exceed the design life of each of the SuDS components listed above. During the routine inspections of any drainage components it may become apparent that they have reached the end of their functional lifetime. In the interest of sustainability, repairs should be the first-choice solution where practicable. If this is not the case, then it will be necessary for the property owners to undertake complete replacement of the component in question.

6 SUMMARY AND CONCLUSIONS

- 6.1 The site which forms the subject of the planning application is located at the land off Wood Street, Hinckley.
- 6.2 The site is located in Flood Zone 1 as confirmed by the Environment Agency.
- 6.3 Planning permission is being sought to construct 35 dwellings as a combination of houses, flats and duplexes with associated parking and access.. The opportunity for using infiltration is highly unlikely.
- 6.4 The proposed drainage strategy therefore seeks to limit surface water runoff to 5 l/s to the Severn Trent combined sewer. Permeable paving will be incorporated to improve the water quality and attenuation shall be provided with the use of below ground cellular tanks storing up to the 1 in 100 year + 40 % climate change allowance.

Appendix A

Site Location Plan



Client			ONYX ROSE LTD			Drawing			SITE/LOCATION PLAN														
Project			Proposed Development			Auth			RFS			Date			DEC 2006			Drawing No					
			Wood Steet			Hinckley			Scale			1 : 1250			Job No			05/63			14		

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Appendix B

Topographical Survey



This plan should only be used for its original purpose.

Castle Survey Ltd does not accept any responsibility for this plan if supplied to any other party, other than the original client.

All dimensions and levels should be checked on-site prior to the design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

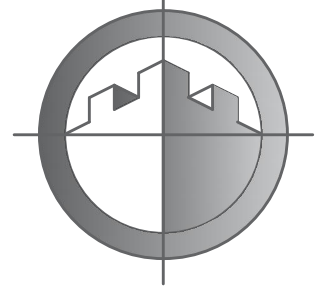
Some services may have been obstructed due to parked vehicles or an overgrown site.

Tree information (where applicable) has been surveyed from ground level and therefore should be treated as approximate only.

Roof linework is indicative only.

The survey has been fixed to GPS OSGB 1936 using the active GPS network.

Floor Plan Legend:	Topographic Legend:
Window Cill & Head Height	Buildings / Walls
Door	Building Canopy / Overhang
Door Height	Concrete edge
Stairs/Step	Kerb line
Radiator	Centre Line
Ventilation / Overhead	Barrier
Access Hatch	Hedge
TV Point	Security Fence
13A Power Socket	Panel Fence
Fused Socket	Gate
Shower Socket	Overhead Line
Extractor Fan	Tree / Sapling
Lantern Light	Tree Canopy Line
Down Light	Chambers
Light Dimmer Switch	Survey Station & Name
Light Switch	Bench Mark
Fixed Lighting	Temporary Bench Mark
Fire Alarm Button	Cover level
Fire Extinguisher	Invert level
Floor Level to Datum	Pipe invert (diameter)
Structural Ceiling Height	Gully
False Ceiling Height	Manhole
	Inspection chamber
	Flag Staff
	Gas Meter
	Electric Post
	Telephone Post
	Pipe Invert
	Roading Point
	BT Cover
	Cover Unknown
	Electricity Cover
	Traffic Light
	Fire Hydrant
	Gas Cover
	Stop Valve
	Tyre Cover
	Gas Valve
	Pop



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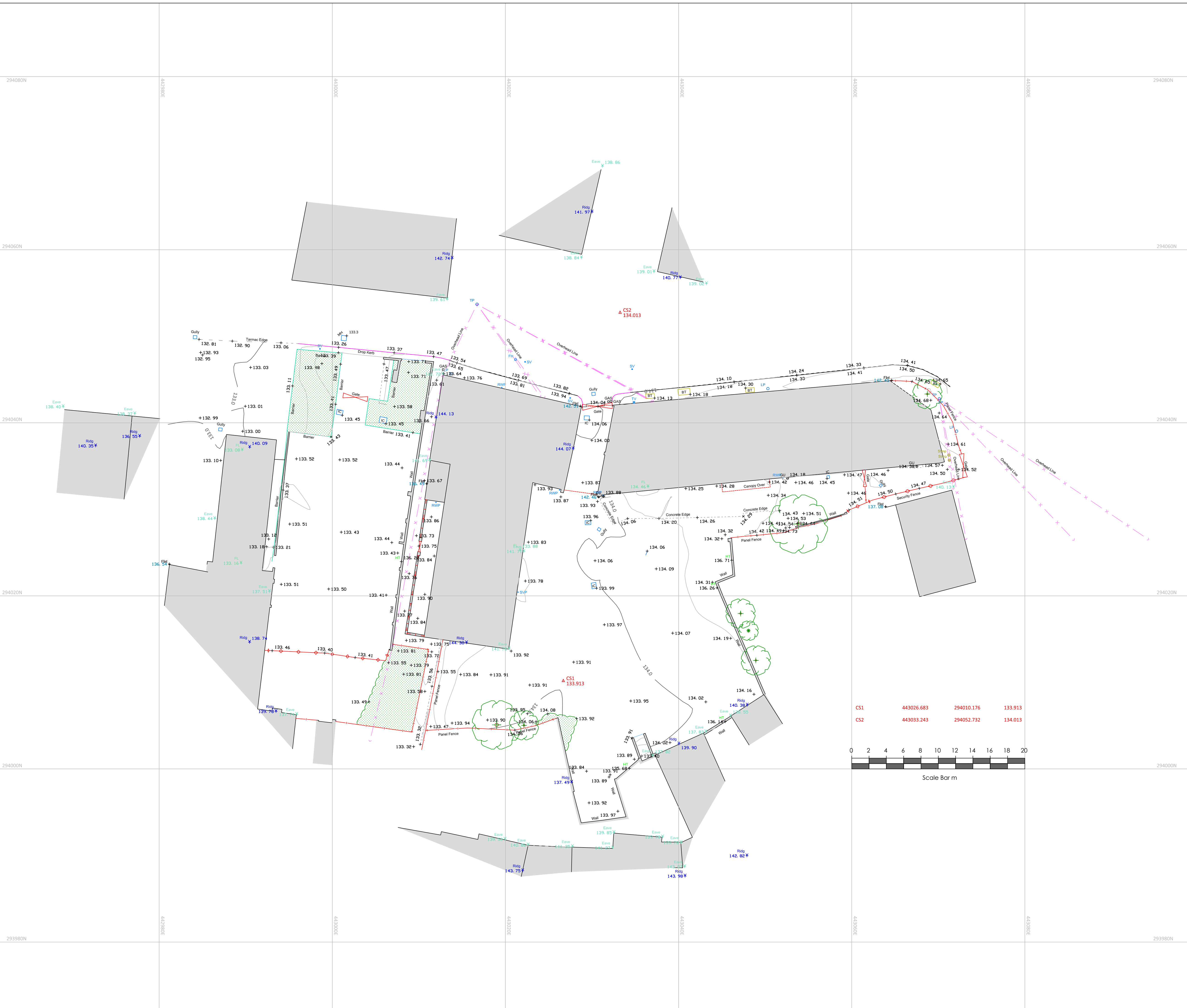
SITE DETAILS:

Wood Street, Hinckley

DRAWING:

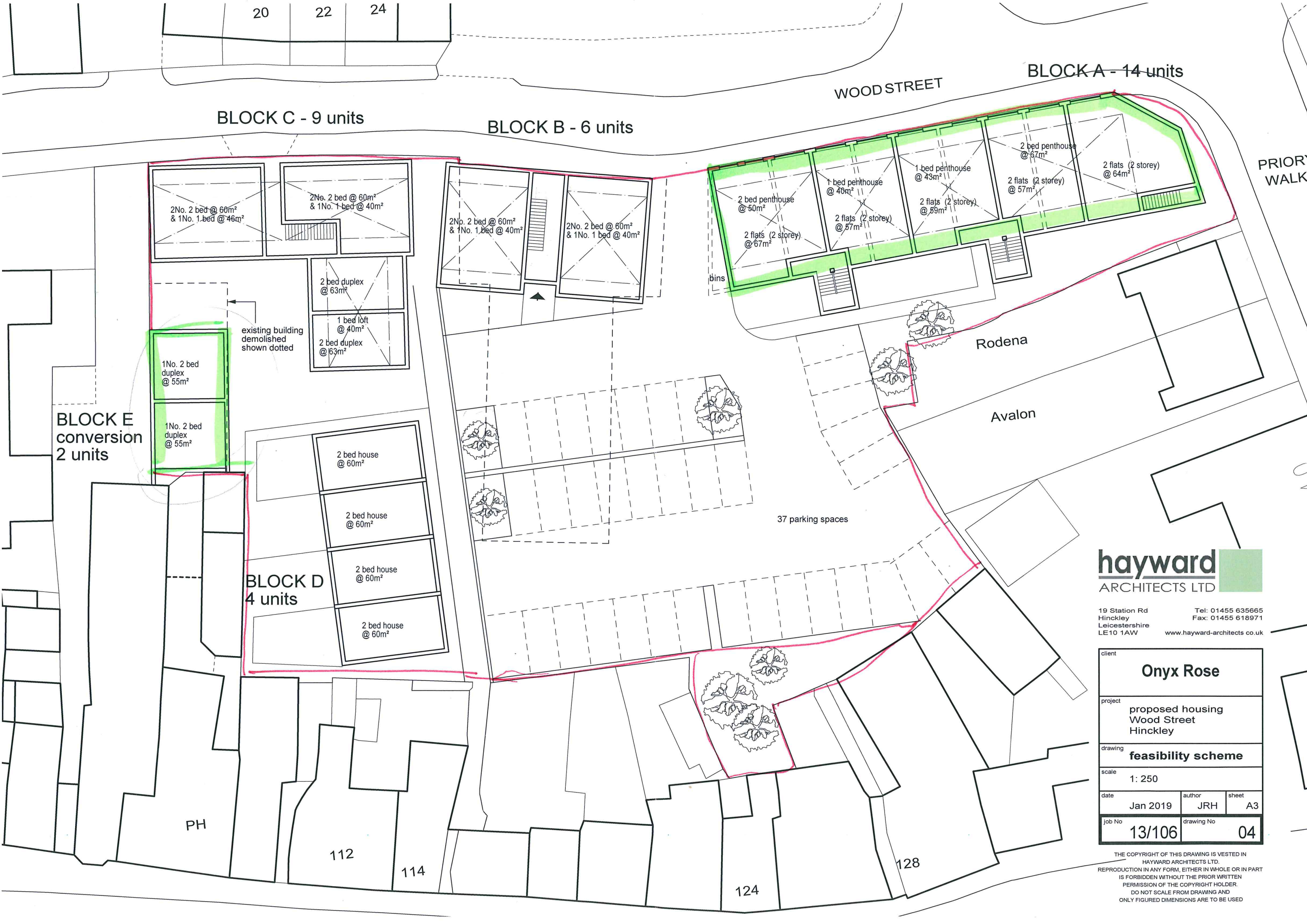
Existing Site Details

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1:200	PJ
DATE ISSUED:	DRAWING NUMBER:
20-02-2019	19034-19-01
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Appendix C

Proposed Site Plan



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client	Onyx Rose		
project	proposed housing Wood Street Hinckley		
drawing	feasibility scheme		
scale	1: 250		
date	Jan 2019	author	JRH
		sheet	A3
job No	13/106	drawing No	04

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Appendix D

Environment Agency Flood Risk Map from Rivers & Sea

Flood map for planning

Your reference
CO19/039/02

Location (easting/northing)
443070/294023

Created
27 Feb 2019 10:28

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

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<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>



Flood map for planning

Your reference
CO19/039/02

Location (easting/northing)
443070/294023

Scale
1:2500

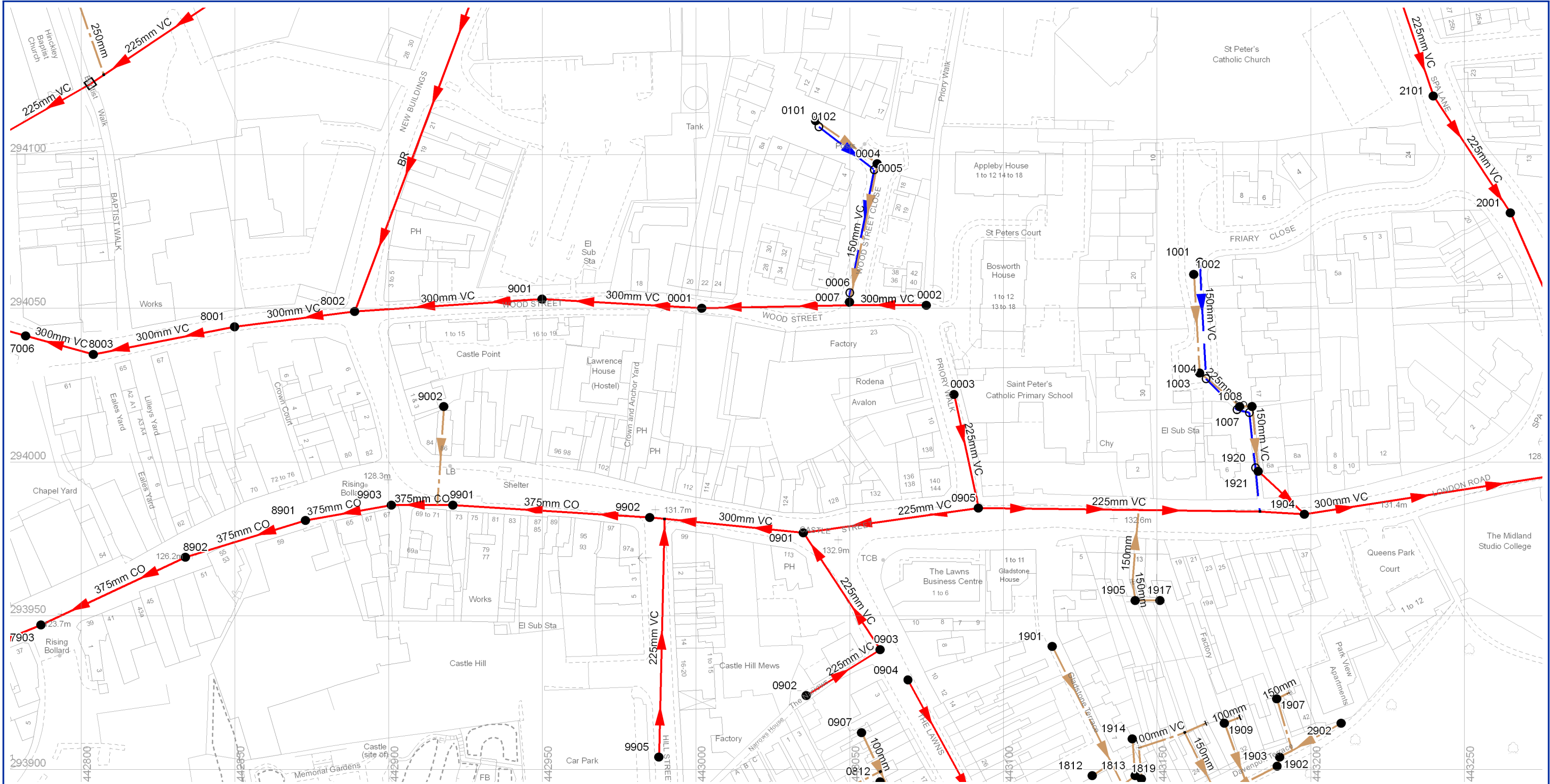
Created
27 Feb 2019 10:28

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area

0 20 40 60m

Appendix E

Severn Trent Sewer Records



— x — x — x — x — Abandoned Gravity Sewer	Culverted Watercourse	■ Blind Shaft	Sewer Chemical Injection Point
Private Combined Gravity Sewer	Cable, Earthing	● Combined Use Manhole	■ Sewer Junction
Private Foul Gravity Sewer	Cable Junction	Flushing Chamber	◆ Sewerage Air Valve
Private Surface Water Gravity Sewer	Cable, Optical Fibre/Instrumentation	○ Foul Use Manhole	◆ Sewerage Hatch Box Point
Public Combined Gravity Sewer	Cable, Low Voltage	● Grease Trap	■ Sewerage Isolation Valve
Public Foul Gravity Sewer	Cable, High Voltage	● Head Node	Soakaway
Public Surface Water Gravity Sewer	Cable, Other	* Hydrobrake	○ Surface Water Manhole
Trunk Combined Gravity Sewer	Housing, Building	Lamphole	■ Vent Column
Trunk Foul Use Gravity Sewer	Housing, Kiosk	Overflow	■ Waste Water Storage
Trunk Surface Water Gravity Sewer	Disposal Site	Penstock	
Combined Use Pressurised Sewer	Sewage Treatment Works	Petrol Interceptor	
Foul Use Pressurised Sewer	Housing, Other		
Surface Water Pressurised Sewer	Pipe Support Structure		
Highway Drain	Sewer Facility Connection Inlet / Outlet		
Combined Lateral Drain (SS)			
Foul Lateral Drain (SS)			
Surface Water Lateral Drain (SS)			

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 1st October 2011, but have not been surveyed and confirmed by Severn Trent Water are shown in orange

MATERIALS	CATEGORIES
- NONE AC - ASBESTOS CEMENT BR - BRICK CC - CONCRETE BOX CULVERT CI - CAST IRON CO - CONCRETE CSB - CONCRETE SEGMENTS (BOLTED) CSU - CONCRETE SEGMENTS (UNBOLTED) DI - DUCTILE IRON GRC - GLASS REINFORCED CONCRETE GRP - GLASS REINFORCED PLASTIC MAC - MASONRY IN REGULAR COURSES MAR - MASONRY RANDOMLY COURSED PE - POLYETHYLENE PF - PITCH PP - POLYPROPYLENE PSC - PLASTIC STEEL COMPOSITE PVC - POLYVINYL CHLORIDE RPM - REINFORCED PLASTIC MATRIX SI - SPUN (GREY) IRON ST - STEEL U - UNKNOWN VC - VITRIFIED CLAY XXX - OTHER	W - WEIR C - CASCADE DB - DAMBOARD SE - SIDE ENTRY FV - FLAP VALVE BD - BACK DROP S - SIPHON HD - HIGHWAY DRAIN S104 - SECTION 104
SHAPE	PURPOSE
C - CIRCULAR E - EGG SHAPED O - OTHER R - RECTANGLE S - SQUARE T - TRAPEZOIDAL U - UNKNOWN	C - COMBINED E - FINAL EFFLUENT F - FOUL L - SLUDGE S - SURFACE WATER



Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD

O/S Map scale:	1:1250	This map is centred upon:	
Date of issue:	06.02.19	O / S Grid reference:	
		x :	443026
		y :	294021

Disclaimer Statement:
1. Do not scale off this Map.
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3. On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012 (date to be confirmed).
Private pumping stations, which form part of these sewers or lateral drains, will transfer to the ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not possess complete records of these assets.
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Sewer Node		Sewer Pipe Data								
REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SP42938901	127.68	126.38	124.77	C	CO	C	375	nil	25.34	nil
SP42939802	130.77	128.64	127.43	C	VC	C	225	nil	29.35	nil
SP42939803	129.79	127.39	123.72	C	VC	C	225	nil	40.54	nil
SP42939901	128.95	127.13	126.72	C	CO	C	375	nil	48.78	nil
SP42939902	131.81	128.60	127.15	C	CO	C	375	nil	44.22	nil
SP42939903	128.41	126.72	126.41	C	CO	C	375	nil	91.74	nil
SP42939905	131.44	130.03	nil	C	VC	C	225	nil	0.00	nil
SP42948002	129.09	126.11	124.27	C	VC	C	300	nil	21.37	nil
SP42949001	131.94	129.58	126.64	C	VC	C	300	nil	20.79	nil
SP42949002	nil	nil	nil	F	nil	nil	nil	nil	0.00	nil
SP42949101	128.00	126.67	120.90	C	VC	C	225	nil	21.49	nil
SP42949207	130.85	128.35	126.64	C	BR	E	440	490	94.94	nil
SP43930800	nil	nil	nil	F	VC	U	100	nil	0.00	nil
SP43930801	nil	nil	nil	F	VC	U	100	nil	0.00	nil
SP43930803	130.28	129.16	127.44	C	VC	C	150	nil	54.87	nil
SP43930814	nil	nil	nil	F	nil	nil	nil	nil	0.00	nil
SP43930820	nil	nil	nil	F	nil	nil	nil	nil	0.00	nil
SP43930901	132.82	129.66	nil	C	VC	C	300	nil	0.00	nil
SP43930902	132.21	131.32	130.60	C	VC	C	225	nil	39.31	nil
SP43930903	132.78	130.58	130.10	C	VC	C	225	nil	94.77	nil
SP43930904	131.39	nil	128.03	C	nil	nil	nil	nil	0.00	nil
SP43930905	133.04	132.00	129.70	C	VC	C	225	nil	25.03	nil
SP43930905	133.04	130.58	nil	C	VC	C	225	nil	0.00	nil
SP43930907	nil	nil	nil	F	nil	nil	nil	nil	0.00	nil
SP43931801	130.62	127.59	127.15	C	VC	C	300	nil	75.55	nil
SP43931802	130.12	127.42	123.79	C	VC	C	225	nil	28.05	nil
SP43931803	130.09	127.70	127.61	C	VC	C	300	nil	493.56	nil
SP43931812	nil	nil	nil	F	nil	nil	nil	nil	0.00	nil
SP43931813	nil	nil	nil	F	nil	nil	nil	nil	0.00	nil
SP43931819	nil	nil	nil	F	VC	C	100	nil	0.00	nil
SP43931901	132.19	130.79	127.86	F	VC	C	225	nil	23.35	nil
SP43931902	129.86	128.23	nil	F	VC	C	300	nil	0.00	nil
SP43931903	129.66	nil	127.71	F	nil	nil	nil	nil	0.00	nil
SP43931905	nil	nil	nil	F	nil	nil	nil	nil	0.00	nil
SP43931907	nil	nil	nil	F	nil	nil	nil	nil	0.00	nil
SP43931909	nil	nil	nil	F	nil	nil	nil	nil	0.00	nil
SP43931914	nil	nil	nil	F	nil	nil	nil	nil	0.00	nil
SP43931917	nil	nil	nil	F	nil	nil	nil	nil	0.00	nil
SP43931920	131.05	129.09	nil	S	VC	C	225	nil	0.00	nil
SP43931921	131.08	129.08	128.98	C	VC	C	225	nil	205.20	nil
SP43940001	133.25	131.11	129.66	C	VC	C	300	nil	35.92	nil
SP43940002	134.64	132.94	nil	C	VC	C	300	nil	0.00	nil
SP43940003	134.11	132.69	131.12	C	VC	C	225	nil	24.11	nil
SP43940004	134.21	132.74	132.19	F	VC	C	150	nil	83.44	nil
SP43940005	134.18	132.69	132.27	S	VC	C	150	nil	97.12	nil
SP43940006	134.15	132.24	132.19	S	VC	C	150	nil	60.00	nil

MATERIALS		SHAPE		PURPOSE	
-	- NONE	PE	- POLYETHYLENE	C	- CIRCULAR
AC	- ASBESTOS CEMENT	PF	- PITCH	E	- EGG SHAPED
BR	- BRICK	PP	- POLYPROPYLENE	O	- OTHER
CC	- CONCRETE BOX CULVERT	PSC	- PLASTIC STEEL COMPOSITE	R	- RECTANGLE
CI	- CAST IRON	PVC	- POLYVINYL CHLORIDE	S	- SQUARE
CO	- CONCRETE	RPM	- REINFORCED PLASTIC MATRIX	T	- TRAPEZOIDAL
CSB	- CONCRETE SEGMENTS (BOLTED)	SI	- SPUN (GREY) IRON	U	- UNKNOWN
CSU	- CONCRETE SEGMENTS (UNBOLTED)	ST	- STEEL		
DI	- DUCTILE IRON	U	- UNKNOWN		
GRC	- GLASS REINFORCED CONCRETE	VC	- VITRIFIED CLAY		
RP	- GLASS REINFORCED PLASTIC	XXX	- OTHER		
MAC	- MASONRY IN REGULAR COURSES				
MAR	- MASONRY RANDOMLY COURSED				



Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD DATA TABLE

O/S Map scale:	1:1750	This map is centred upon:
Date of issue:	06.02.19	O / S Grid reference:
Sheet No.	2 of 3	x: 443026
		y: 294021

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Sewer Node

Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SP43940007	134.11	132.16	nil	C	VC	C	150	nil	0.00	nill
SP43940101	134.12	133.08	132.76	F	VC	C	150	nil	76.28	nill
SP43940102	134.08	133.04	132.72	S	VC	C	150	nil	71.25	nill
SP43941001	132.97	130.92	129.60	S	VC	C	150	nil	28.83	nill
SP43941002	132.37	130.30	129.57	F	VC	C	150	nil	43.92	nill
SP43941003	131.19	129.54	129.39	F	VC	C	150	nil	113.53	nill
SP43941004	131.18	129.52	129.33	S	VC	C	225	nil	74.42	nill
SP43941005	131.08	129.31	129.30	S	VC	C	225	nil	412.00	nill
SP43941006	131.05	129.38	129.31	F	VC	C	150	nil	57.14	nill
SP43941007	131.02	129.26	129.12	S	VC	C	225	nil	129.36	nill
SP43941008	131.03	129.29	129.11	F	VC	C	150	nil	117.22	nill
SP43941204	134.67	133.05	nil	C	VC	C	225	nil	0.00	nill

MATERIALS

-	- NONE	PE	- POLYETHYLENE
AC	- ASBESTOS CEMENT	PF	- PITCH
BR	- BRICK	PP	- POLYPROPYLENE
CC	- CONCRETE BOX CULVERT	PSC	- PLASTIC STEEL COMPOSITE
CI	- CAST IRON	PVC	- POLYVINYL CHLORIDE
CO	- CONCRETE	RPM	- REINFORCED PLASTIC MATRIX
CSB	- CONCRETE SEGMENTS (BOLTED)	SI	- SPUN (GREY) IRON
CSU	- CONCRETE SEGMENTS (UNBOLTED)	ST	- STEEL
DI	- DUCTILE IRON	U	- UNKNOWN
GRC	- GLASS REINFORCED CONCRETE	VC	- VITRIFIED CLAY
RP	- GLASS REINFORCED PLASTIC	XXX	- OTHER
MAC	- MASONRY IN REGULAR COURSES		
MAR	- MASONRY RANDOMLY COURSED		

SHAPE

C	- CIRCULAR
E	- EGG SHAPED
O	- OTHER
R	- RECTANGLE
S	- SQUARE
T	- TRAPEZOIDAL
U	- UNKNOWN

PURPOSE

C	- COMBINED
E	- FINAL EFFLUENT
F	- FOUL
L	- SLUDGE
S	- SURFACE WATER

TABULAR KEY

- A. Sewer pipe data refers to downstream sewer pipe.
- B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.
- C. Gradient is stated a 1 in...



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SEWER RECORD DATA TABLE

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Appendix F

British Geological Survey

Borehole Log

A F Howland Associates

Telephone Norwich (0603) 58637

Borehole Record

Method **Shell & Auger** Date **25.5&31.5.88**

Site **LEICESTER ROAD, HINCKLEY**

Bh No
2

Dia mm **150** Coord

Ground Level m.OD **132.71**

Soil Samples/Tests
Type/Test Depth m.

Water & Progress
OD Level m. Depth m.

Description of Strata Legend

B 1	0.20 - 0.60		132.01	0.7	NATURAL GROUND Reddy grey building rubble and ash	XXXXXX XXXXXX XXXXXX XXXXXX
D 1	0.95				Firm yellow brown mottled silty sandy CLAY	- x -
U 1(50)	1.00 - 1.45		131.51	1.20	Firm brown mottled very sandy slightly gravelly CLAY	- . -
D 2	1.45		131.11	1.60		- . -
D 3	1.70					- . -
U 2(45)	1.80 - 2.25					- . -
D 4	2.30					- . -
D 5	2.60					- . -
U 3(40)	2.80 - 3.25				Firm brown mottled black and yellow brown flint gravelly, silty sandy, becoming very sandy, CLAY	- . -
D 6	3.25					- . -
D 7	3.40					- . -
U 4(40)	3.60 - 4.05					- . -
D 8	4.05		128.61	4.10		- . -
D 9	4.20					- . -
C 1(13)	4.50 - 4.95				Medium dense brown clayey fine medium coarse SAND and fine medium coarse GRAVEL, bound	- . -
B 2	4.50 - 4.95					- . -
C 2(28)	5.20 - 5.65		127.51	5.20		- . -
B 3	5.20 - 5.65					- . -
W 1	5.20					- . -
C 3(33)	6.40 - 6.85					- . -
B 4	6.40 - 6.85					- . -
C 4(30)	7.60 - 8.05				Medium dense to dense brown slightly silty fine medium coarse very sandy fine medium coarse GRAVEL	- . -
B 5	7.60 - 8.05					- . -
C 5(26)	9.10 - 9.55					- . -
B 6	9.10 - 9.55					- . -
D 10	9.70		123.11	9.60	Very stiff to hard grey sandy chalk gravelly CLAY, Boulder Clay	- . -
U 5(90)	9.90 - 10.35					- . -

Remarks

Chiselling required GL-0.7m for 0.5hrs; Water at 5.2m on pulling casing

Sheet 1 of 3

Sample/Test key.
U () U100 sample (blows)
D Disturbed sample
B Bulk sample
W Water sample

Penetration Tests
S () Standard (N value)
C () Cone (N value)
- Progress & Day

Logged by **A.F.H.** Scale **1:50** Final Casing depth **10.35m** Job No. **AB114**

Appendix G

Microdrainage Network Calculations

JMS (Midlands) Ltd		Page 1
Victoria Count	Wood Street	
Tennant St Nuneaton	Hinckley	
Warwickshire CV11 4LZ	Network	
Date 18/03/2019	Designed by BP	
File CO19_039_02_Network.mdx	Checked by	
XP Solutions	Network 2017.12	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	18.000	0.180	100.0	0.067	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	13.200	0.120	110.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	21.700	0.150	144.7	0.067	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	10.600	0.110	96.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	21.700	0.220	98.6	0.067	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	5.000	0.040	125.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	10.100	0.100	101.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.30	132.650	0.067	0.0	0.0	0.0	1.00	17.8	9.1
1.001	50.00	5.53	132.470	0.067	0.0	0.0	0.0	0.96	16.9	9.1
2.000	50.00	5.43	133.270	0.067	0.0	0.0	0.0	0.83	14.7	9.1
2.001	50.00	5.61	133.120	0.067	0.0	0.0	0.0	1.02	18.1	9.1
3.000	50.00	5.36	133.270	0.067	0.0	0.0	0.0	1.01	17.9	9.1
3.001	50.00	5.45	133.050	0.067	0.0	0.0	0.0	0.90	15.9	9.1
1.002	50.00	5.74	132.275	0.201	0.0	0.0	0.0	1.30	51.7	27.2

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.002		134.000	132.175	0.000	0	0

JMS (Midlands) Ltd		Page 2
Victoria Count	Wood Street	
Tennant St Nuneaton	Hinckley	
Warwickshire CV11 4LZ	Network	
Date 18/03/2019	Designed by BP	
File CO19_039_02_Network.mdx	Checked by	
XP Solutions		Network 2017.1.2
<u>Simulation Criteria for Storm</u> Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 0.000 Hot Start (mins) 0 Inlet Coefficient 0.800 Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000 Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 1 Number of Storage Structures 3 Number of Real Time Controls 0 <u>Synthetic Rainfall Details</u> Rainfall Model FSR Profile Type Summer Return Period (years) 2 Cv (Summer) 0.750 Region England and Wales Cv (Winter) 0.840 M5-60 (mm) 19.600 Storm Duration (mins) 30 Ratio R 0.404		
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JMS (Midlands) Ltd		Page 3
Victoria Count	Wood Street	
Tennant St Nuneaton	Hinckley	
Warwickshire CV11 4LZ	Network	
Date 18/03/2019	Designed by BP	
File CO19_039_02_Network.mdx	Checked by	
XP Solutions	Network 2017.1.2	
Online Controls for Storm		
Hydro-Brake® Optimum Manhole: 7, DS/PN: 1.002, Volume (m³): 2.3		
Unit Reference MD-SHE-0098-5000-1500-5000 Design Head (m) Design Flow (l/s) Flush-Flo™ Objective Application Sump Available Diameter (mm) Invert Level (m) Minimum Outlet Pipe Diameter (mm) Suggested Manhole Diameter (mm) 1.500 5.0 Calculated Minimise upstream storage Surface Yes 98 132.275 150 1200		
Control Points Head (m) Flow (l/s) Design Point (Calculated) 1.500 5.0 Flush-Flo™ 0.431 4.9 Control Points Head (m) Flow (l/s) Kick-Flo® 0.878 3.9 Mean Flow over Head Range - 4.3		
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated		
Depth (m) Flow (l/s) 0.100 3.2 0.200 4.4 0.300 4.8 0.400 4.9 0.500 4.9 0.600 4.8 0.800 4.3 1.000 4.1 Depth (m) Flow (l/s) 1.200 4.5 1.400 4.8 1.600 5.1 1.800 5.4 2.000 5.7 2.200 6.0 2.400 6.2 2.600 6.5 Depth (m) Flow (l/s) 3.000 6.9 3.500 7.4 4.000 7.9 4.500 8.4 5.000 8.8 5.500 9.2 6.000 9.6 6.500 10.0 Depth (m) Flow (l/s) 7.000 10.3 7.500 10.7 8.000 11.0 8.500 11.3 9.000 11.6 9.500 11.9		
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JMS (Midlands) Ltd		Page 4
Victoria Count	Wood Street	
Tennant St Nuneaton	Hinckley	
Warwickshire CV11 4LZ	Network	
Date 18/03/2019	Designed by BP	
File CO19_039_02_Network.mdx	Checked by	
XP Solutions		Network 2017.12

Storage Structures for Storm

Complex Manhole: 1, DS/PN: 1.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	27.0
Max Percolation (l/s)	37.5	Slope (1:X)	300.0
Safety Factor	1.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	133.270	Cap Volume Depth (m)	0.350

Cellular Storage

Invert Level (m)	132.650	Safety Factor	1.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	40.0	40.0	0.900	0.0	62.4
0.800	40.0	62.4			

Porous Car Park Manhole: 3, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	21.0
Max Percolation (l/s)	58.3	Slope (1:X)	300.0
Safety Factor	1.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	133.270	Cap Volume Depth (m)	0.350

Porous Car Park Manhole: 5, DS/PN: 3.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	27.8	Slope (1:X)	300.0
Safety Factor	1.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	133.270	Cap Volume Depth (m)	0.350

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JMS (Midlands) Ltd				Page 5																																																																																																																
Victoria Count			Wood Street																																																																																																																	
Tennant St Nuneaton			Hinckley																																																																																																																	
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File CO19_039_02_Network.mdx			Checked by																																																																																																																	
XP Solutions			Network 2017.12																																																																																																																	
<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>																																																																																																																				
<u>Simulation Criteria</u> Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000 Hot Start Level (mm) 0 Inlet Coeffiecient 0.800 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (1/per/day) 0.000 Foul Sewage per hectare (1/s) 0.000 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 1 Number of Storage Structures 3 Number of Real Time Controls 0																																																																																																																				
<u>Synthetic Rainfall Details</u> Rainfall Model FSR Ratio R 0.405 Region England and Wales Cv (Summer) 0.750 M5-60 (mm) 19.800 Cv (Winter) 0.840 Margin for Flood Risk Warning (mm) 300.0 Analysis Timestep 2.5 Second Increment (Extended) DTS Status OFF DVD Status OFF Inertia Status OFF Profile(s) Summer and Winter Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440 Return Period(s) (years) 1, 30, 100 Climate Change (%) 0, 0, 40																																																																																																																				
<table><tr><td></td><td>US/MH</td><td></td><td>Return</td><td>Climate</td><td>First (X)</td><td>First (Y)</td><td>First (Z)</td><td>Overflow</td><td>Water</td></tr><tr><td>PN</td><td>Name</td><td>Storm</td><td>Period</td><td>Change</td><td>Surcharge</td><td>Flood</td><td>Overflow</td><td>Act.</td><td>Level</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>(m)</td></tr><tr><td>1.000</td><td>1</td><td>60 Winter</td><td>1</td><td>+0%</td><td>1/30 Winter</td><td></td><td></td><td></td><td>132.827</td></tr><tr><td>1.001</td><td>2</td><td>15 Winter</td><td>1</td><td>+0%</td><td>1/15 Summer</td><td></td><td></td><td></td><td>132.856</td></tr><tr><td>2.000</td><td>3</td><td>30 Winter</td><td>1</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>133.330</td></tr><tr><td>2.001</td><td>4</td><td>30 Winter</td><td>1</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td><td>133.175</td></tr><tr><td>3.000</td><td>5</td><td>15 Winter</td><td>1</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>133.339</td></tr><tr><td>3.001</td><td>6</td><td>15 Winter</td><td>1</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td><td>133.132</td></tr><tr><td>1.002</td><td>7</td><td>15 Winter</td><td>1</td><td>+0%</td><td>1/15 Summer</td><td></td><td></td><td></td><td>132.919</td></tr></table>								US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water	PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level										(m)	1.000	1	60 Winter	1	+0%	1/30 Winter				132.827	1.001	2	15 Winter	1	+0%	1/15 Summer				132.856	2.000	3	30 Winter	1	+0%	100/15 Summer				133.330	2.001	4	30 Winter	1	+0%	30/15 Summer				133.175	3.000	5	15 Winter	1	+0%	100/15 Summer				133.339	3.001	6	15 Winter	1	+0%	30/15 Summer				133.132	1.002	7	15 Winter	1	+0%	1/15 Summer				132.919										
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Warwickshire CV11 4LZ	Network	
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XP Solutions	Network 2017.1.2	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Synthetic Rainfall Details

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	120 Winter	30	+0%	1/30 Winter				133.337
1.001	2	60 Winter	30	+0%	1/15 Summer				133.334
2.000	3	30 Winter	30	+0%	100/15 Summer				133.382
2.001	4	60 Winter	30	+0%	30/15 Summer				133.351
3.000	5	15 Winter	30	+0%	100/15 Summer				133.406
3.001	6	60 Winter	30	+0%	30/15 Summer				133.345
1.002	7	60 Winter	30	+0%	1/15 Summer				133.339

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Victoria Count	Wood Street	
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XP Solutions	Network 2017.12	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.405
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 19.800 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

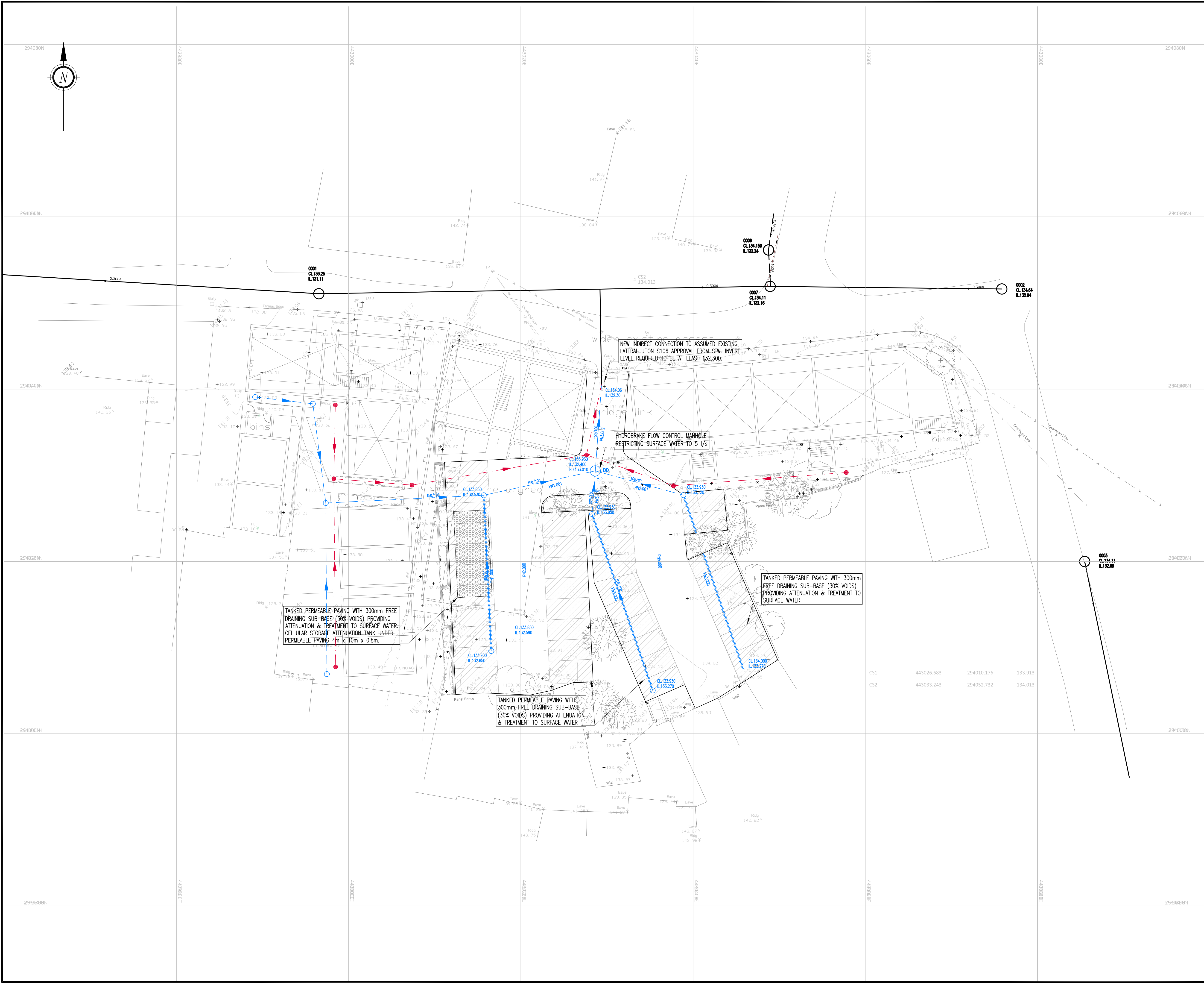
Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	120 Winter	100	+40%	1/30 Winter				133.635
1.001	2	120 Winter	100	+40%	1/15 Summer				133.628
2.000	3	120 Winter	100	+40%	100/15 Summer				133.633
2.001	4	120 Winter	100	+40%	30/15 Summer				133.626
3.000	5	120 Winter	100	+40%	100/15 Summer				133.634
3.001	6	120 Winter	100	+40%	30/15 Summer				133.625
1.002	7	120 Winter	100	+40%	1/15 Summer				133.621

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Over-flow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.835	0.000	0.13		2.2	FLOOD RISK	
1.001	2	1.008	0.000	0.13		1.9	FLOOD RISK	
2.000	3	0.213	0.000	0.60		8.4	SURCHARGED	
2.001	4	0.356	0.000	0.43		7.0	SURCHARGED	
3.000	5	0.214	0.000	0.58		9.8	FLOOD RISK	
3.001	6	0.425	0.000	0.66		8.2	SURCHARGED	
1.002	7	1.121	0.000	0.11		4.9	SURCHARGED	

Appendix H

Proposed Drainage Strategy Plan



Drainage Key			
Private Surface Water		Private Foul Water	
Surface Water Manhole Text	CL.00.00 IL.00.00 BD.00.00	Foul Water Manhole Text	CL.00.00 IL.00.00 BD.00.00
Surface Water Pipe Diameter / Gradient	150/150	Foul Water Pipe Diameter / Gradient	150/150
Perforated Pipe			
Crate Attenuation			
Permeable Paving			

Existing Services Key	
Combined Sewer	0.7500
Surface Water Sewer	0.7500
Foul Water Sewer	0.3000

- General Notes:
- Do not scale this drawing. All dimensions are in metres unless otherwise noted. Any discrepancies are to be recorded and reported to the engineers immediately.
 - This drawing is to be read in conjunction with all other engineers and architects drawings, and the specification.
 - All work is to be to the satisfaction of the engineer and local authority building control.
 - The contractor is responsible for and must take all necessary precautions to ensure the stability of the works at all times during construction.
 - All workmanship and materials are to be to current British Standards.
 - All services are to be located and protected as necessary by the contractor prior to the commencement of the works.
 - Any existing details which are shown on this drawing are for guidance only and are to be checked on site by the contractor. Any variations are to be recorded and reported to the engineer immediately.
 - All highway works are to be in accordance with the local authorities design guide and specification.
 - Prior to the occupation of the first dwelling, street nameplates shall be erected in accordance with the highway authority and to the wording agreed with the planning authority.
 - During construction works on site, all roads and footpaths are to be swept and kept clear of obstructions, this is to include existing highways as appropriate to ensure safe passage of all road users.
 - Provision shall be made for the installation of all mains services including ducting prior to the laying of the road base-course.
 - All road markings and signs are to be in accordance with 'the traffic signs regulations and directions' 2016.
 - All sewer works are to be in accordance with sewers for adoption 6th edition.
 - All private connections to adoptable sewers should be a minimum of 100mm diameter (foul) and 150mm diameter (surface) made in vitrified clay connecting soffit to soffit.

P1 INITIAL ISSUE			
Rev	Notes	Drawn	Approved
			
Issuing Office: JMS Midlands (Nuneaton): Victoria Court, 25 Tennant Street Nuneaton, Warwickshire, United Kingdom, CV11 4LZ, Tel: 02476 350505			
Project PROPOSED APARTMENTS AT WOOD STREET HINCKLEY			
Drawing Title DRAINAGE STRATEGY			
Client ONYX ROSE			
Date MAR 2019	Drawn By BP	Checked By BP	
Scale 1:200 			
Drawing No. CO19_039_02 - 001		Sheet Size A1	Revision P1
STRATEGY			