

ALAN CRITCHLOW

PROPOSED RESIDENTIAL DEVELOPMENT
SCROPTON ROAD, SCROPTON

FLOOD RISK ASSESSMENT

ADC Infrastructure Limited
Western House
Western Street
Nottingham
NG1 3AZ
tel. 0115 9414817
www.ADCinfrastructure.com

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1.0 INTRODUCTION

- 1.1 ADC Infrastructure have been commissioned to produce a Flood Risk Assessment (FRA) in support of a planning application for a residential development on a site off Scropton Road in Scropton (approximate grid reference 419405, 330232). An application is being made to South Derbyshire District Council for planning consent.
- 1.2 This Flood Risk Assessment has been carried out in accordance with the requirements of the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance (PPG). It investigates the flood risk posed to the site from fluvial, pluvial, sewer and groundwater-based sources. A section in this document provides requirements for mitigation and an analysis of any likely residual risks.
- 1.3 The report also considers the specific conditions that have been accorded to the site as part of Policy 23L of the Adopted Plan for South Derbyshire, and how these have been discharged.

2.0 SOURCES OF INFORMATION

2.1 The report has been based upon a variety of information sources as listed below:

- Severn Trent sewer asset record plans;
- Topographical survey;
- Proposed Site Layout;
- Environment Agency Flood mapping.
- South Derbyshire Local Plan.
- South Derbyshire Strategic Flood Risk Assessment (SFRA)
- Derbyshire County Council- Flood Investigation Report
- Derbyshire County Council – LLFA Early Engagement Report

3.0 EXISTING SITE

- 3.1 The existing site is located off Scropton Road in the village of Scropton. The plot covers an area of approximately 0.695ha and is accessed directly from Scropton Road.
- 3.2 The site is currently a brownfield site that consists of Hawthorn Farm and its associated farm buildings and yard area. There is an onsite track that leads off Scropton Road and is the primary access route onto the site.
- 3.3 Scropton Road forms the southern boundary of the site. To the west and east there are private residential properties, whilst to the north is existing greenfield/agricultural land. A location plan is included below in **Figure 1**.

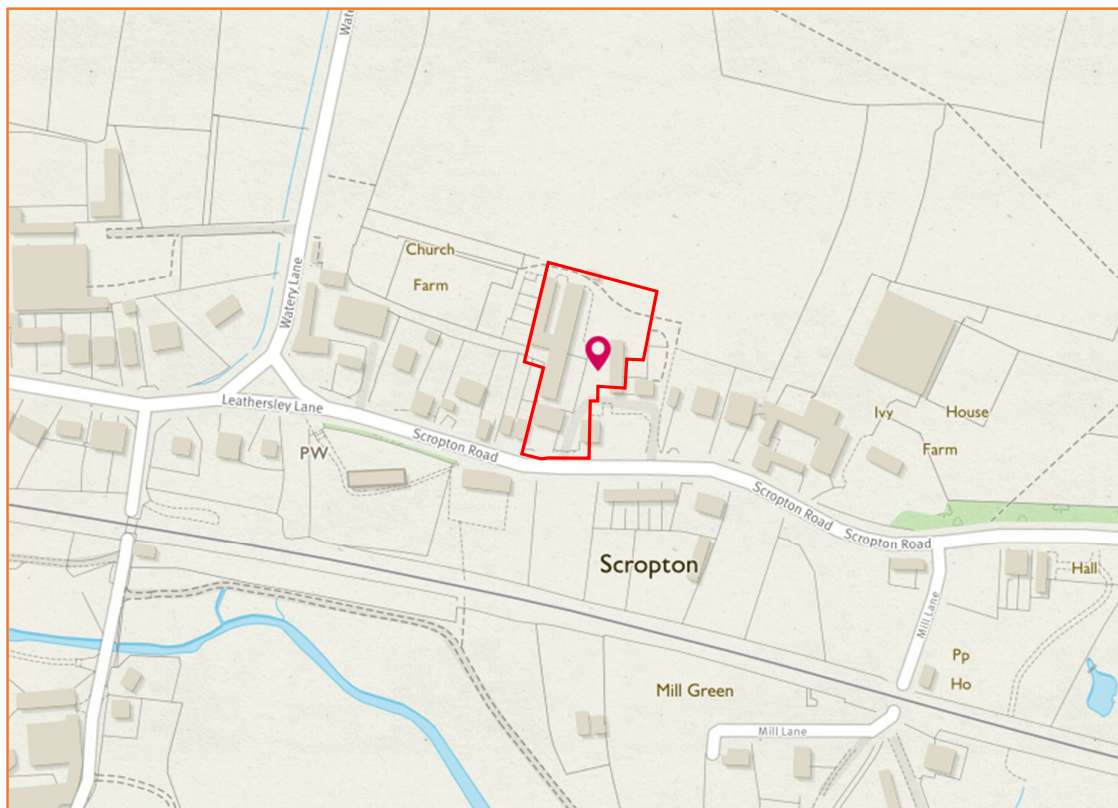


Figure 1 – Approximate site location.

- 3.4 Towards the front of the site there is a relatively new detached property that falls within the red line boundary of the site but will be separate from the proposed development.
- 3.5 The site has a gentle rise from the site entrance on Scropton Road, where levels are lowest, towards the rear of the site. Adjacent to the northern site boundary there is a grassed soil mound which forms the highest point on the site. A copy of the topographical survey is provided in **Appendix A**.
- 3.6 The topographic survey also picked up elements of an existing drainage network that serve the site. Further information provided by the site owner confirmed the presence of a recently laid 150mm surface water pipe that currently serves the existing properties at the front of the site and connects into the existing public sewer in Scropton Road. It is also anticipated that this new surface water sewer will serve the new development.

- 3.7 Drawing ADC1863/DR/50 has been prepared by ADC Infrastructure which shows the existing drainage layout for the site, based off the information provided by Severn Trent, and drainage plans provided the private landowner. A copy of which can be found in **Appendix B**.

Geology

- 3.8 The British Geological Survey (BGS) online mapping was reviewed to give an indication of the underlying ground conditions on site. The online mapping showed that the bedrock geology and superficial deposits were as follows:

Bedrock Geology: *Mercia Mudstone Group – Sedimentary Bedrock formed approximately 201 to 252 million years ago in the Triassic Period. Local environment previously dominated by hot deserts.*

Superficial Deposits: *Alluvium – Clay, Silt, Sand and Gravel. Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by rivers.*

- 3.9 The historic borehole records held by the BGS were also reviewed for the site. The nearest deep borehole (> 30m below ground level) was on the former Holly Bank Farm site off Scropton Road, which was drilled to a depth of 210m. The borehole log showed that the soil strata consist of a layer of topsoil underlain by clays and marls, with a bedrock of sandstone underneath.

Soils

- 3.10 The Cranfield Soil and Agrifood Institute Soils mapping for the site was also reviewed. The mapping showed that the site is underlain by two separate soil types.
- 3.11 Most of the site is underlain by freely draining, slightly acid loamy soils. Whilst the soils towards the rear of the site and the neighbouring agricultural land to the north are described as “loamy and clayey floodplain soils with naturally high ground groundwater”. These soils are described as naturally wet and have impeded drainage.

Onsite Drainage Implications

- 3.12 Given the complex nature of the underlying soils and geology, it is unknown whether infiltration-based drainage systems, such as swales and soakaways will be viable on site.
- 3.13 A full ground investigation, that includes infiltration testing done in accordance to BRE 365 guidance would confirm onsite ground conditions and provide an infiltration rate for the underlying soil strata. From this a definitive judgement can be made on the suitability of infiltration drainage techniques on site.

Flood Warnings/Flood Alert

- 3.14 The site along with the rest of Scropton falls within a Flood Warning Area and receives the Flood Warning Service from the Environment Agency. This advises residents on the appropriate actions to take in event of flooding in the area.

4.0 PROPOSED DEVELOPMENT

- 4.1 The development comprises of a proposed residential development of 10 dwellings with associated car parking facilities. The existing Hawthorn Farm building and detached property at the front of the site will be retained. The main access off Scropton Road will also be retained and will continue to serve the proposed development.
- 4.2 The proposed development will involve a change in site use from a former farm yard/ storage area to a residential development and will mean that future site users will be on site on a more permanent basis.
- 4.3 A masterplan of the proposed development has been provided and is included in **Appendix C**.

5.0 PLANNING CONTEXT

Flood and Water Management Act

5.1 In combination with the Flood Risk Regulations, 2009 (which enact the EU Floods Directive in England and Wales), the Flood and Water Management Act places significantly greater responsibility on Local Authorities to manage and lead on local flooding issues. The Act and Regulations together raise the requirements and targets that Local Authorities need to meet, this includes:

- To play an active role in leading flood risk management in an area;
- The development of a Local Flood Risk Management Strategy;
- To prepare preliminary flood risk assessments (PFRAs), flood hazard and risk maps, and flood risk management plans (FRMPs);
- To develop and implement drainage and flood risk management strategies;
- To be responsible for the approval, adoption and subsequent maintenance of Sustainable Urban Drainage Systems (SuDs).

5.2 The Local Lead Flood Authority (LLFA) for the Scropton area is Derbyshire County Council (DCC), have responsibility for the management of flood risk for the local area. DCC have been consulted during the preparation of this FRA.

The National Planning Policy Framework (NPPF)

5.3 The NPPF sets out the government's planning policies for England and the expectations of how these policies should be applied. It acts as guidance for local planning authorities and decision-makers, both in drawing up plans and making decisions about individual planning applications.

5.4 Section 14 of the NPPF sets out how the government intends decision-making authorities to meet the challenge of climate change plus flooding and coastal change. Paragraph 155 sets out how inappropriate development in areas at risk of flooding should be avoided by directing development away from these areas, but where development is necessary, making it safe for its lifetime without increasing flood risk elsewhere.

5.5 Paragraph 159 advises:

“If it is not possible for development to be located in zones with a lower risk of flooding, the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in national planning guidance.”

5.6 Paragraph 160 advises that:

“The application of the exception test should be informed by a strategic or site-specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. For the exception test to be passed it should be demonstrated that:

- a) *the development would provide wider sustainability benefits to the community that outweigh the flood risk; and*

- b) *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 overall."*

5.7 Paragraph 163 continues to advise 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. 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;*
- 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."*

Planning Practice Guidance (PPG)

5.8 The PPG associated with the NPPF provides more detailed guidance on how the requirements of the NPPF can be met in practice. It includes recommendations on the allowances for climate change and for the application the sequential and exception tests. Three critically important tables are included within the PPG that set the framework for discussion and analysis of site-specific flood risk.

5.9 Table 1 of the Planning Practice Guidance defines flood zones based upon event return probability and is used to steer development and classify land for development. The table is reproduced below.

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. (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. (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)

5.10 Table 2 of the Planning Practice Guidance defines development type by associated vulnerability to flooding. The table is reproduced overleaf.

Vulnerability Classification	Definition
Essential Infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly Vulnerable	• Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure').
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.
Less Vulnerable	• Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'More Vulnerable' class; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill* and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
Water Compatible Development	• Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves.

	• Navigation facilities. • Ministry of Defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.
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5.11 Table 3 of the Planning Practice Guidance (Flood Risk Vulnerability and flood zone 'compatibility') outlines the circumstances in which development may or may not be appropriate and when an Exception Test will be required. The table is reproduced below.

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 †	✗	Exception Test Required	✓	✓
Zone 3b	Exception Test Required*	✗	✗	✗	✓*

† In Flood Zone 3a – essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional flood plain) essential infrastructure that must be there and has passed the Exception Test, and water-compatible uses, should be designed to:

- remain operational and safe for users in times of flood
- result in no net loss of flood plain storage
- not impede water flows and not increase flood risk elsewhere.

South Derbyshire Local Plan, 2016

5.12 The site falls within the jurisdiction of South Derbyshire and so is subject to the policies and guidance specified within the Local Plan. The latest plan was adopted by the Council in June 2016 and covers the period 2011 to 2028.

5.13 Policy SD2 is the specific policy relating to flood risk that all proposed developments should adhere to. The policy states that:

- All development proposals in South Derbyshire must follow a sequential approach to flood risk management and priority should be given to sites with the lowest flood risk;
- Developments within areas identified as being risk of flooding should:
 - Be resilient to flooding through design and layout;
 - Incorporate appropriate mitigation measures;

- *Not increase flood risk to other properties or the surrounding area;*
 - *Not affect the integrity or continuity of existing flood defences.*
- *Suitable measures to deal with surface water runoff are required to minimise increasing flood risk locally. Preferably through the incorporation of Sustainable Drainage Systems (SuDs) within the development design;*
 - *For developers to restore culverted watercourses where suitable to a natural state;*
 - *To contribute to the enhancement of watercourses in accordance with the objectives of the Water Framework Directive.*
 - *That proposals for flood management that lower the risk of flooding to the surrounding local areas will be actively supported by the Council.*

5.14 Policy SD3 specifically relates to sustainable water supply, drainage and sewerage infrastructure. In terms of surface water and foul drainage, the policy states:

- *Surface water from new development will be expected to be managed using SuDs; discharge to watercourse; or connection to a surface water mains sewer. Only where these options are not technically feasible and in consultation with Water Companies, will surface water discharges to a combined sewer be permitted.*
- *Foul flows generated by new development will be expected to connect to the mains sewer. Only where a connection to the mains sewer is not technically feasible (given the nature and scale of proposals) will discharge to package treatment works, septic tanks or cess pits be permitted.*

5.15 In Part 2 of the Adopted Plan for South Derbyshire, the site was allocated a specific policy (Policy H23L) as part of the wider Non-Strategic Housing Allocations for the District area.

5.16 In terms of flood risk, Policy H23L states:

“an appropriate flood risk assessment to identify appropriate measures to protect the site from residual flood risk in the event of flood defence failure.”

Flood Risk Status

5.17 The Environment Agency were consulted and provided the Product 4 (Flood Mapping) dataset for Scropton which showed that the site lies within Flood Zone 3 (see Figure 2), but within an area that currently benefits from flood defences. A copy of the Product 4 dataset can be found in **Appendix D**.

5.18 The proposed development is residential and is therefore categorised as ‘more vulnerable’ under the guidance given in Table 2 the PPG. In accordance with Table 3 of the PPG and as the development is nominally within Flood Zone 3, both the Sequential and Exception Tests would normally be required.

5.19 However, the site currently benefitting from flood defences, and as such the risk to the site is significantly reduced. Therefore, the development can be considered to be suitable.

5.20 A summary of the flood risk status of the proposed development is provided in the table below.

Flood Zone	Flood Zone 3- Area that benefits from flood defences
Development Vulnerability Classification	More Vulnerable
Flood Zone Compatibility	Sequential and Exception Test are required.

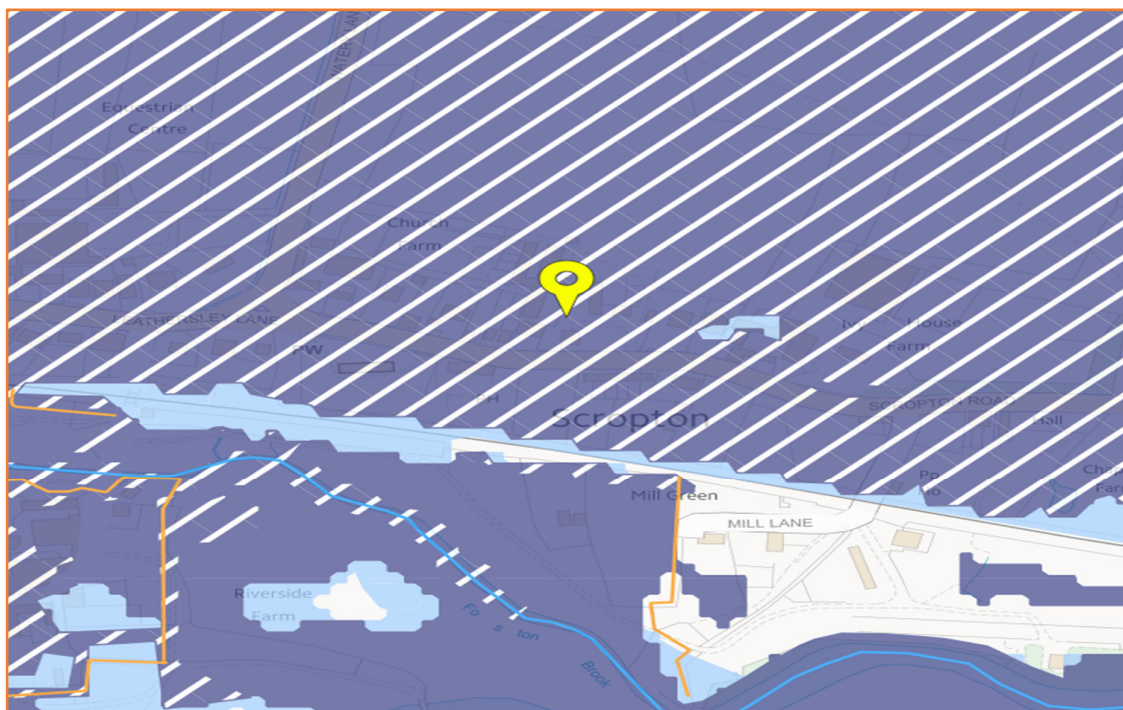


Figure 2 - EA Flood Map for Planning extract, showing fluvial flood risk to the site.

Flood history and consultation

- 5.21 DCC as the LLFA for Scropton are required under Section 19 of the Flood and Water Management Act to investigate all flooding incidents that occur within Derbyshire. Due to a history of repeated flood events within Scropton, a formal flood investigation for Scropton was undertaken. DCC have provided a copy of the flood investigation report as part of their formal response.
- 5.22 The report detailed the localised flooding in Scropton following an intense rainfall event in July 2012, that resulted in road closures and the internal flooding of some properties in the village. It also highlighted the last serious flood event in November 2000, and that both Scropton Road and Leathersley Lane were known to have previously flooded.
- 5.23 The flooding was attributed to heavily saturated soils following an exceptionally wet period of weather, that were unable to absorb the additional water and led to the inundation of the local drainage network. This was further exacerbated by the poor condition of the existing road drainage network, and the minor watercourse that drains the land to the north of the village being culverted under Leathersley Lane.
- 5.24 Most of the flooding in Scropton was around the junction of Watery Lane and Leathersley Lane and didn't impact the site directly. Although it did prompt DCC and other relevant agencies to improve flood defences in the village, and to ensure that all drainage assets are maintained on a regular basis. A copy of the Flood Investigation Report provided by DCC can be found in **Appendix E**.
- 5.25 DCC did also confirm that according to its own internal datasets, there are currently no known records of historical flooding within 100m of the site boundary.
- 5.26 A review of the publicly available Recorded Flood Outlines dataset showed the Environment Agency only had records for the 1957 flood event. This was attributed to the channel capacity of both the River Dove and Foston Brook being exceeded, and no formal flood defences being in place.

- 5.27 As part of their data request response the Environment Agency provided a recorded flooding outlines map that shows the extent of the 1957 event. The site is shown to fall within the area that was flooded. A copy of the recorded flood event outline mapping can be found within **Appendix D**.

6.0 FLOOD RISK ASSESSMENT

Existing risks

- 6.1 In accordance with the NPPF and local planning guidance, this Flood Risk Assessment considers the risk posed to the development from a range of flooding sources. This section of the report details the investigation of flood risk from all pertinent sources; a subsequent section provides recommended mitigation where the risk is deemed significant.
- 6.2 The flood risks that may be posed to any site are summarised in the table below. The degree of risk to the site is indicated in the table below and site-specific factors site are outlined and described in greater detail within the forthcoming sections.

Flooding Source	Degree of Risk	Source of Risk
Fluvial	Low	The nearest watercourses to the site are the Foston Brook and the River Dove. These have previously posed a significant flood risk to the site. However, the recent improvement of local flood defences means that the site has a reduced risk of flooding from fluvial sources.
Tidal	None	The development is not in a tidally influenced area.
Canals	None	There are no canals within the vicinity of the site.
Groundwater	Low	The LLFA have done an initial assessment of the groundwater flood risk to the site. They have stated that the site is potentially at risk, due to a shallow groundwater level. Ground investigation works are required on site to confirm this.
Sewers	Low	No historical sewer flooding records exist for the site. Risk deemed to be minimal.
Pluvial (Surface Water) runoff	None	The EA mapping shows no pluvial (surface water) flood risk to the site.
Reservoirs and Waterbodies	Low	The site is within an area that would be affected by flooding attributed to a reservoir failure. However, given that there is a minimal chance of this happening, then the risk can be considered to be low.

Fluvial risk

- 6.3 The closest watercourse to the site is the Foston Brook which located approximately 155m to the south-west of the site, where it then goes onto outfall in the River Dove. The Environment Agency designate the Foston Brook as a main river, due to the substantial catchment that it drains.
- 6.4 The River Dove is located approximately 300m to the south of the site. Both these watercourses, in particular the Foston Brook, are shown to pose a significant fluvial flood risk to the site. With numerous recorded flooding incidents, the most notable being in November 2000, and has resulted in the site falling within Flood Zone 3.
- 6.5 In response to this, a significant investment of £8.7 million was made jointly by the Environment Agency, Nestle and the local authority in 2012/2013 to improve the local flood defences, with the aim of protecting 1600 homes in the villages of Scropton, Hatton and Egginton. The works included

improving the existing flood defences along the Foston Brook, and the raising and extending of the defences along the River Dove.

- 6.6 The flood defences have been designed to protect the area from a 1 in 100-year (1% AEP) river flood and has significantly reduced the flood risk to the area, as can be seen in the EA Flood Map for Planning (see Figure 2). The defences are currently owned and maintained by the private landowners.
- 6.7 In April 2018, the Environment Agency conducted a visual inspection of the existing defences along the Foston Brook and made the onsite photographs publicly available on Google Street View. These show the defences along Foston Brook to be an extensive earthen bund that runs northwards from Leathersley Lane. In addition to a secondary defensive bund adjacent to the Derby-Crewe railway line and Leathersley Lane. Copies of the spot location photos taken by the Environment Agency of the flood defences can be found in **Appendix F**.
- 6.8 A formal request was sent to the Environment Agency to obtain the Product 8 (Flood Defence Breach Hazard mapping) dataset, to confirm the level of protection is offered by the current defences. As well as the maximum flood extents should these defences be breached.
- 6.9 The Environment Agency confirmed in their response that there hasn't been any breach modelling for the flood defences that protect the site. They did confirm that do have modelled data from a Strategic Flood Risk Management (SFRM) study conducted by Halcrow in 2010, of the River Dove and its tributaries.
- 6.10 The SFRM study was commissioned to produce updated flood extents, flood hazard mapping and hydraulic modelling outputs for the catchment for use by the Environment Agency. The Foston Brook as a main river, and a tributary of the River Dove was explicitly modelled. This also included the flood defences along the Foston Brook, as they were before the improvement works in 2014.
- 6.11 Model outputs for a 1 in 20-year (5% AEP), 1 in 100 year + climate change, and 1 in 1000-year (0.1% AEP) flooding events were provided as part of the modelling data package. The outputs showed how the flood defences provided adequate protection for the site up to the high order events of the 1 in 100 year + climate change and 1 in 1000 year.
- 6.12 There is relatively minor flooding to the site entrance off Scropton Road, but this can be expected as this is the lowest point on site. This can be mitigated against by designing the finished flood levels of the plots and access routes onsite are designed at an appropriate design level. A copy of the modelling outputs can be found in **Appendix G**.
- 6.13 The Environment Agency also provided mapping of the existing flood defences that protect the site. In addition to, a detailed table that lists the following:
- the construction dates of the defences
 - their designed standard of protection (SoP)
 - their graded condition based on the recent visual inspection.
- 6.14 The detailed table shows that the defences around Scropton were built in phases in the 1970s, 1990s, and most recently in 2014 as part of the improvement works. The visual inspection graded most of the defences as a 2 or "Good" rating. This means that there are minor defects to the defences, but that these wouldn't compromise the defences and reduce their overall performance.
- 6.15 The defence table records do show some flood defence structures that were graded as a 3 or "Fair". This means that there are potential defects that could reduce the effectiveness of the defences. Although it should be noted that one of these defences are natural channels to the south of the

Derby-Crewe railway line, with the other being a defensive structure linking to the rail embankment. These defences would be compensated for by the railway embankment, which would act as a “barrier” to overland flows coming from a southerly direction.

- 6.16 Given that the majority of the flood defences that currently provide protection to the site are in a good condition, and that a visual inspection was undertaken by the Environment Agency recently, then it can be assumed that the residual risk to the site at present is minimal. A copy of the flood defence records provided by the Environment Agency can be found in **Appendix F**.
- 6.17 Although it is recommended that the Environment Agency commission breach modelling on the existing defences to better understand the risk should the existing defences fail. As well as to continue regular visual inspections of the flood defences to ensure that they are in an adequate state of repair, and to conduct maintenance as and when required.

Tidal flooding

- 6.18 The site is located within an area that is not tidally influenced. Therefore, there is no current risk from tidal flooding.

Canal flooding

- 6.19 There are no canals within vicinity of the site and therefore there is no risk of canal flooding.

Groundwater flooding

- 6.20 The British Geological Survey maps for the area have been reviewed and suggest a bedrock geology composed primarily of Mercia Mudstone that is overlain by a layer of alluvium. Mudstone is highly impermeable and acts as a natural barrier for ground water levels.
- 6.21 The Local Flood Risk Management Strategy (LFRMS) produced by DCC in July 2015 was also reviewed. The report contained mapping showing indicative areas of shallow groundwater across Derbyshire. This data was obtained from the BGS SuDs Dataset and shows that the site falls within an area that has shallow ground water depths.
- 6.22 DCC also provided an LLFA Early Engagement Response for the site, as part of which, the BGS dataset held by the Council for the site was reviewed. The engagement response report highlighted that:
- There is a very significant potential for one or more geohazards associated with infiltration.
 - Ground instability problems are probably present, and increased infiltration may result in ground instability.
 - Groundwater is likely to be less than 3m below the ground surface for at least part of the year.

A copy of the LLFA Early Engagement Response can be found in **Appendix H**.

- 6.23 However, the report goes onto state this is only indicative, and that site-specific ground investigation would be required to confirm this.
- 6.24 Furthermore, the Strategic Flood Risk Assessment (SFRA) for South Derbyshire states that there had not been any recorded incidents of groundwater flooding across the District area.

- 6.25 As such the risk of groundwater flooding to the site can be considered to be low. Although a ground investigation and infiltration testing could be conducted onsite to confirm the risk.

Pluvial risk

- 6.26 The EA publish pluvial (surface water) flood maps which show the route of surface water runoff across the ground. Typically, these flood maps identify overland drainage paths that are often part of a historic natural land drainage system.
- 6.27 The mapping shows that there is no risk from pluvial flooding at present to the site. An extract of the mapping is included as **Figure 3** below.
- 6.28 The proposed development will see an increase the impermeable area on site. However, provided careful mitigation is included in the development design, it is anticipated that the risk of surface water flooding can be adequately managed on site.



Figure 3 - The pluvial flood risk to the site.

Sewer flooding

- 6.29 A developer enquiry was submitted to Severn Trent Water and as part of their formal response to the enquiry was the provision of sewer asset record plans of the area. A copy of these can be found within **Appendix I**.
- 6.30 Then plans shows that there is a small section of adopted foul water sewer within the site entrance, and public sewers located nearby in Scropton Road. There is no indication of any previous flood events that have been attributed to the existing drainage network.
- 6.31 The local Highways Authority were also consulted on whether there were any adopted surface water drainage features near the site. The Highways Authority confirmed that the gully pots on the south side of Scropton Road were indeed adopted by themselves, and that these connecting into the Severn Trent surface water sewer. There was no indication that these have been linked to any historic sewer flooding to the site directly or the surrounding area.

- 6.32 The SFRA for South Derbyshire states that Severn Trent did provide the DG5 register for the District, that shows all historic sewer flooding events due to their adopted sewer assets. Although, again there was no indication of any specific sewer flooding events having occurred within Scropton itself. As such, the risk from sewer flooding to the site can be considered low.

Reservoirs and waterbodies

- 6.33 The EA has prepared reservoir failure flood risk mapping to show the largest area that might be flooded if a reservoir were to fail. The mapping displays a worst-case scenario and is only intended as a guide.
- 6.34 The mapping indicates that the site does fall within an area that would be affected by flooding were a reservoir to fail upstream, see Figure 4 overleaf for an extract of the EA mapping.
- 6.35 However, as mentioned previously the mapping is for indicative purposes only and the actual risk to the site is minimal.
- 6.36 As such the risk to the site from reservoir flooding can be considered to be low.

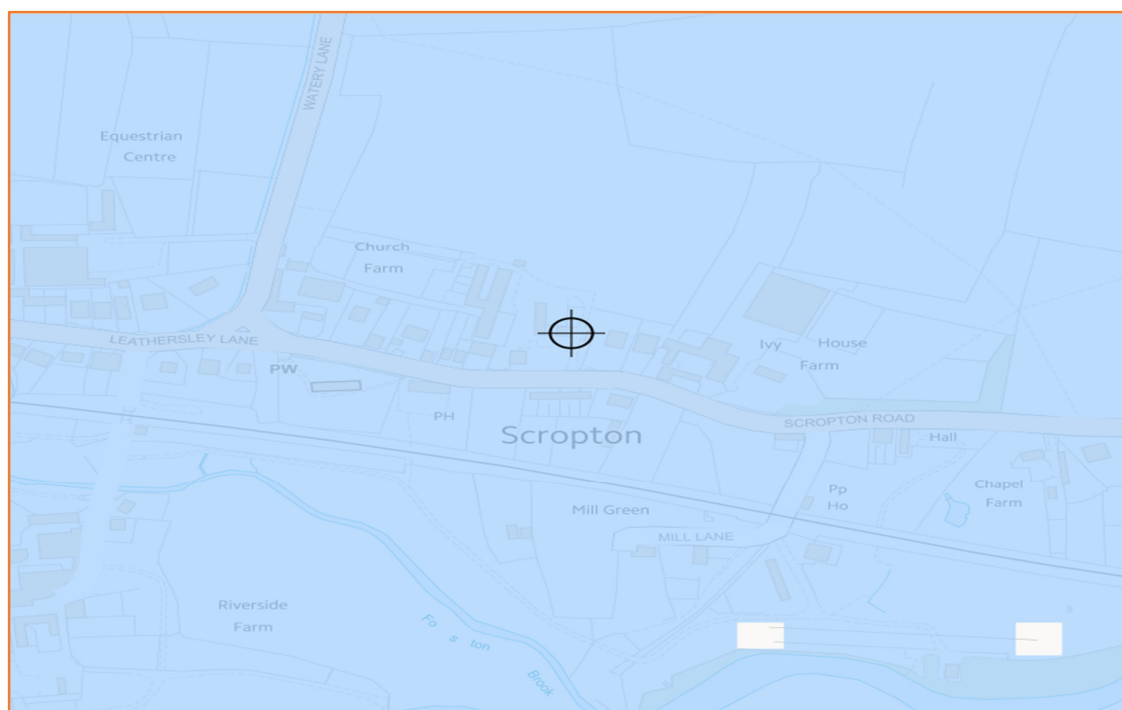


Figure 4 - The flood risk from reservoirs to the site.

Proposed Mitigation

- 6.37 The risk of flooding to the site from a variety of sources has been investigated and there is no direct risk posed to the site from any sources at present. The site is located within Flood Zone 3 but falls within an area that currently benefits from flood defences.
- 6.38 The local landowners who own the existing flood defences, on behalf of the local authority and the Environment Agency, are required under the provisions of the Flood and Water Management Act to maintain these on an ongoing basis.

- 6.39 The flood defences that are protecting the site are mostly in good state of repair. As mentioned previously, it is recommended that the Environment Agency commission breach modelling to better understand the potential risk of the existing defences failing.
- 6.40 Furthermore, it is again recommended that the Environment Agency undertakes a regular programme of inspection of the defences. So that any future defects or issues that are detected, and remedial works are conducted accordingly.
- 6.41 The site also benefits from an Environment Agency flood warning area that applies to the whole of Scropton, specifically related to the River Dove. When a flood warning is issued by the Environment Agency for the area, residents are expected to act and undertake the following actions:
- move vehicles to higher ground if it's safe to do so
 - move family and pets to safety
 - move important items upstairs or to a safe place.
 - turn off gas, electricity and water supplies, if it is safe to do so
 - utilise property protection products such as flood barriers, or air brick covers
 - keep abreast of latest flood risk situation.
- 6.42 Access and egress to and from the development should also be considered in the detailed development design. Access routes should allow all future site occupants to be able to access and exit their properties during a flood event. This includes sufficient vehicular access to allow the emergency services to reach the development during flooding conditions.
- 6.43 It is recommended that safe access routes are provided that are at a level above design flood levels and that avoid surface water flow paths. It is also advised that the local planning authority, South Derbyshire District Council, and the Environment Agency are consulted during the detailed design process of the development.

7.0 SURFACE WATER DRAINAGE STATEMENT

Existing Discharge Rate

- 7.1 The existing site is a former farm yard and currently serves as a storage area. The topographical survey of the site showed that there was evidence of an onsite drainage network. It has been confirmed by the private landowner that a surface water sewer was laid onsite that currently serves the existing properties on site and is intended to serve the proposed development as well.
- 7.2 The site comprises of various impermeable surfaces and it is assumed that all roof areas and hard standing areas drain to the existing drainage network. Whilst the gravel, soft landscaping and any areas not connected to a gully are assumed not to.
- 7.3 An existing drainage layout plan for the site was prepared by ADC Infrastructure, a copy of which can be found within **Appendix B**.
- 7.4 A runoff rate for the existing site was calculated using the Modified Rational Method. A total impermeable area of 1960m² and a rainfall intensity of 50mm/hr, a peak discharge of **27l/s** was calculated.

Discharge Options

- 7.5 In accordance with the Building Regulations Part H, the newly published Non-Statutory Technical Standards for SuDS and prevailing best practice, surface water should look to be discharged according to the following preferential hierarchy:
- Infiltration drainage techniques, such as swales and soakaways;
 - An open watercourse, river or ditch;
 - A surface water sewer;
 - A combined sewer.
- 7.6 The British Geological Survey (BGS) mapping, borehole records and the Soilsmap mapping were all reviewed to give an indication of the underlying ground conditions. The BGS mapping and borehole records shown that the site is underlain by soils and geology that has impeded drainage. Therefore, it is assumed that infiltration drainage techniques would be unviable on site.
- 7.7 Although, the Soilsmap mapping did suggest that a portion of the site was underlain by relatively freely draining soils.
- 7.8 A comprehensive Phase 2 ground investigation that includes infiltration testing in accordance with BRE 365 guidance would confirm the ground conditions on site and provide an infiltration rate for the underlying soils. Following this a judgement could be made on the suitability of infiltration drainage techniques.
- 7.9 As infiltration drainage techniques are likely to be unsuitable, preference would then be to the disposal of surface water runoff to an open watercourse. The private landowner has confirmed that there are drainage ditches to the north which are under his ownership. Although the local topography for the site does not currently drain in this direction, and the capacity of the ditch is uncertain.
- 7.10 A balancing pond has also been considered to attenuate some of surface water runoff generated on site. The private landowner has confirmed that they own the land to the north of the current

site, where a balancing pond could be located. From there surface water runoff would be discharged into a small drainage ditch and conveyed downstream.

- 7.11 If the option to drain towards the existing ditch is chosen, there is a potential need for hydraulic modelling to investigate the likely impact of the additional surface water runoff being conveyed to this ditch. Further consultation with the Environment Agency and local authority would also be required to agree an appropriate discharge rate. This option is not considered to be the optimum solution for the site.
- 7.12 The surface water runoff generated onsite is envisaged to be discharged into the existing private surface water sewer onsite. This sewer has been laid with the intention to serve the proposed development, and there is already a formal connection into the public Severn Trent sewer in Scropton Road. Although formal approval under a Section 106 agreement with Severn Trent for the connection would have to be sought.
- 7.13 The sewer asset record plans provided by Severn Trent Water show that the public surface water sewer in Scropton Road is a 375mm diameter pipe, which has been confirmed by the private site owner to run on the south side of Scropton Road. The adopted sewer in Scropton Road is conveyed by gravity, and according to Severn Trent there is flow control device located near the pumping station storm overflow off Mill Lane. Although the pass forward flow rate of the control device is unknown at present.

Proposed Discharge Rate

- 7.14 The Non-Statutory Technical Standards for Sustainable Drainage requires that discharge from proposed development is limited such that the proposed 1 in 1 year, 1 in 30 year and 1 in 100-year discharge rates do not exceed that of the existing discharge rates.
- 7.15 A staged approach to discharge such as that described above requires consideration of the long-term storage volume requirements. The long-term storage requirement is stated as follows:

“Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6-hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event but should never exceed the runoff volume from the development site prior to redevelopment for that event.”

- 7.16 In practice, for sites where infiltration is not viable, this requirement translates to a need to release the excess volume (above greenfield) at a trickle rate not considered to cause any risk, often taken as 2l/s/ha.
- 7.17 Severn Trent in their developer enquiry response stated that in accordance with their brownfield surface water policy, the new development must:

“be drained of surface water based on the existing discharge rate less 30%.”

- 7.18 As such, Severn Trent have proposed a discharge rate of 18l/s for the site, so to achieve a sustainable discharge and to lessen any risk of flooding caused by the development. Although, Severn Trent have stipulated that they need to know the pass forward flow rate for the downstream flow control device. The connection to the onsite drainage will be subject to the Section 106 agreement made with Severn Trent Water.

- 7.19 Severn Trent have also stated that any flows off site that exceed the proposed discharge rate of 18l/s should look to be attenuated onsite. A copy of the Severn Trent Developer Enquiry response can be found in **Appendix J**.
- 7.20 The proposed development is estimated to be 46% impermeable and to cover 0.323ha. A calculation of the total volume of balancing storage required onsite has been made using the Micro Drainage Quick Storage Module for a range of return periods. Full outputs are included as **Appendix L**, and the results have been summarised in the table below. In accordance with the latest guidance published by the EA an allowance of 30% for climate change has been made.

Return Period	Discharge Rate (l/s)	Impermeable Area (ha)	Attenuation Volume (m ³)
1 in 30 year	18	0.323	32-60
1 in 100 year +30%	18	0.323	76-128

- 7.21 The two options for the proposed surface water drainage network has been prepared by ADC Infrastructure. These include indicative pipe sizes, manhole cover levels and pipe inverts for the proposed network. In addition to, details of the Hydro brake control structure, the connection into the outfall, and the required sizing for the onsite attenuation features. A copy of the proposed drainage layout plans can be found in **Appendix K**.

8.0 FOUL WATER DRAINAGE STATEMENT

- 8.1 In accordance with the guidance specified with the Building Regulations Part H, foul water effluent should look to be discharged according to the following preferential hierarchy:
- A foul water sewer;
 - A combined sewer;
 - A septic tank;
 - A cesspool.
- 8.2 The sewer asset record plans have been obtained for the site and the surrounding area. The plans show that there is a gravity conveyed foul sewer running along Scropton Road. This then outfalls into the pumping station near Mill Lane, before foul effluent is pumped off via a combined, pressurised rising main away from Scropton.
- 8.3 A close-up view of the sewer record plans shows that there is an adopted manhole onsite, SK19303202 and lateral connection into the main foul sewer just inside the site entrance. It is currently assumed that any private foul drainage network onsite connects into this manhole. A copy of the sewer asset record plans obtained from Severn Trent can be found in **Appendix I**.
- 8.4 Likewise, the existing drainage layout for the site, ADC1863/DR/050, shows evidence of an existing private drainage network on site. However, little is known about the layout of this network, its current condition and the connection into the Severn Trent sewer in Scropton Road. A copy of the existing site drainage layout can be found in **Appendix B**.
- 8.5 Severn Trent in their Developer Enquiry response have confirmed that a gravity foul discharge into the existing public foul sewer in Scropton Road is acceptable. This is due to the proposed discharge from the development being deemed as “very low” and wouldn’t exceed the current capacity of the existing network. A copy of the Severn Trent Developer Enquiry response can be found in **Appendix J**.
- 8.6 A Section 106 agreement shall be sought with Severn Trent to make a formal connection into their existing sewer asset.
- 8.7 Foul effluent shall look to be discharged off site via this connection into the Severn Trent sewer. A review of levels on site has shown that it is possible to convey foul water effluent by gravity into the adopted foul sewer.
- 8.8 The public foul sewer within the proposed development may be put forward under a Section 104 agreement with Severn Trent to maintain on an ongoing basis.
- 8.9 The private lateral connections that will serve the residential properties shall be maintained by the private landowners as part of the ongoing maintenance of the private properties.
- 8.10 A layout plan showing the proposed foul water drainage network has been prepared by ADC Infrastructure. This includes indicative pipe sizes, manhole cover levels and pipe inverts for the proposed network, along with details of the formal connection into the Severn Trent adopted sewer. A copy of the proposed drainage layout plan can be found in **Appendix K**.

9.0 SUSTAINABLE DRAINAGE ASSESSMENT

- 9.1 The proposed development may require between 76-128m³ of attenuation to balance flows from the site and ensure that there is no increase in flood risk elsewhere due to the development.
- 9.2 The ground conditions and space constraints on site may mean that some SuDs features may not be viable on site. This will be dependent on achievable infiltration rates of the underlying soils.
- 9.3 Any such development can give rise to pollution during both the construction and occupation phases in relation to hydrocarbons, suspended solids and general waste. Careful consideration of the treatment of surface water runoff should provide confidence that the proposed development will not result in any detriment to the receiving waters.
- 9.4 In this instance it is anticipated that the bulk of the storage volume on site will be provided by either a onsite attenuation tank or an open balancing pond that will be sized accordingly.

10.0 MAINTENANCE AND ADOPTION

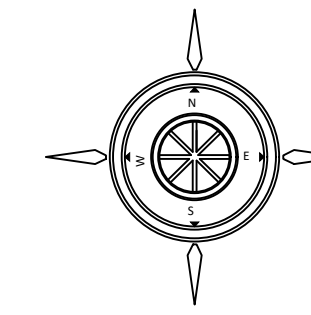
- 10.1 If any part of the proposed drainage system is to be adopted under a Section 104 agreement, it will become the responsibility of Severn Trent to maintain. Any private drainage features on site should be maintained by the private landowner as per the table below.
- 10.2 The maintenance of the features proposed are expected to be dictated by the general maintenance associated with the externals and drainage of the development.
- 10.3 The table below has been prepared from the recommendations contained in the CIRIA SuDS Manual and should set minimum standards for inspection and maintenance.

Drainage Component	Maintenance Task	Frequency
Below ground drainage pipes	Inspect for blockages ensure free running	Every 3 months and after significant storm events
Surface water gullies and linear drainage features	Inspect for blockages ensure free running jet or vacuum as appropriate	Every 3 months and after significant storm events
Permeable Paving Surfaces	Permeable paving to be swept or vacuumed in accordance with the manufacturer's instructions	Once a year
Catch pits	Inspect for and remove silt	Every 6 months and after any significant storms
Attenuation Pond	Inspect all areas for litter build up and remove litter as required	Every month and after any significant storm
	Cut grass and vegetation	Every 6 months and more frequently near outfalls
	Inspect inlets, outlets for blockages and remove as necessary	Every month and after any significant storm
Discharge Control	Inspect for blockage and correct operation	Every 3 months and after any significant storm.

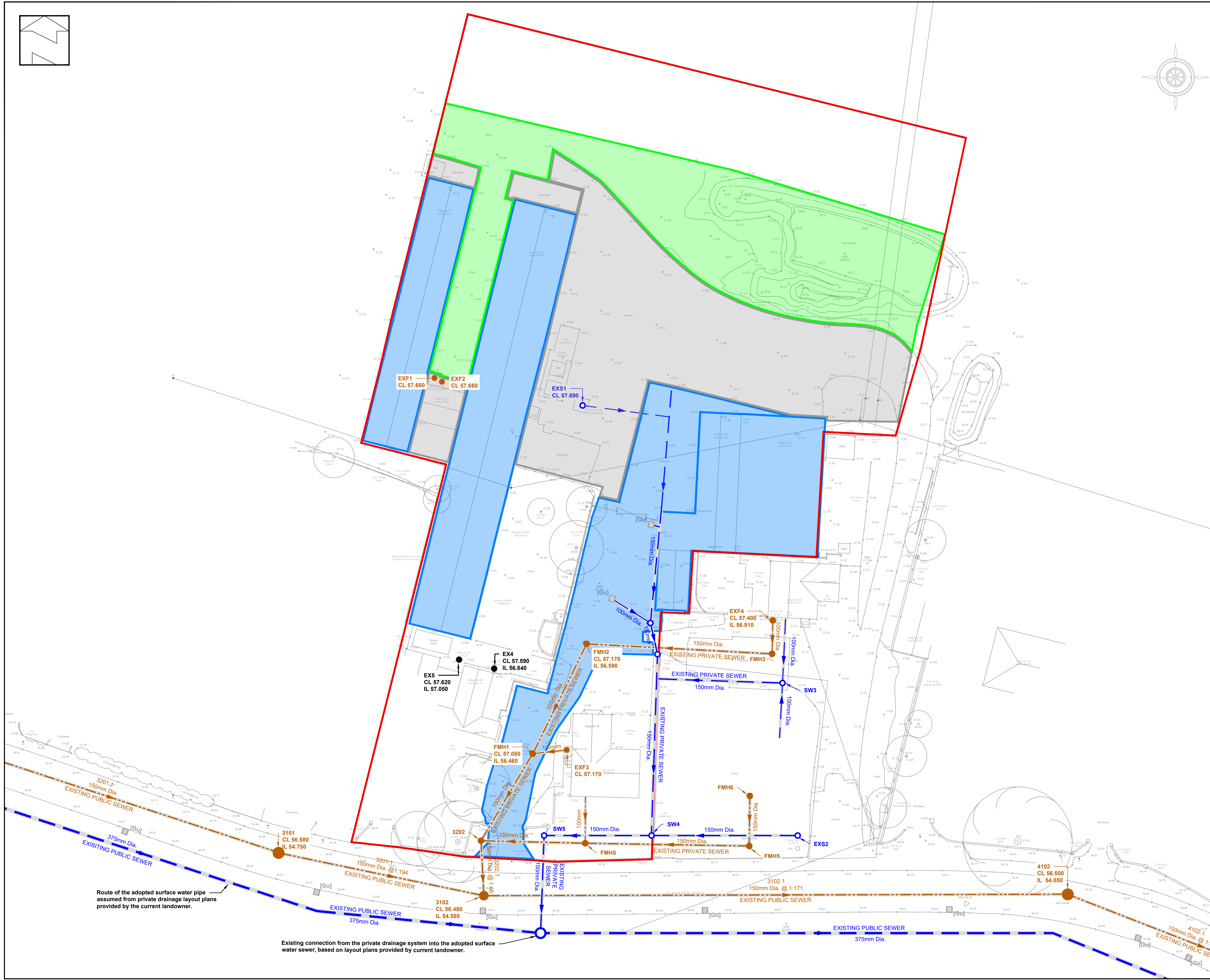
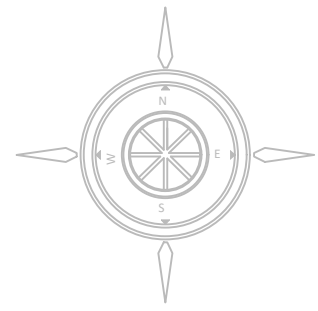
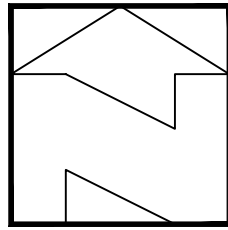
11.0 CONCLUSIONS AND RECOMMENDATIONS

- 11.1 This Flood Risk Assessment has been carried out on behalf of Alan Critchlow in respect of a proposed residential development in Scropton, South Derbyshire. It has been conducted in accordance with the requirements of the NPPF and associated Planning Practice Guidance.
- 11.2 The site has not been found to be at any direct risk at present from flooding from fluvial, sewer, or groundwater-based sources. The site is located within Flood Zone 3, but within an area that currently benefits from flooding defences.
- 11.3 The discharge strategy has been considered and calculations of anticipated discharge rates and attenuation volumes have been carried out. The proposed development should limit discharge to a rate of 18l/s and attenuation volumes of up to 128m³ may be required.
- 11.4 Attenuation is proposed via an onsite attenuation tank or open attenuation storage pond, which will store the excess volume of surface water, so that the agreed discharge rate is not exceeded.
- 11.5 Providing the recommendations of this report are followed, the development can proceed without being at any significant flood risk and without increasing flood risk elsewhere. The development proposals are considered sustainable from a flood risk perspective.

APPENDIX A TOPOGRAPHICAL SURVEY



APPENDIX B EXISTING DRAINAGE LAYOUT



Key	
	Site Boundary
	Existing Surface water gravity sewer
	Assumed Surface water gravity sewer
	Existing Foul water gravity sewer
	Existing Private gravity sewer
	Adopted Surface water gravity sewer
	Adopted Foul water gravity sewer
	Existing Drained Hard Surfaced Area
	Existing Undrained Hard Surfaced Area
	Existing Permeable Surfaced Area

The existing draiange layout is derived from the Severn Trent sewer asset record plans, and the private drainage plans provided by the client.

P2	Amendments to existing drainage layout based on plans provided by client.	28/11/2018
P1	First Issue to client	01/11/2018
Rev	Description	Date

Client:

Alan Critchlow

Project:

Proposed Residential Development
Scropton Road, Scropton

Title:

Existing Drainage Layout

Drg Size:	Scale:
A1	1:250
Date:	28/11/2018
Drg No:	Rev:
ADC1863/DR/051	P2

APPENDIX C PROPOSED SITE MASTERPLAN

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KEY



Site Boundary
0.695 Ha/ 1.717 Ac



Site Access
To be detailed by Highway Consultants



Proposed Dwellings



Existing Dwellings to be Maintained



Shared Surface - 7.5m overall width
To be detailed by Highway Consultants



Illustrative Vegetation



Landscape Buffer (5m)
In accordance with site specifics outlined for planning permission on site (Policy 23L)



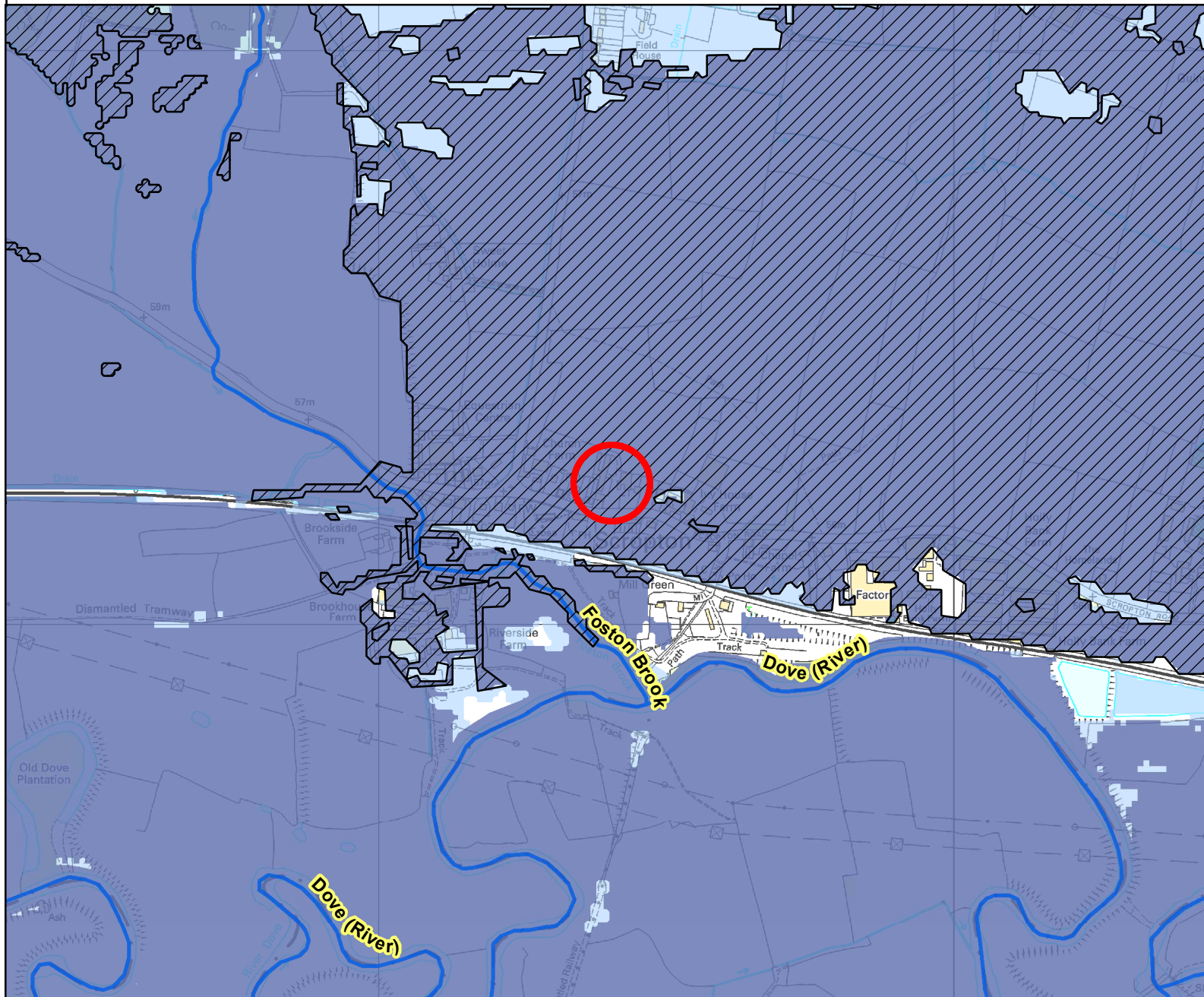
Retained Existing Outbuilding
Converted to a garage for plot 10



Plot no.	Plot Size	Building Footprint
1	284.4sqm	circa 1,800sqft
2	315.7sqm	circa 1,700sqft
3	306.4sqm	circa 1,700sqft
4	395.2sqm	circa 1,800sqft
5	444.7sqm	circa 2,100sqft
6	342.2sqm	circa 1,700sqft
7	505.8sqm	circa 2,100sqft
8	373.8sqm	circa 1,700sqft
9	251.9sqm	circa 1,600sqft
10	319.1sqm	circa 1,700sqft

APPENDIX D ENVIRONMENT AGENCY DATASETS

Flood Map for Planning, centred on Grid Ref 419405,330232 created 26 October 2018.



Legend

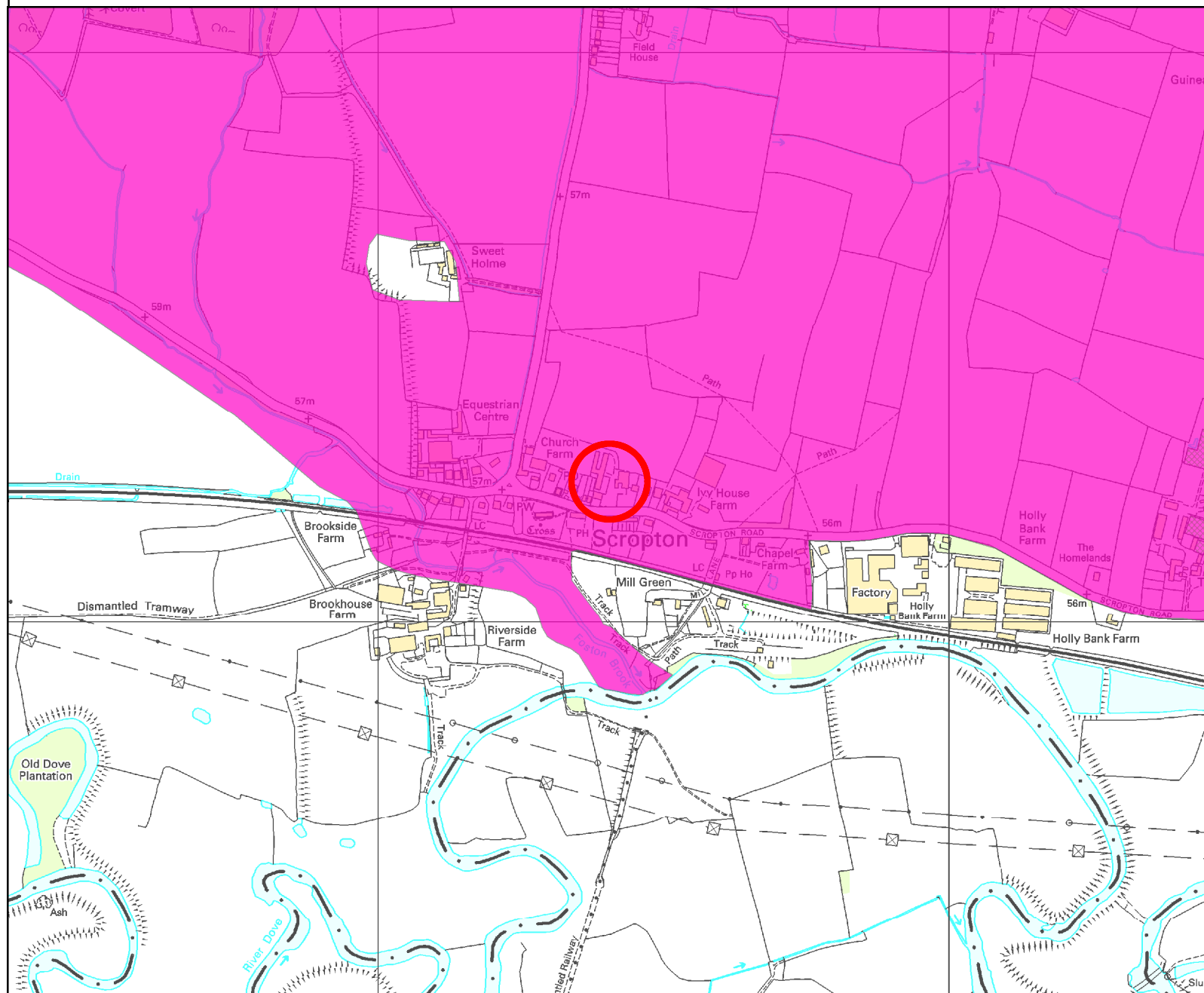
- Areas Benefiting from Defences
- Main Rivers
- Flood Zone 3
- Flood Zone 2
- Approximate location of site

Flood Map Areas (assuming no defences)
Flood Zone 3 shows the area that could be affected by flooding from a river with a 1 in 100 (1%) or greater chance of happening each year.
Flood Zone 2 shows the extent of an extreme flood from rivers with up to a 1 in 1000 (0.1% - 1%) chance of occurring each year

Scale 1:10,000



Recorded Flood Outline, centred on Grid Ref 419405,330232 created 26 October 2018.



Legend

Recorded Flood Event Outlines

START_DATE

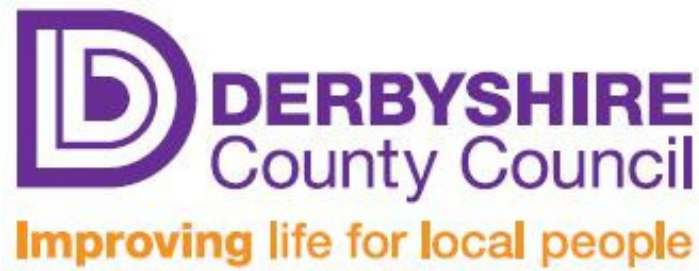
01/08/1957

Approximate location of site

Scale 1:10,000



APPENDIX E
DCC FLOOD INVESTIGATION REPORT
SCROPTON – JULY 2012 FLOODS



Flood Investigation Report

Investigative report into the flooding of Watery
Lane, Leathersley Lane & Scropton Road,
Scropton - 6th July 2012

Final Report
February 2014

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Executive Summary

This Flood Investigation Report has been produced by Derbyshire County Council (DCC) fulfilling duties under the Flood and Water Management Act (FWMA, 2010) as the Lead Local Flood Authority (LLFA) for Derbyshire.

Section 19 of the FWMA states that on becoming aware of a flood within their local area the LLFA should investigate the flooding event to an extent considered necessary or appropriate.

DCC has produced a LLFA policy which stipulates locally agreed thresholds for undertaking a Section 19 flood investigation in Derbyshire. The Derbyshire Strategic Flood Board deemed it necessary to carry out a formal investigation into the flood incident which occurred at Scropton on 6th July 2012, as it met locally agreed criteria.

The flood events of 6th July 2012 resulted in the temporary closure of Leathersley Lane and internal damage to properties on Watery Lane, Scropton. The flooding was a resultant impact of an intense rainfall event that fell onto an already heavily saturated catchment over a short period of time. The inability of the ground to absorb more water and the rapid inundation of the local drainage network, led to excessive surface water flowing overland onto Watery Lane subsequently entering into a number of properties on Leathersley Lane.

The UK Met Office confirmed that June and July 2012 recorded the highest rainfall figures since 1912.

There are a number of Risk Management Authorities (RMAs) that have relevant flood risk management responsibilities and functions in the affected area including:

- DCC (Highways Authority for Watery Lane/Leathersley Lane and associated highway drainage infrastructure);
- Highways Agency (HA) (responsibility for maintaining the A50 and associated highway drainage infrastructure); and
- South Derbyshire District Council (SDDC) (a Land Drainage Authority under the Land Drainage Act (LDA), 1991).

The identified RMAs, and other groups, should continue to work together, sharing information and reports, with the aim of meeting the recommendations and actions contained in this report.

1. Introduction

1.1 Section 19 Investigations – Duty to Investigate

Section 19 of the FWMA states:

- (1) On becoming aware of a flood in its area, a LLFA must, to the extent that it considers it necessary or appropriate, investigate :
 - a. which RMAs have relevant flood risk management functions, and
 - b. whether each of those RMAs has exercised, or is proposing to exercise, those functions in response to a flood event.
- (2) Where an authority carries out an investigation under section 1 (above) it must:
 - a. publish the results of its investigation, and
 - b. notify any relevant RMAs.

1.2 Derbyshire's Locally Agreed Criteria for Formal Investigation

DCC have identified local thresholds for formally investigating flood incidents across Derbyshire within LLFA policy. Within this policy each characteristic of flooding has had a threshold pre-determined as to when a formal flood investigation will be triggered within Derbyshire which are as follows.

- **Number of properties internally flooded** - An event where records or anecdotal evidence shows that five or more residential properties, or two or more non-residential properties (industrial/commercial) affecting employment, have been internally flooded.
- **Critical infrastructure impacted by the flood** - An event which leads to a protracted impact on a key utility service (water, sewage treatment, electricity distribution, gas distribution, telecommunications, rail network, strategic road network) in excess of 12 hours before restoration of the service.

More information regarding the LLFA policy and local thresholds can be found online at <http://www.derbyshire.gov.uk/environment/flooding/default.asp>.

A formal investigation into the flood incident at Scropton on 6th July 2012 has been undertaken because the event triggered two locally agreed flooding 'characteristics'. These were as follows:

- Five residential properties were internally flooded; and
- Critical infrastructure (Leathersley Lane, Scropton Road and Watery Lane) was inundated and impacted.

Although critical infrastructure (Leathersley Lane) was impacted by the flood, the actual road closure was less than 12 hours. However there was still a significant impact involving access and egress to the village, disruption to traffic flows and an increased safety risk to road users and attending highway maintenance staff.

2. Scropton Background

2.1 Location

The village of Scropton is situated approximately 12km south-west of the outskirts of Derby within the district boundary of South Derbyshire District. The A511 runs in a north-west/south-easterly direction immediately east of the village and the A50 runs east to west immediately to the north of Scropton (refer to Figure 1).

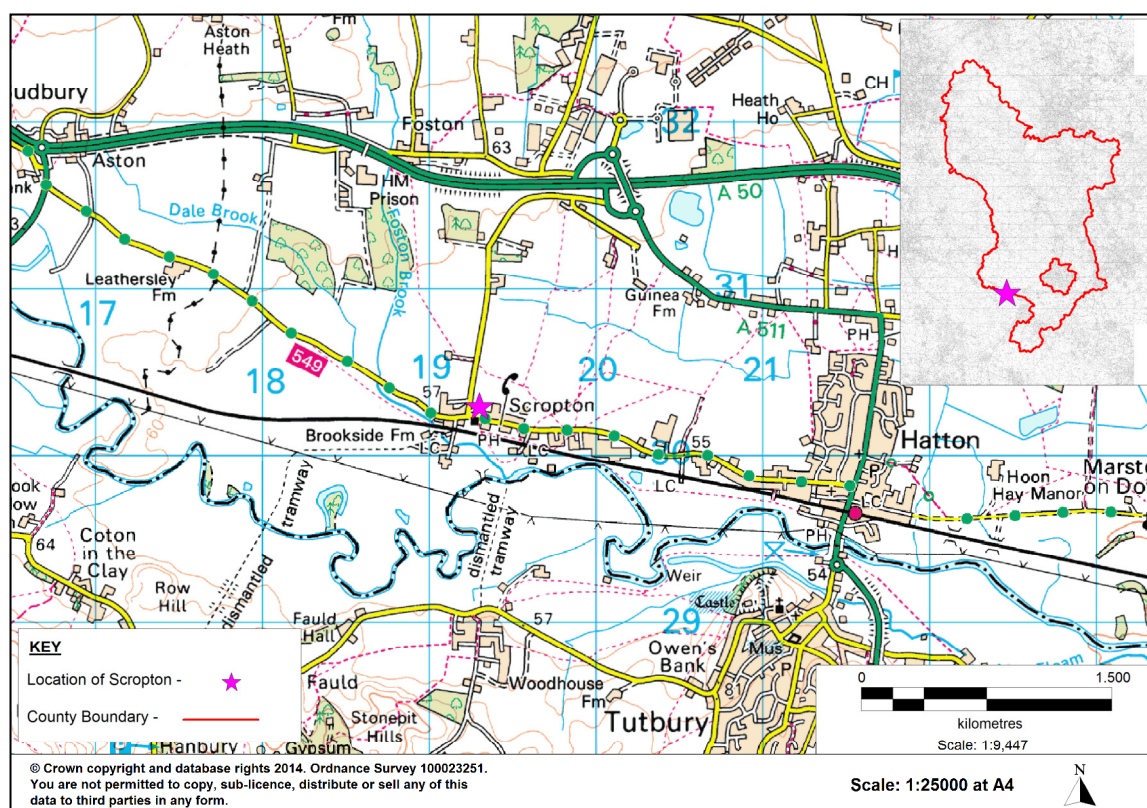


Figure 1: Location plan for Scropton

Leathersley Lane (the location of the main impacts from the flood event) runs centrally through the settlement connecting to Scropton Road. Watery Lane runs perpendicular with Leathersley Lane and immediately adjacent to the affected stretch of Leathersley Lane.

2.2 Local Drainage System

Foston Brook is designated a 'main river' and is the most significant watercourse in the locality as it conveys water, generated from a substantial catchment, south-east to its confluence with the River Dove.

It is understood that surface water from the northern part of the catchment flows through two culverts beneath the A50 before converging to the westerly drainage ditch alongside Watery Lane.

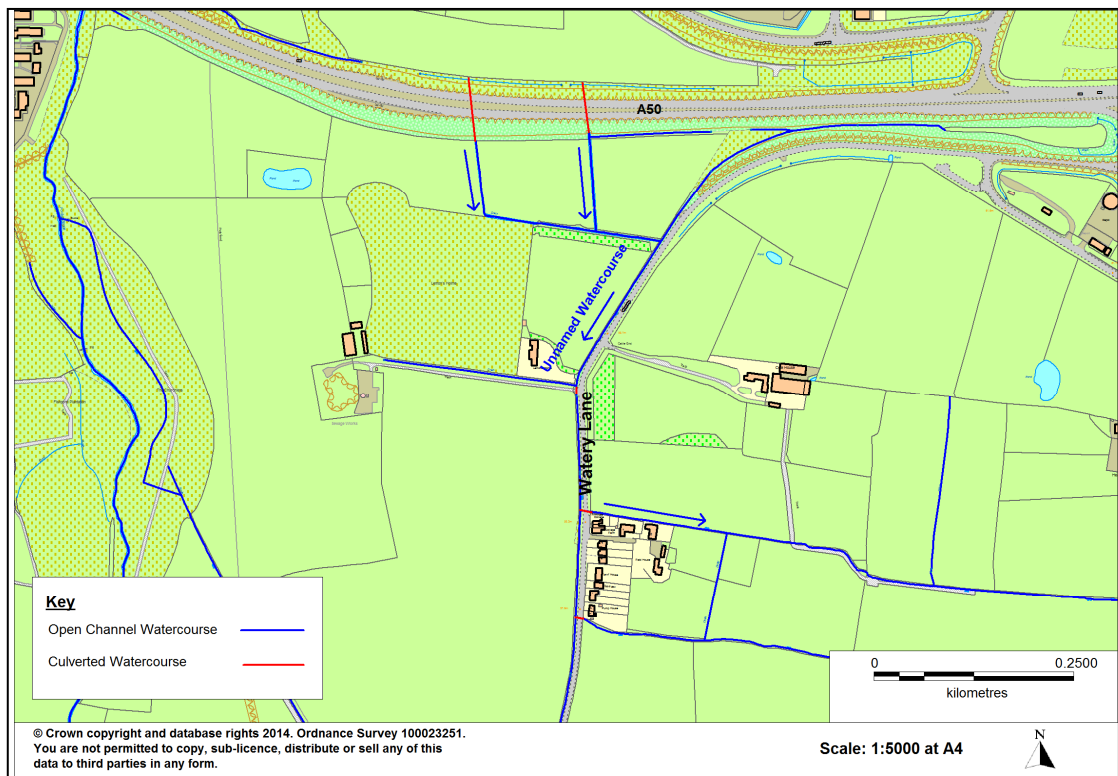


Figure 2: Local drainage features on Watery Lane

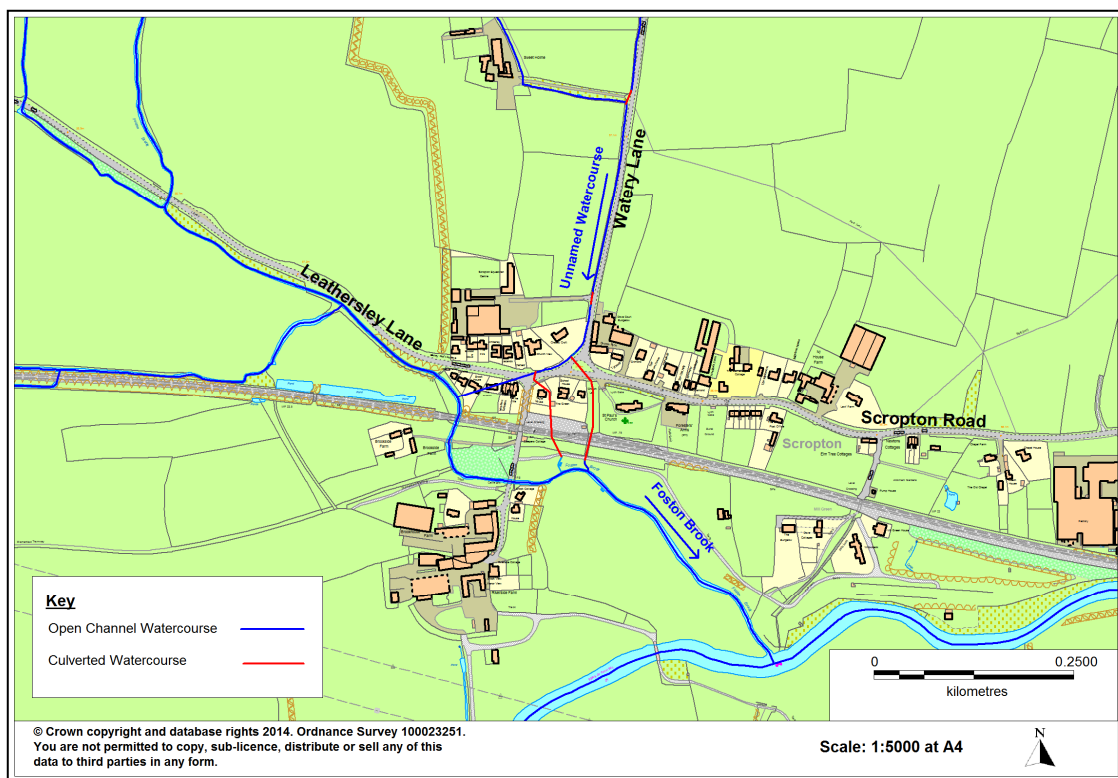


Figure 3: Local drainage features on Leathersley Lane

A network of ordinary watercourses, including drainage ditches and surface water generated from Watery Lane all feed into Foston Brook (at Ordnance Survey National Grid Reference (OS NGR) 419230, 330230) (refer to Figure 4). Isolated sections of the watercourse are culverted to facilitate access/egress to several properties and the conveyance of flow under the road network. This water is then transported in a south-easterly direction to the River Dove. According to the Environment Agency's data, the majority of Scropton lies within Floodzone 3 (1 in 100 year fluvial event and Floodzone 2 (1 in 1000 year fluvial event).

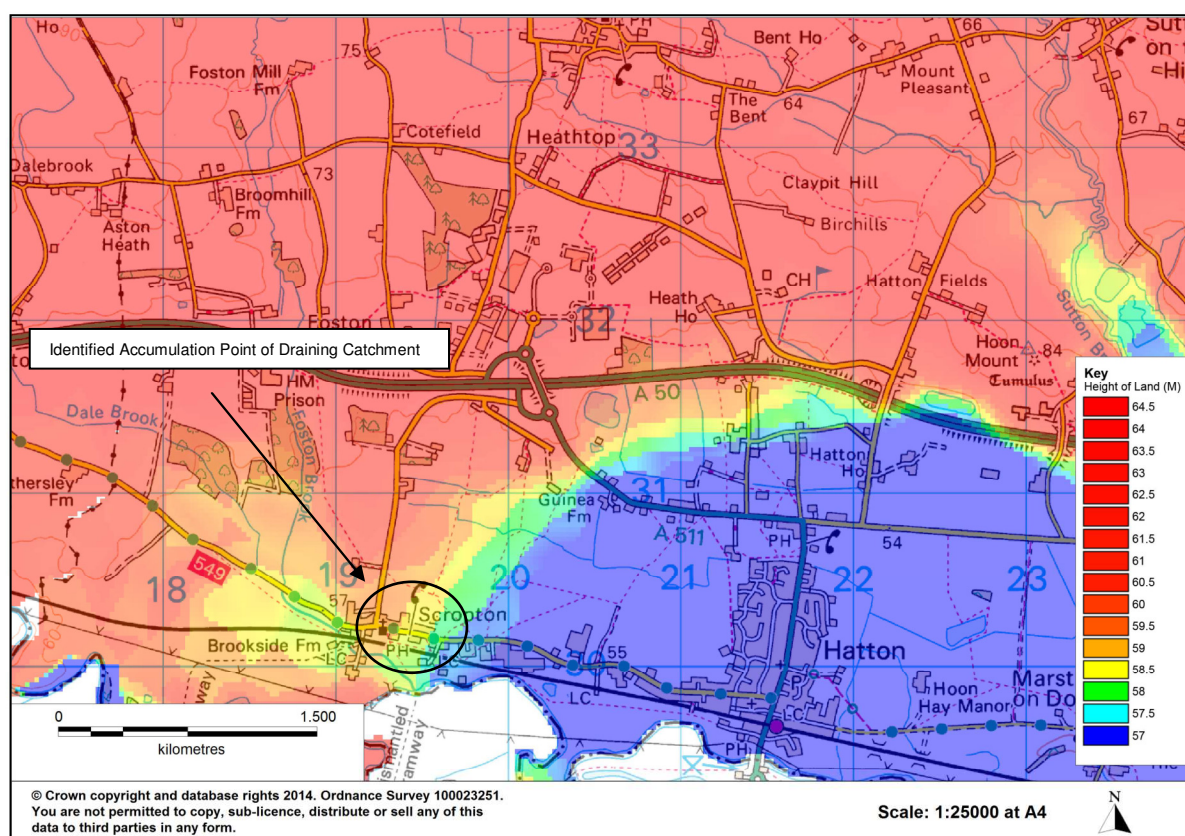


Figure 4: Approximate catchment draining to focal point in Scropton (piped culverts at OS NGR 419234, 330228)

2.3 Historical Flood Information

DCC hold a suite of data relating to flooding for Derbyshire obtained from various sources. There are a few historical flooding records in Scropton; however limited information was recorded relating to source, pathway or receptor of these events. These include a report of surface water flooding approximately 1.5km east of Scropton. Scropton is known to flood regularly from both fluvial and pluvial sources and on one occasion resulted in at least 25 residential properties suffering internal property flooding. The arterial highway route through the village (Scropton Road and Leathersley Lane) is known to be impacted by flood waters numerous times a year and in 2012 was impacted on several occasions. Local knowledge also suggested that in November 2000, the source of flooding to the village was Foston Brook, with a relatively minor contribution from the ordinary watercourse close to Watery Lane.

3. Flooding on the 6th July 2012

The majority of the information supporting the description of the flooding incident is based on first-hand accounts of residents, the written reports and subsequent accounts given by *Balfour Beatty* personnel (who attended site as they are the managing agent on behalf of the Highways Agency for this region), a DCC Emergency Planning Officer who attended the incident and local Elected Members. Further information was obtained during site visits post event.

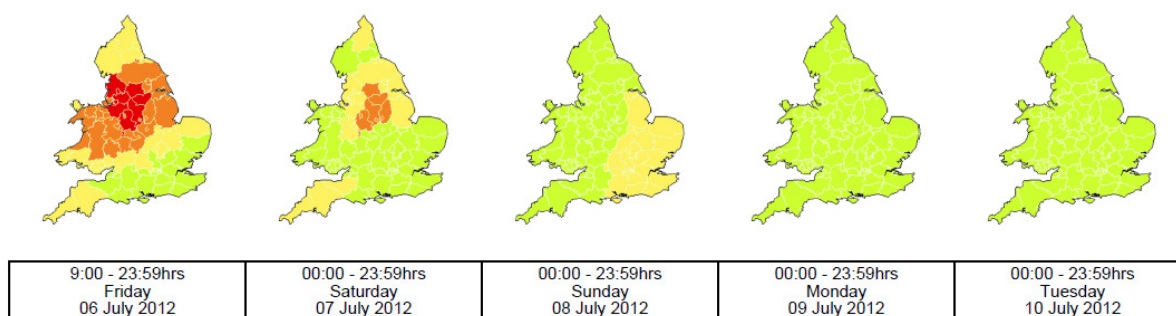
3.1 Information Prior to the Event

Worsening from the catchments located within central England had been subject to heavy rainfall onto ground with limited or 'zero' soil moisture deficits (indicating that the ground was already highly saturated).

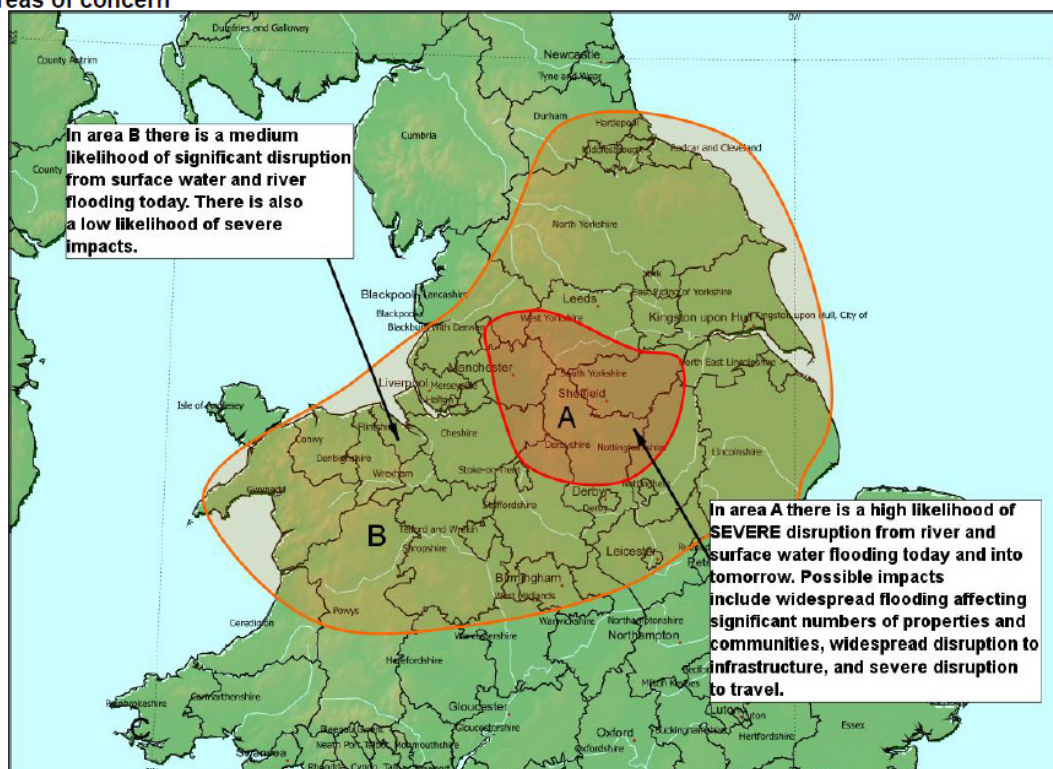
On Friday 6th July at 09:00hrs the Flood Forecasting Centre (a working partnership between the Environment Agency and Met Office) issued a Flood Guidance Statement which indicated that an area of the East Midlands (including South Derbyshire) was indicated as being at risk of flooding (refer to Figure 5 below).

Flood Guidance Statement 9:00hrs 06 July 2012

Our assessment of daily flood risk for England and Wales is below.



Specific areas of concern



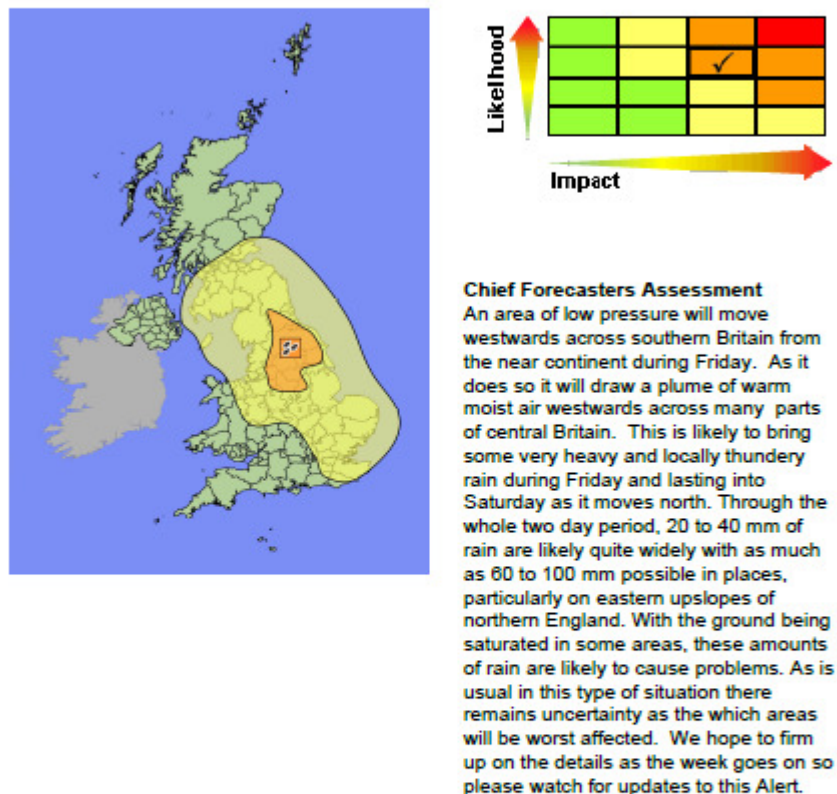
Next Statement Due: 12:00hrs Friday 06 July 2012

Figure 5: Extracted Figure from the Flood Forecasting Centre Flood Guidance Statement

The Met Office also issued a 'Severe Weather Warning' at the same time for the area. The Chief Forecaster of the Met Office stated, "Through the whole two day period, 20 to 40mm of rain are likely quite widely with as much as 60 to 100mm possible in places, particularly on eastern upslopes of northern England" (the area which included Scropton – refer to Figure 5 above).



National Severe Weather Warning Service



The Met Office have issued an **Amber Alert of Rain**

Valid from 00:05 on Fri, 06th Jul 2012 until 23:55 on Fri, 06th Jul 2012

Heavy and persistent rain is likely to extend north and west across many eastern, northern and central parts of England and Wales on Friday, reaching much of southern Scotland later in the day. This is likely to lead to surface water flooding, particularly in the Amber area, where there is an increasing likelihood of river flooding. The public should be prepared for disruption to travel and outdoor activities. The rain across central England, East Anglia and southeast England should ease later in the day.

For more details please go to:

http://www.metoffice.gov.uk/weather/uk/uk_forecast_warnings.html

Issued by the Met Office at 12:19 on Wed, 04th Jul 2012

Figure 6: Extracted from the Met Office 'Severe Weather Warning' bulletin

3.2 Description of the Event

The main impacts of the event took place in the evening of the 6th July 2012. The peak impacts, described by residents, took place approximately 9pm on Friday 6th of July where residential properties on Watery Lane were subject to flooding and surface water ingress, with one resident reporting up to 0.5m depth internal flooding. Later Friday evening the situation deteriorated, with flood water continuing to accumulate at the junction of Watery Lane to Leathersley Lane with water being unable to discharge into Foston Brook spreading in an easterly direction resulting in Scropton Road, which is the focal point of the drainage catchment, becoming

impassable by late Friday evening (refer to Figure 7 & 8 below). Furthermore, the water continued to back up Watery Lane, documented by a resident reaching the access to the ex-Council building. It was also noted by residents that road users continued to travel on Watery Lane despite the Road Closed/Flooded warning signage installed by DCC Rapid Response Team.

Prior to the event, the region had experienced an exceedingly wet April and June leaving the ground saturated. As forecasted by the Met Office, on the morning of 6th July 2012 intense rainfall of up to 40mm in 48 hours fell on an already saturated Foston Brook catchment. Figure 4 above illustrates the natural low focal point of the local surface water catchment.

The flood water was observed to accumulate at the junction of Watery Lane and Leathersley Lane resulting in the highway becoming impassable requiring the road to be temporarily closed. The flood water then overtopped the Leatherlsey Lane kerbing and entered private property curtilages resulting in garden flooding and subsequent internal property flooding.



Figures 7 & 8: Water flooding from Watery Lane to Leathersley Lane 6th July 2012 taken in daylight hours, during flood conditions

A localised walkover undertaken by the residents during the flood event, residents identified water surcharging from the drainage ditch on the westerly side of Watery Lane as a result of possible capacity exceedance of the existing operating capacity of the ditch. The surface water runoff then travelled in a southerly direction to the natural low point of the wider surface water catchment, amalgamating with the already large volume of water accumulating at the Watery Lane/Leathersley Lane junction as a result of the Non-return valves restricting water discharging into Foston Brook and therefore creating a backup effect.

A local resident who lives in the immediate vicinity of the affected area witnessed during the flood event Foston Brook overtopping potentially due to exceedance of capacity and inundating nearby fields with water (refer to Figure 9 below illustrating to the extent of flooding).



Figure 9: Photograph illustrating extent of Foston Brook overtopping

It was documented by several residents that the accumulation of water in central Scropton occurred at a steady rate in relation to the rainfall, but it was acknowledged by numerous residents that a sudden deluge of water joined the already large quantity of water but the source or pathway of this water was unclear during the flood event.

4. Summary of Findings

According to the Met Office, 2012 was the wettest year on record for England with unseasonably very wet months of June and July. The flooding that occurred on 6th July 2012 was a result of an intense summer storm event that fell onto an already highly saturated catchment to the west and north-west of the A50. The result of the combination of factors described below was the ingress of storm flood water to properties on Watery Lane, Leathersley Lane and Scropton Road:

- The inability of the ground to absorb more water and the inundation of the upstream drainage network resulted in considerably increased flow rates to the entry point of the Foston Brook culverts (the main focal point of the drainage network),
- The existing condition of the drainage system alongside Watery Lane was observed to have deposits of material affecting the operating capacity of the system,
- The exceedance of the capacity of the local surface water systems, both open channel and piped,
- The presence of non-return valves restricting discharge to Foston Brook allows water to back up and overtop onto Watery Lane, and
- Driver behaviour.

Several large commercial properties are situated on Scropton Road receiving daily deliveries from HGV's utilising Watery Lane as an access/egress road to the arterial route through the village of Scropton. Watery Lane does not benefit from a footway or kerbing leaving the highway verge vulnerable to erosion, forcing the verge into the drainage ditch from vehicular activity. A site visit after the event observed that localised sections of the critical drainage ditch had material deposited in the cross sectional profile potentially reducing its operating capacity, restricting the

conveyance of flow and enabling water to over-top onto the carriageway. Watery Lane as described by residents then acted as a conduit conveying surface water in a southerly direction to the junction of Leathersley Lane/Scropton Road being the lower elevation of the wider surface water catchment. Furthermore, it is understood that Leathersley Lane is an approved diversion route for the A50 which is thought to possibly cause further problems by allowing additional traffic movements on Watery Lane and worsening the deterioration to the highway verge.

SDDC confirmed they carry out reactive maintenance on the aforementioned critical drainage ditch alongside Watery Lane. Historically SDDC have been unable to identify a relevant Riparian Landowner, and this work is carried out as a preventative measure in an attempt to mitigate flooding to the village of Scropton. SDDC records suggested funds were available for maintenance in March, prior to the event. SDDC will continue to undertake basic maintenance moving forward subject to available funding. A suggestion from local residents was to remove the material excavated from the open channel from site to avoid being re-deposited into the ditch by the HGV's accessing the village from the A50 trunk road.



Figure 10 & 11: Picture illustrating ditches aligning Watery Lane

The Environment Agency have recently completed a flood defence scheme in the Lower Dove catchment which is expected to reduce the risk of flooding for 1600 residential properties in Scropton, Hatton and Egginton. The culvert conveying Foston Brook under Leathersley Lane, which was observed during the flood event to be partially blocked, is expected to be cleansed as part of the wider scheme. Two culverts spanning Leathersley Lane were identified to be fed by the drainage system on the westerly side of Watery Lane and outfall into Foston Brook. The aforementioned culverts have non-return valves connected onto them which operate when the Foston Brook is in spate reducing 'main river' impact. The unnamed watercourse regularly becomes overwhelmed as a result of the baffle plate, which was installed to deflect water into a supplementary balancing area, forcing the water to back up and overtop onto Watery Lane. Therefore the main flow path through

Scropton is focussed down Watery Lane whereby the flood water accumulates at the junction with Leathersley Lane and then forces the immediate road network to become impassable.



Figure 12: Picture illustrating baffle plate in channel

Severn Trent Water (STW) who are a Risk Management Authority responsible for the operation and maintenance of the public sewer network have infrastructure located within close proximity of the affected area but there is no evidence to suggest that the apparatus exacerbated the flooding. It was reported that STW experienced some isolated blockages within their infrastructure after the further flooding on the 10th July with the blockage being removed by a STW contractor.

The balancing pond located approximately 1.5km north-east of Scropton village is understood to receive surface water runoff from the A50. During the flood event the pond was perceived to be relatively dry suggesting the pond may be discharging into the drainage system alongside Watery Lane. Balfour Beatty drainage plans and an existing CCTV survey of the asset found no relationship between the pond and the drainage system alongside Watery Lane. The pond is connected to a series of ditches to the easterly side of the surface water catchment.

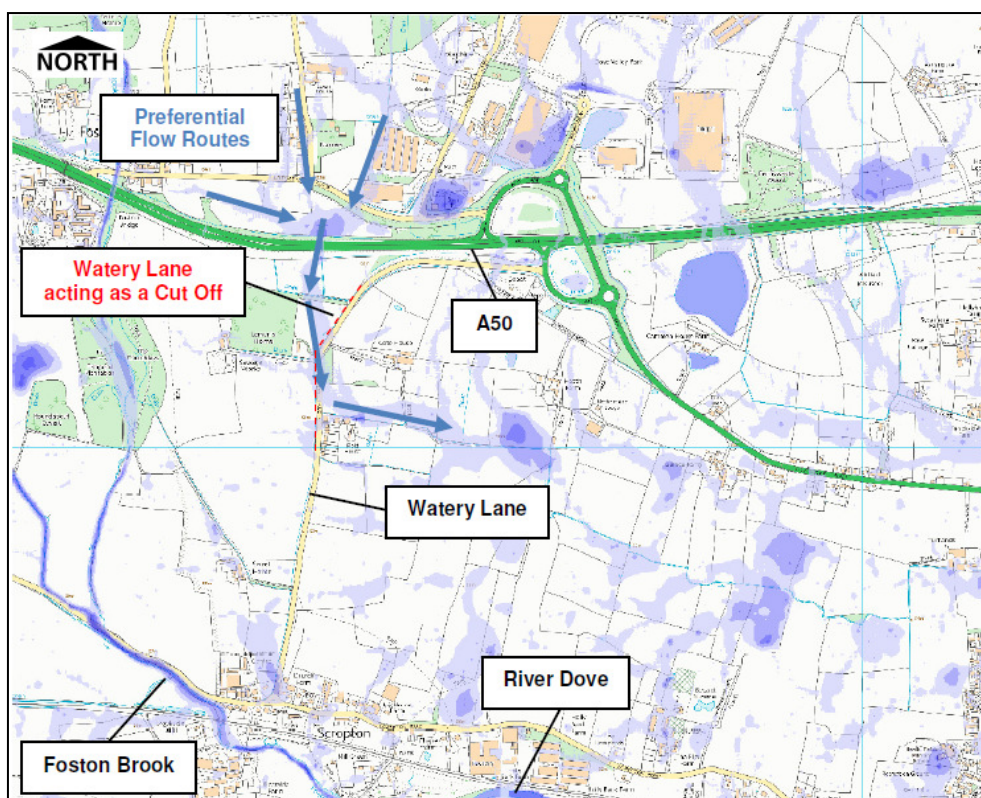


Figure 13: Map illustrating the flow routes around the A50

As it was suggested that several culverted sections of the ordinary watercourse during the flood event were operating at a reduced capacity, DCC commissioned a contractor to cleanse and undertake an internal condition survey of each of the identified assets. The said culverts, which are thought to connect the westerly side of the drainage system to a network of open channel ditches on the easterly side of Watery Lane were investigated by the contractor and found to have a minor build-up of debris/detritus at the inlet of the two culverts which may have restricted the dissipation of flow from the Watery Lane drainage system (refer to Figure 14). Following the results of the condition survey, no major structural defects were identified (refer to Figure 15 below). This operation was extended to encompass the remaining culverts spanning Leathersley Lane and these also required some minor remedial works which have since been undertaken.



Figure 14 & 15: Picture illustrating condition of inlet and internal CCTV image of culvert spanning Watery Lane

Residents in the locality suggested that the response time from DCC highways to install temporary signage could be improved as some road users appeared unaware of the flooding in Scropton and continued to use Leathersley Lane/Scropton Road creating bow waves and worsening the impact upon properties aligning Leathersley Lane/Scropton Road. Furthermore, local residents suggested that appropriate maintenance, a timely removal, and improved positioning of the Road Closed/Flooding signage are essential in the future to derive maximum effects.

5. Responsibilities and Future Actions

5.1 *DCC the Lead Local Flood Authority for Derbyshire*

As a Lead Local Flood Authority DCC has the responsibility to coordinate the management of flood risk and the interaction of RMAs across Derbyshire.

As stated within the Introduction section, DCC as the LLFA has a duty to investigate flood incidents under Section 19 of the FWMA. Publication of this report is the conclusion of that process.

The LLFA also has a responsibility to maintain a register of assets which if they were to fail would be considered to have a significant impact on flood risk (as detailed within Section 21 of the FWMA). The register must contain a record about each structure or feature, including the ownership and state of repair. As the LLFA, DCC look for support and information from other agencies that are designated as RMAs to ensure any assets which could potentially have a significant effect on flood risk are recorded on the asset register.

Derbyshire County Council as the local Highways Authority is the relevant RMA with responsibility for the management of surface water falling within the curtilage of Watery Lane and maintaining the highway culverts to an appropriate design standard to drain surface water from the highway. DCC also have riparian responsibilities for the highway culverts at Watery Lane and Leathersley Lane. As the LLFA, DCC has permissive enforcement powers related to ordinary watercourses within private ownership and is the consenting Authority for works on ordinary watercourses under the LDA.

DCC are investing monies to introduce a pilot Community Flood Warden Scheme in Scropton which will allow;

- Local residents to have an active voice in any Flood Planning work,
- Residents and public bodies work together through Planning to direct public resources to address flood mitigation issues, using both local knowledge and technical expertise,
- By training wardens to monitor local ordinary watercourses and critical assets such as culvert screens and to report problems to the appropriate RMA. This could also apply to the Foston Brook (a Main River) with reporting lines to the EA, and
- Wardens play a central role in further educating other local residents & businesses on risk levels, activation & communication arrangements.

If the scheme delivers the anticipated benefits then DCC intend to roll out similar schemes to other affected communities. Further information regarding the Community Flood Warden Scheme will be fed to the local community in the near future.

Following the recent completion of a catchment study for Scropton, DCC have received monies to commission a 'Detailed Design' to investigate further the high level proposals represented in the catchment study. The results of this study will be fed back to the community upon completion.

5.2 Other Risk Management Authorities

There are a number of other RMAs that have relevant flood risk management responsibilities and functions in Scropton and these are:

- **Highways Agency** – the relevant RMA with responsibility for the management of surface water falling within the curtilage of the A50 and maintaining drainage infrastructure to an appropriate service and structural grade to drain surface water from the highway,
- **Severn Trent Water** - the relevant RMA with responsibility for the management, operation and maintenance of the public sewer network, and
- **South Derbyshire District Council** (a Land Drainage Authority under the LDA).

5.3 Land Owners

There are a number of 'riparian landowners', particularly within the catchment to the west of Watery Lane, that have a responsibility to maintain ordinary watercourses that fall within their land. All riparian owners have the same rights and responsibilities. These responsibilities include the requirement to *"keep any structures, such as culverts, trash screens, weirs and mill gates clear of debris"*. However, *"a landowner has no duty in common law to improve the drainage capacity of watercourse he/she owns."*

A full explanation of the rights and responsibilities of riparian ownership are given in the Environment Agency publication, *"living on the edge"*.

<http://www.environment-agency.gov.uk/homeandleisure/floods/31626.aspx>

5.4 Actions

Derbyshire County Council has agreed/ undertaken the following:

- The identified culverts have been entered onto the flood risk Asset Register (Section 21 FWMA);

- Liaise with SDDC to review the maintenance regime of the trapezoidal drainage ditches aligning Watery Lane and will endeavour to ensure the ditch is free from obstructing debris in the event of severe weather warnings;
- A detailed design of feasible mitigation options from the catchment study has been commenced and DCC will report the findings back to the community once it is complete,
- DCC will work with SDDC to ensure that all known riparian land owners are fully aware of their responsibilities, and
- DCC will continue to liaise with the community via Scropton Parish Council to introduce a pilot Flood Warden Scheme.

South Derbyshire District Council has agreed the following action:

- As a RMA with general/permissive powers under the LDA, SDDC will work with DCC to ensure all known riparian land owners are fully aware of their responsibilities, including maintaining the free passage of flow through their section of watercourse and where possible removing any debris which could lead to downstream obstruction.

6. Sources of Information

The following documents, reports, records or sources of information have contributed to this report and are available on request:

- Flood Incident Survey reports from residents and local elected members,
- Flood Forecasting Centre and Met Office statements and warnings,
- Photographs supplied by DCC and residents,
- SDDC's initial post incident report, and
- Site meeting notes between Balfour Beatty, DCC and SDDC.

7. Status of Report and Disclaimer Information

This report has been prepared as part of DCC's responsibilities under the FWMA.

The findings of the report are based on a subjective assessment of the information available by those undertaking the investigation and therefore may not include all relevant information. As such it should not be considered as a definitive assessment of all factors that may have triggered or contributed to the flood event.

The opinions, conclusions and any recommendations in this report are based on assumptions made by DCC when preparing this report, including, but not limited to those key assumptions noted in the report, including reliance on information provided by others.

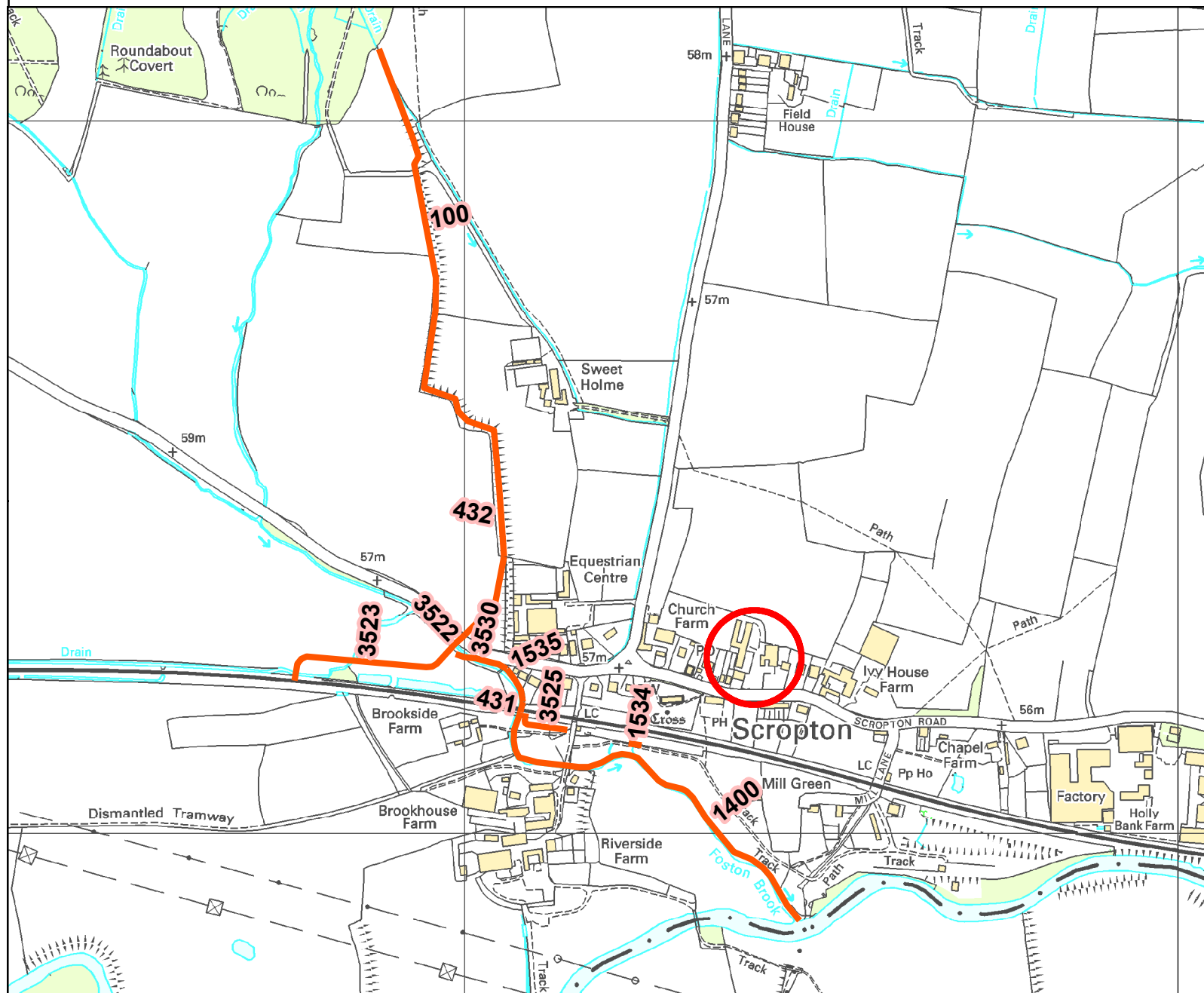
DCC expressly disclaims responsibility for any error in, or omission from, this report arising from or in connection with any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the time of preparation and DCC expressly disclaims responsibility for any error in, or omission from, this report arising from or in connection with those opinions, conclusions and any recommendations.

DCC does not accept any liability for the use of this report or its contents by any third party.

APPENDIX F FLOOD DEFENCE DATASET

Defence Layer Map, centred on Grid Ref 419405,330232 created 26 October 2018.



Legend

 Flood Defences selection

 Approximate location of site

Scale 1:8,000



Defence	Crest Levels (m AOD)		Description	SoP (Years)	Length (m)	Condition		Year Built
	D/S	U/S				Overall	Worst	
100	60.30	60.30	Defence modified in 2001 & 2013 to form part of Foston FSR. Cohesive fill earth embankment with grass cover. Wet side slope 1 in 25, Dry side slope 1 in 5, and crest width of 3.5m. Bandwidth of 10m.	100	790.97	2	2	1973
431	58.82	58.60	Link flood bank to railway	100	14.71	3	3	1973
432	60.30	60.30	Formerly the Firs flood bank, modified and incorporated into Foston FSR 2013. Cohesive fill earth embankment with grass.	100	128.09	2	2	1973
1400	0.00	0.00	Natural channel	25	569.93	3	3	0
1534	58.35	58.35	St Pauls Church cattle creep defence.	100	18.28	2	2	1973
1535	58.60	58.63	New brick flood wall.	100	52.16	3	3	1995
3522	60.30	60.30	A 200m length of Leathersley Lane has been raised to tie in with the flood embankment (Foston North and South). Construction as per DCC Highways specification.	100	25.67	2	2	2014
3523	58.28	58.28	Cohesive fill earth embankment with grass cover. Wet side slope is 1 in 5, and crest width of 5m. Embankment forms part of Foston Flood Storage Reservoir. Bandwidth of 40m.	100	257.38	2	2	2014
3525	58.28	58.30	Cohesive fill earth embankment with 1 in 3.25 side slopes and 3.5m crest. 100mm dia. drain runs between rail line and toe of embankment. Bandwidth of 13m.	100	73.16	2	2	2014
3530	0.00	0.00	Natural channel	25	75.62	3	3	0

Visual inspection condition grades		
Grade	Rating	Description
1	Very Good	Cosmetic defects that will have no effect on performance
2	Good	Minor defects that will not reduce the overall performance of the asset
3	Fair	Defects that could reduce performance of the asset
4	Poor	Defects that would significantly reduce the performance of the asset. Further investigation is required.
5	Very Poor	Severe defects resulting in complete performance failure.



View looking northwards along earthen embankment, adjacent to Scropton Riding & Driving Centre.



View looking north-west along earthen embankment, adjacent to Holme Farm Equestrian Centre.



View looking south towards Leathersley Lane. Note the areas of standing surface water in adjacent fields.



View looking southwards from Leathersley Lane of the flood defences on Brookside Farm.



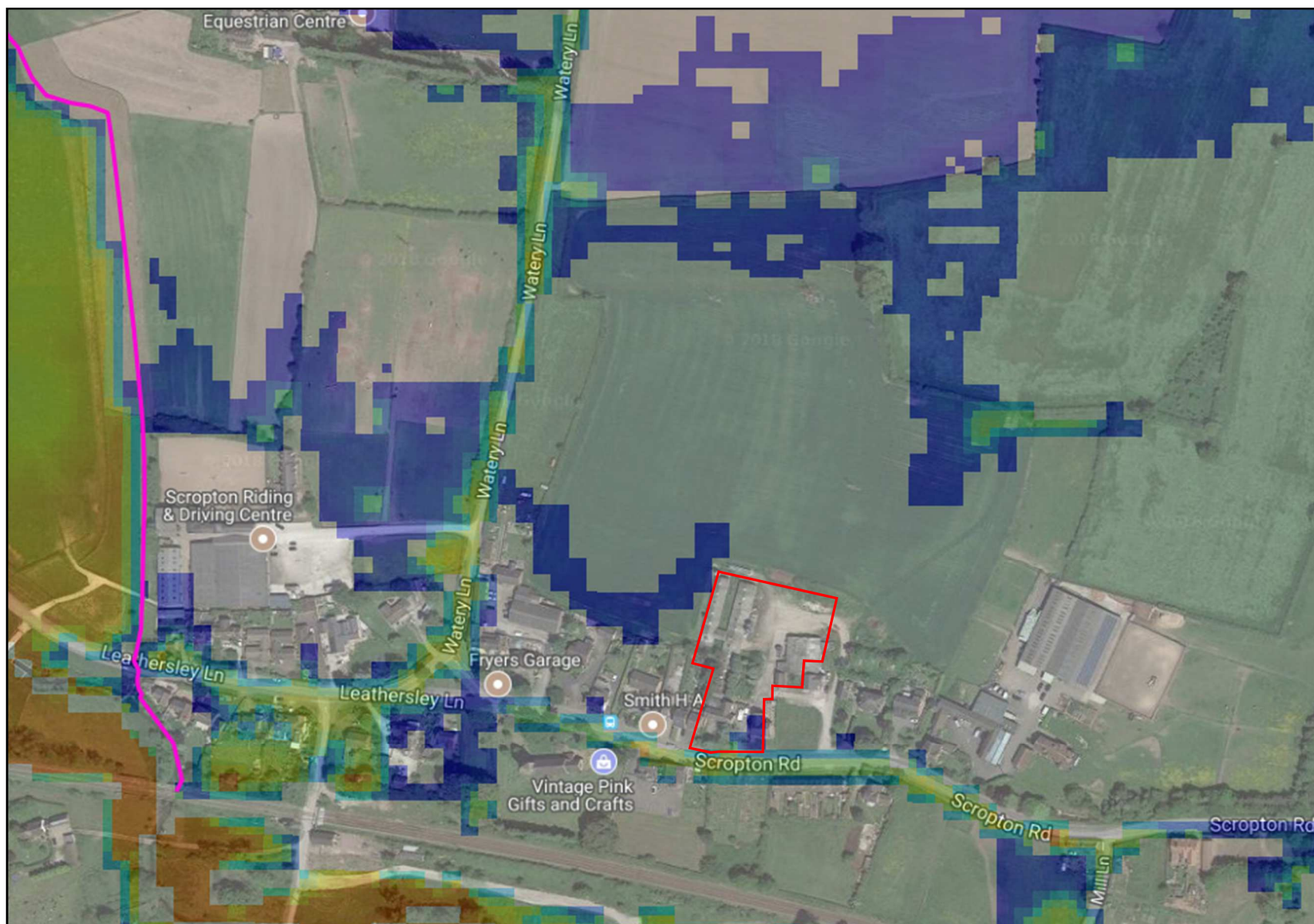
View looking westwards of the flood defences (L) on Brookside Farm across to the Foston Brook (R).

APPENDIX G

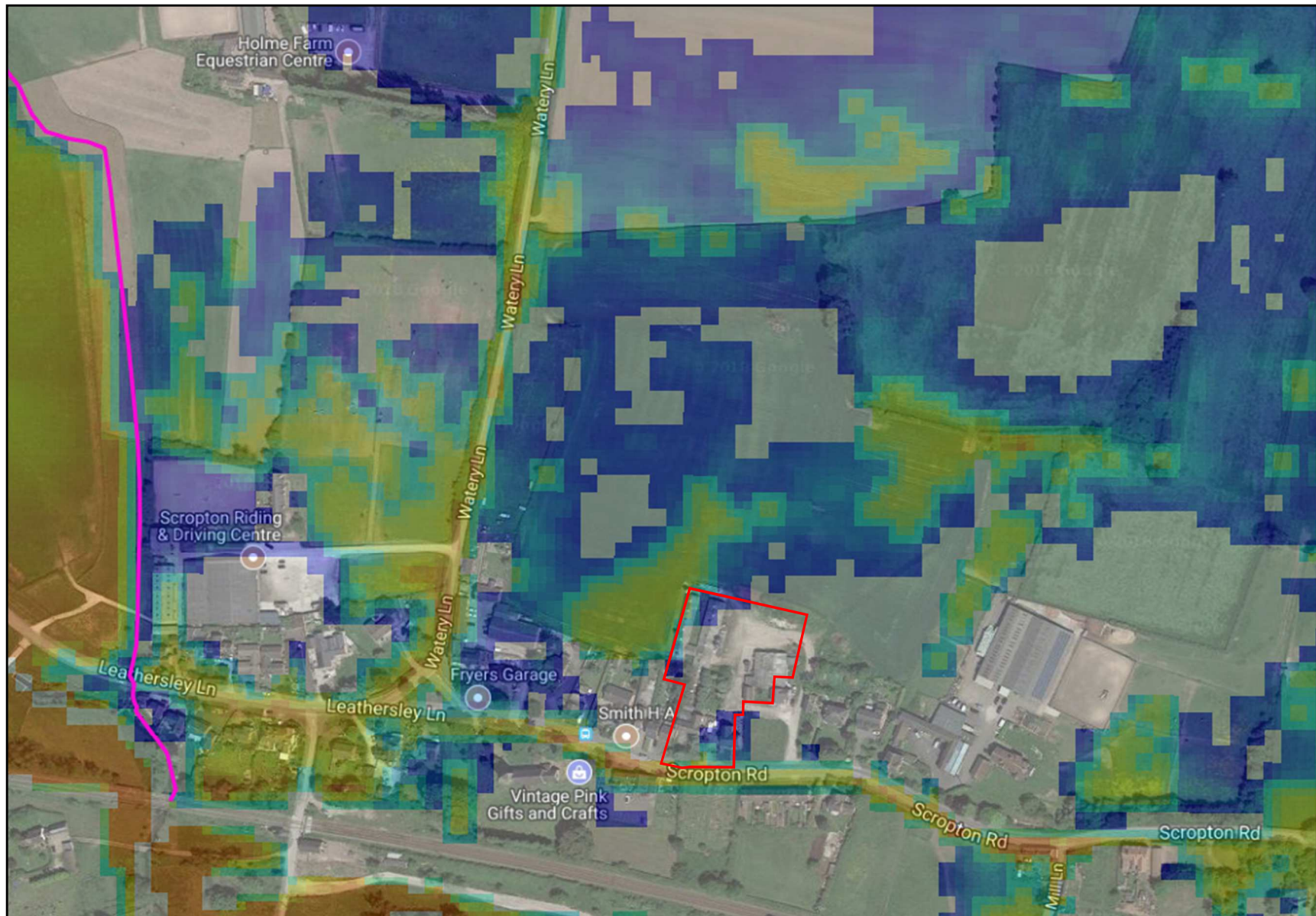
SFRM MODELLING OUTPUTS



The modelled flood extents for the 1 in 20-year (5% AEP) event. Site boundary is marked in red, and flood defences are marked in pink.



The modelled flood extents for the 1 in 100 - year + CC event. Site boundary is marked in red, and flood defences are marked in pink.



The modelled flood extents for the 1 in 1000-year (0.1% AEP) event. Site boundary is marked in red, and flood defences are marked in pink.

APPENDIX H LLFA EARLY ENGAGEMENT RESPONSE

Early Engagement Response Form

DCC REFERENCE:	2018/29. Land North of Scropton Road, Scropton		
DCC CONTACT:	Scott Stone (scott.stone@derbyshire.gov.uk)		
PLANNING REFERENCE:	N.A		
ADDRESS OF SITE:	Land north of Scropton Road, Scropton		
DATE RECEIVED:	11/10/2018	DATE DUE:	01/11/2018

SURFACE WATER INFORMATION:

The Environment Agency's Updated Flood Map for Surface Water gives an indication of the scale and distribution of surface water flood risk, and also raises awareness of the surface water flood risk for the following rainfall events 1/30yr, 1/100yr.

The site is not at risk from Surface Water flooding (as indicated on the EA's Updated Flood Map for Surface Water).

Note; Any alteration to the impermeable area for this development, may exacerbate the surface water flood risk, and should be managed appropriately.

Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate (as per National Planning Policy Framework 165), and also apply the hierarchy of drainage options to ensure that surface water is directed to the most appropriate outfall.

Developments that do not include any SuDS features are expected to provide evidence as to why these principles cannot be followed. The applicant is advised to review the **Planning and Development Guidance Notes** available on Derbyshire County Council's website (www.derbyshire.gov.uk/flooding/strategy) should any guidance on the drainage strategy for the proposed development be required.

The LLFA requires that site surface water drainage is designed in line with DEFRA's Non-statutory technical standards for sustainable drainage systems (March 2015), including restricting developed discharge of surface water to greenfield runoff rates, making suitable allowances for climate change (in line with the latest guidance from DEFRA) and urban creep (allowance of 10%),

Note; The Greenfield runoff rate which is to be used for assessing the requirements for limiting discharge flow rates and attenuation storage for a site should be calculated for the whole development area (paved and pervious surfaces - houses, gardens, roads, and other open space) that is within the area served by the drainage network whatever size of the site and type of drainage system. Significant green areas such as recreation parks, general public open space etc., which are not served by the drainage system and do not play a part in the runoff management for the site, and which can be assumed to have a runoff response which is similar to that prior to the development taking place, can be excluded from the greenfield analysis.

Details of how and by whom, the on-site surface water drainage systems will be maintained and managed after completion and for the lifetime of the development to ensure the features remain functional, will also be required prior to commencement of the works.

The LLFA also strongly encourages that the developer should take into account designing drainage systems for exceedance working with the natural topography of the site, utilising natural mini sub-catchments.

HISTORICAL FLOODING INFORMATION:

According to LLFA held datasets, there are currently no records of historical flooding within 100m of the site boundary, however there are records of flooding further along Scropton Road to the east and Leathersley Lane to the west.

The area also has a Section 19 Formal Flood Investigation Report, which has been sent along with this response form.

Note; As part of the Drainage Strategy or Flood Risk Assessment for the site, the applicant should always investigate all possible sources of information on past flooding, as the LLFA cannot guarantee that every record of previous historic flooding is accounted for.

FLUVIAL INFORMATION (Ordinary watercourse and Main River where applicable)

The nearest watercourse to the site is the Foston Brook (Main River), approximately 155 metres to the south.

The LLFA does not generally undertake or hold any data relating to modelling on specific ordinary watercourses. The applicant is advised to contact the Environment Agency who hold modelling data for Main Rivers and some ordinary watercourses.

Due to the historic mining and mineral extraction operations in Derbyshire, networks of old stone soughs and adits may exist beneath the ground surface in parts of the County (particularly North East Derbyshire District, High Peak Borough, Derbyshire Dales District and the Peak District National Park area). The applicant is therefore advised to investigate the potential for hidden watercourses existing on the land prior to any works being undertaken.

BRITISH GEOLOGICAL SURVEY DATA:

An analysis of the British Geological Survey (BGS) data is summarised below:

- There is a very significant potential for one or more geohazards associated with infiltration.
- Ground instability problems are probably present. Increased infiltration may result in ground instability.
- The groundwater is not expected to be especially vulnerable to contamination. Infiltrating water should be free of contaminants.
- Groundwater is likely to be less than 3 m below the ground surface for at least part of the year.

The information supplied above should only be used as a guide, and site specific ground investigations should be undertaken to inform any subsequent Flood Risk Assessments/Drainage Strategies.

OTHER RELEVANT INFORMATION AND COMMENTS:

The County Council does not adopt any SuDS schemes at present (although may consider ones which are served by highway drainage only). As such, it should be confirmed prior to commencement of works who will be responsible for SuDS maintenance/management once the development is completed.

Any works in or nearby an ordinary watercourse may require consent under the Land Drainage Act (1991) from the County Council For further advice, or to make an application please contact Flood.Team@derbyshire.gov.uk.

No part of the proposed development shall be constructed within 5-8m of an ordinary watercourse and a minimum 3 m for a culverted watercourse (increases with size of culvert). It should be noted that DCC have an anti-culverting policy.

The LLFA is currently formulating Local Guidance for planning applications for major development with surface water implications. In the interim period, and as this information may be used to inform an application for major development to which the LLFA is a statutory consultee, it should be noted the minimum details required on all major planning applications are as follows:

- *Site plan and impermeable area*
- *Topographic survey of the site*
- *Appropriate evidence to support how the site will drain (photographs / maps / a confirmation letter from a water company)*
- *Basic calculations of the greenfield/brownfield runoff and discharge rates.*
- *A quick storage estimate to show the required storage volume of surface water on site and an indication of the likely location*
- *Calculations should include allowances for the current Environment Agency guidance for climate change and urban creep*
- *Basic ground investigation (desktop survey as a minimum)*
- *Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate (as per National Planning Policy Framework 165).*

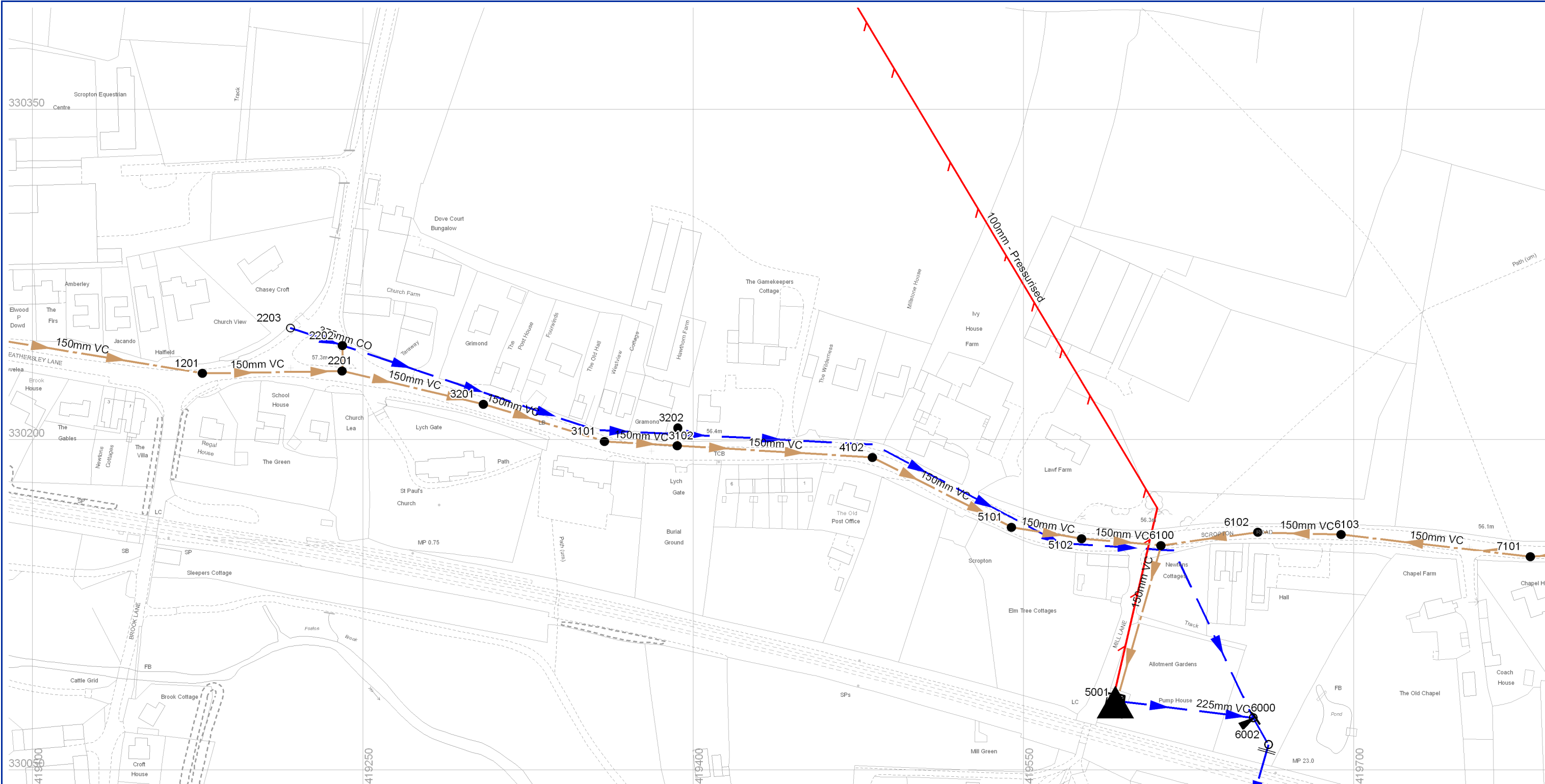
These details are required at the early planning stage to demonstrate that the proposed site is able to drain and that due consideration has been given to the space required on site for surface water storage.

COMPLETED BY:	Scott Stone	DATE:	16/10/2018
CHECKED BY:	Daniel Killer	DATE:	18/10/2018
SIGNATURE:			
DATE SUBMITTED:	18/10/2018		

The County Council holds a suite of information that can inform site development across Derbyshire. The information within this document has been interpreted and provided by an officer from the Flood Risk Management Team.

- Historical data has been collated from a range of sources and is anecdotal. The provision of this data is suggested to act as a guide only.
- Fluvial data has been provided by the Environment Agency however the applicant is advised to contact the Environment Agency for further information should the site lie within the floodplain of a Main River.
- The County Council holds BGS data under a licenced agreement and therefore is not licenced to reproduce this information into the public domain.
- Further information regarding the Water Framework Directive, ecology and biodiversity should be obtained from the Environment Agency and Natural England.
- Derbyshire County Council cannot guarantee that the information provided is complete or comment on its accuracy, and is not liable for any use of this information by third parties.

APPENDIX I SEVERN TRENT SEWER ASSET RECORD PLANS



- Abandoned Gravity Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Public Combined Gravity Sewer
- Public Foul Gravity Sewer
- Public Surface Water Gravity Sewer
- Trunk Combined Gravity Sewer
- Trunk Foul Use Gravity Sewer
- Trunk Surface Water Gravity Sewer
- Combined Use Pressurised Sewer
- Foul Use Pressurised Sewer
- Surface Water Pressurised Sewer
- Highway Drain
- Combined Lateral Drain (SS)
- Foul Lateral Drain (SS)
- Surface Water Lateral Drain (SS)

- Culverted Watercourse
- Cable, Earthing
- Cable Junction
- Cable, Optical Fibre/Instrumentation
- Cable, Low Voltage
- Cable, High Voltage
- Cable, Other
- Housing, Building
- Housing, Kiosk
- Disposal Site
- Sewage Treatment Works
- Housing, Other
- Pipe Support Structure
- Sewage Pumping Facility
- Sewer Facility Connection Inlet / Outlet

- Blind Shaft
- Combined Use Manhole
- Flushing Chamber
- Foul Use Manhole
- Grease Trap
- Head Node
- Hydrobrake
- Lamphole
- Outfall
- Overflow
- Penstock
- Petrol Interceptor
- Sewer Chemical Injection Point
- Sewer Junction
- Sewerage Air Valve
- Sewerage Hatch Box Point
- Sewerage Isolation Valve
- Soakaway
- Surface Water Manhole
- Vent Column
- Waste Water Storage
- Pre-1937 Properties

- MATERIALS**
- 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
- 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

- CATEGORIES**
- W - WEIR
 - C - CASCADE
 - DB - DAMBOARD
 - SE - SIDE ENTRY
 - FV - FLAP VALVE
 - BD - BACK DROP
 - S - SIPHON
 - HD - HIGHWAY DRAIN
 - S104 - SECTION 104



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

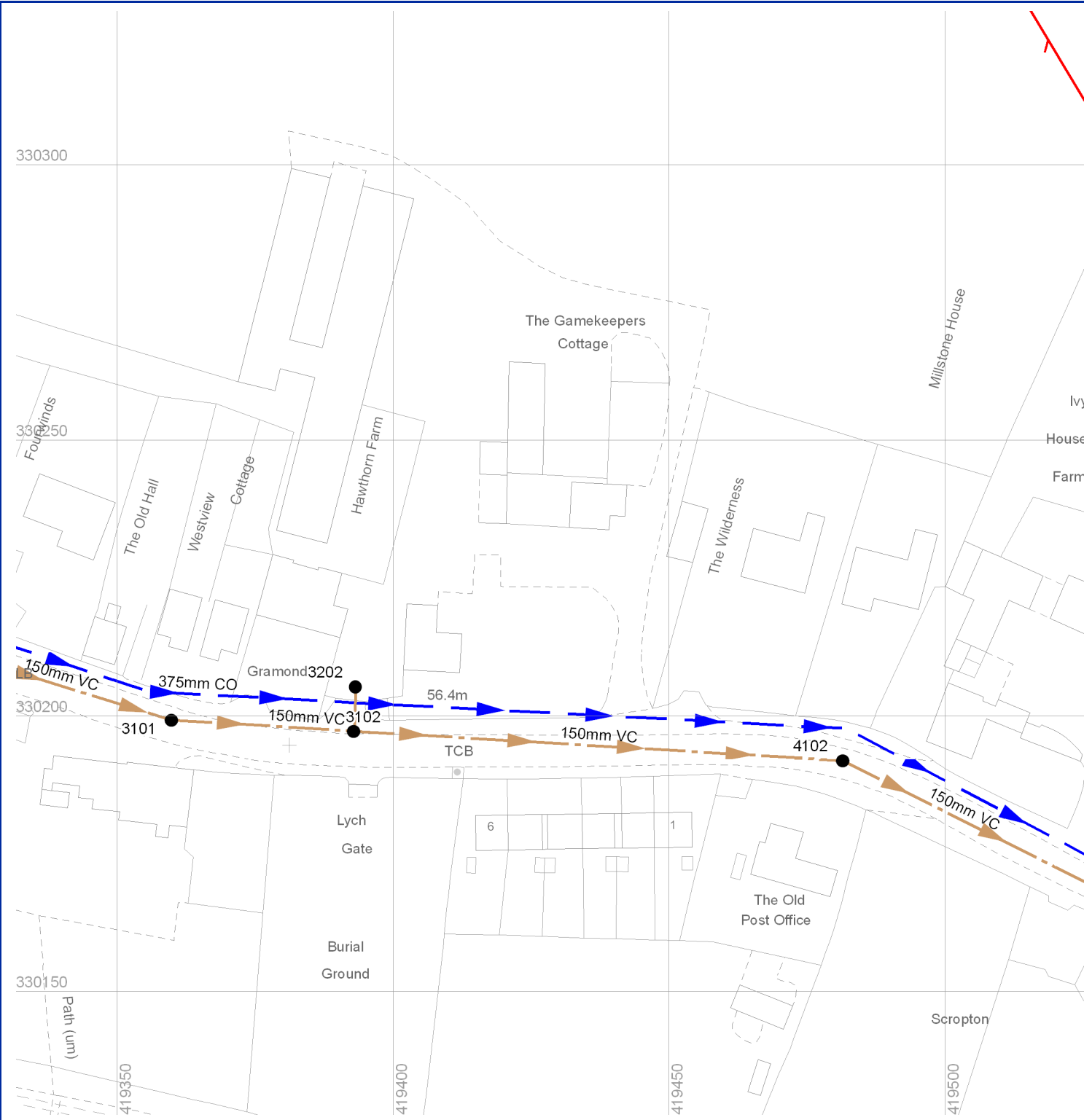
SEWER RECORD

O/S Map scale: 1:1750
Date of issue: 19.10.18

This map is centred upon:
O / S Grid reference:
x : 419438
y : 330219

Disclaimer Statement:
1. Do not scale off this Map.
2. This map and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this Map and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of Severn Trent Water's assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.
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.
These assets may not be displayed on this Map.
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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



Sewer Node

Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SK19303101	56.58	54.75	54.58	F	VC	C	150	nil	194.47	nill
SK19303102	56.48	54.58	54.06	F	VC	C	150	nil	171.42	nill
SK19303202	55.00	54.70	54.58	F	VC	C	150	nil	66.67	2007
SK19304102	56.50	54.05	53.68	F	VC	C	150	nil	190.97	nill

Abandoned Gravity Sewer

Private Combined Gravity Sewer

Private Foul Gravity Sewer

Private Surface Water Gravity Sewer

Public Combined Gravity Sewer

Public Foul Gravity Sewer

Public Surface Water Gravity Sewer

Trunk Combined Gravity Sewer

Trunk Foul Use Gravity Sewer

Trunk Surface Water Gravity Sewer

Combined Use Pressurised Sewer

Foul Use Pressurised Sewer

Surface Water Pressurised Sewer

Highway Drain

Combined Lateral Drain (SS)

Foul Lateral Drain (SS)

Surface Water Lateral Drain (SS)

Culverted Watercourse

Cable, Earthing

Cable Junction

Cable, Optical Fibre/Instrumentation

Cable, Low Voltage

Cable, High Voltage

Cable, Other

Housing, Building

Housing, Kiosk

Disposal Site

Sewage Treatment Works

Housing, Other

Pipe Support Structure

Sewage Pumping Facility

Sewer Facility Connection Inlet / Outlet

Blind Shaft

Combined Use Manhole

Flushing Chamber

Foul Use Manhole

Grease Trap

Head Node

Hydrobrake

Lamphole

Outfall

Overflow

Penstock

Petrol Interceptor

Sewer Chemical Injection Point

Sewer Junction

Sewerage Air Valve

Sewerage Hatch Box Point

Sewerage Isolation Valve

Soakaway

Surface Water Manhole

Vent Column

Waste Water Storage

Pre-1937 Properties

TABULAR KEY

Sewer pipe data refers to downstream sewer pipe.

Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.

Gradient is stated a 1 in...

MATERIALS

- 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

CATEGORIES

W - WEIR

C - CASCADE

DB - DAMBOARD

SE - SIDE ENTRY

FV - FLAP VALVE

BD - BACK DROP

S - SIPHON

HD - HIGHWAY DRAIN

S104 - SECTION 104

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

SEVERN TRENT WATER

Severn Trent Water Limited

Asset Data Management

PO Box 5344

Coventry

CV3 9FT

Telephone: 0845 601 6616

SEWER RECORD (Tabular)

O/S Map scale: 1:1000

Date of issue: 19.10.18

Sheet No. 1 of 1

This map is centred upon: O / S Grid reference: x : 419428 y : 330227

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APPENDIX J SEVERN TRENT DEVELOPER ENQUIRY RESPONSE

ADC Infrastructure
Western House
Western Street
Nottingham
NG1 3AZ

FAO: Peter Stickley

Severn Trent Water Ltd

Leicester Water Centre
Gorse Hill
Anstey
Leicester
LE7 7GU

Tel: 024 777 16843

www.stwater.co.uk

net.dev.east@severntrent.co.uk

Contact: Asset Protection East
(waste water)

Your Ref:

Our Ref: 8327713

18th October 2018

Dear Sirs,

Land North of Scropton Road, Scropton, Derbyshire, DE65 5PP
Proposed 12 dwellings (419405, 330232)

I refer to your 'Development Enquiry Request' in respect of the above named site. Please find enclosed the sewer records that are included in the fee together with the Supplementary Guidance Notes (SGN) which refer to surface water disposal from development sites.

Protective Strips

Due to recent change in legislation, there could be sewers, which have transferred over to the Company that are not shown on the statutory sewer records, but are located on your clients land. These sewers will have protective strips that we will not allow to be built over. The sewers could be identified whilst the land is being surveyed. If this is the case, please contact us for further guidance upon discovery.

The 375mm dia public surface water sewer could be located within or very close to the site entrance, therefore care should be taken when carrying out any excavations in that area.

Foul Water Drainage

A gravity foul discharge from 12 dwellings is very low and can be accepted into the public foul sewer in Scropton Road.

Surface Water Drainage

Under the terms of Section H of the Building Regulations 2010, the

disposal of surface water by means of soakaways should be considered as the primary method. If this is not practical and no watercourse is available as an alternative, the use of sewerage should be considered. In addition, other sustainable drainage methods should also be explored before a discharge to the public sewerage system is considered.

If ground conditions are not favourable, for soakaways and other SUDs techniques, evidence should be submitted. The evidence should be either percolation test results or by the submission of a statement from the SI consultant (extract or a supplementary letter). This would satisfy the SGN (enclosed).

Subject to the above, can you please provide further information, to demonstrate how the former impermeable areas on the site are currently drained, if indeed they are positively drained, identifying which impermeable areas drain to which pipeline and the connections/outfalls to the public sewerage system identified. Ideally, a drainage survey of the existing site is required.

The submitted drawings do not shown any existing site sewers connection points to the public sewers. Surface water from this site is likely to be draining to the 375mm dia surface water sewer in Scropton Road (appears located in footpath/verge) therefore a combined discharge to the 150mm dia foul sewer is not accepted.

The foul sewer is thought to surcharge at certain times which could indicate there is surface water flows in the foul system from some possible combined areas upstream, however I would be reluctant to allow surface water flows from this site into the foul system, without concrete proof that the existing impermeable areas do all discharge to the foul sewer via an existing, live connection. Flows other than foul from 12 properties should not be expected.

Please note that Severn Trent have a brownfield surface water policy where we require the new development to be drained of sw based on the existing discharge rate less 30%, which would be a discharge rate of 18 l/sec. This is to achieve a sustainable discharge and to lessen the risk of the development causing any flooding, however sewer records do show a flow control device is located at MH 6002 near the pumping station storm overflow near the railway, therefore I will require to determine this devices designed pass forward flow rate before I can stipulate or accept any sw discharge rate from the site.

Any flows generated by the site in excess of the permitted discharge rate will have to be attenuated within the development site.

Connections

For any new connections including the use, reuse and indirect to the public sewerage system, the developer will need to submit Section 106 application. Our Developer Services department are responsible for handling all such enquiries and applications. To contact them for an application form and associated guidance notes please call 0800 707 6600 or download from www.stwater.co.uk

Please quote the above reference number in any future correspondence (including e-mails) with STW Limited. Please send **all correspondence** to the net.dev.east@severntrent.co.uk email inbox address, a response will be made within 15 days.

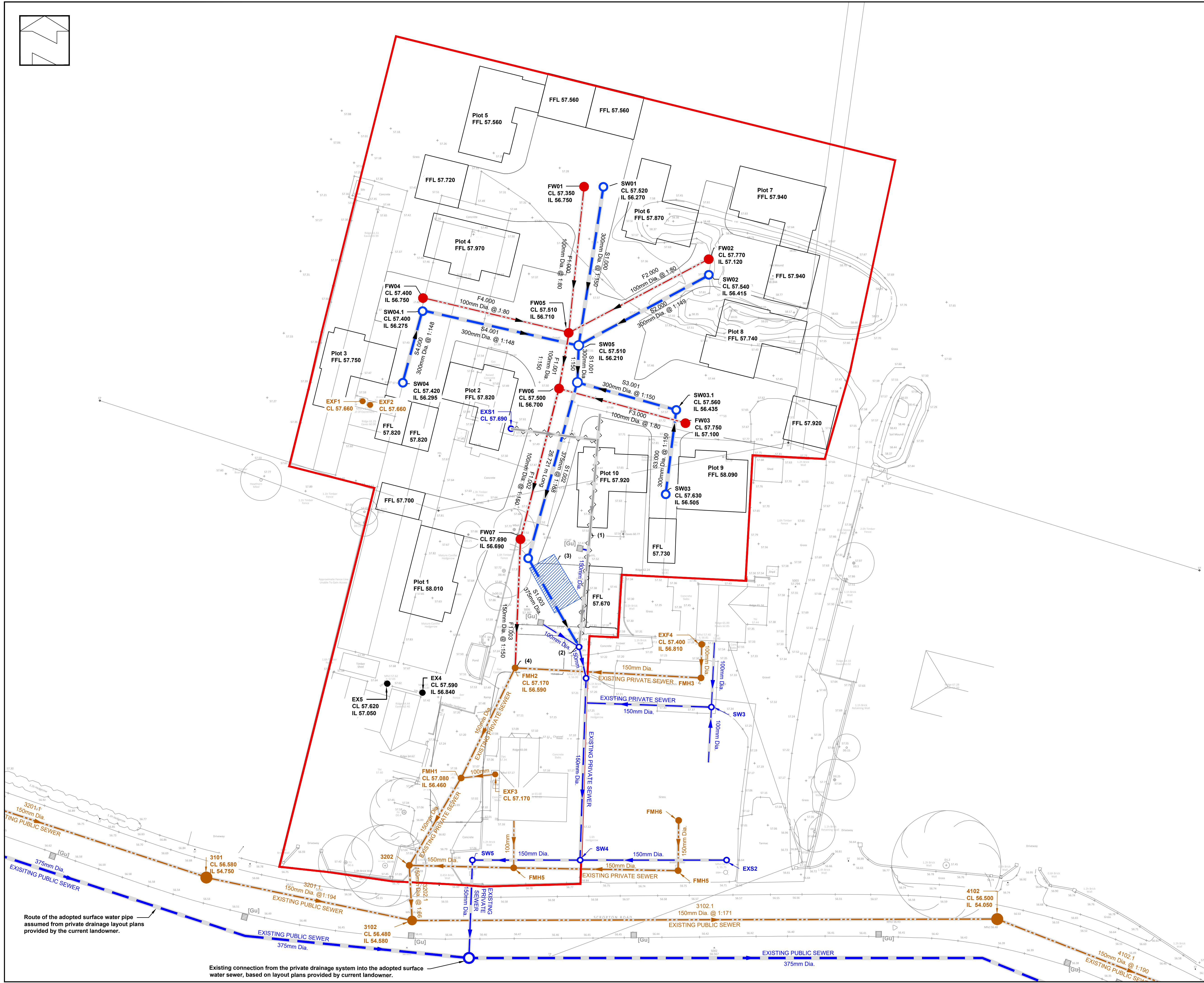
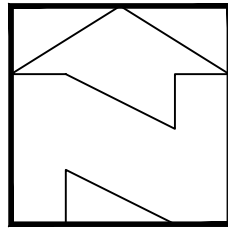
Please note that Developer Enquiry responses are only valid for 6 months from the date of this letter.

Yours sincerely,



Keith Baker
Senior Evaluation Technician
Asset Protection East (wastewater)
Asset Data
Wholesale Operations

APPENDIX K PROPOSED DRAINAGE STRATEGY



Key	
	Site Boundary
	Existing Surface water gravity sewer
	Existing Foul water gravity sewer
	Existing Private gravity sewer
	Proposed Adoptable Surface water gravity sewer
	Proposed Adoptable Foul water gravity sewer
	Existing Foul water gravity sewer to be abandoned or removed
	Existing Surface water gravity sewer to be abandoned or removed
	Storm Water Attenuation Tank. (Subject to detailed design).

All finished floor levels (FFL) have been set in accordance with PPG guidance:

Ground floor level should be a minimum of whichever is higher of:

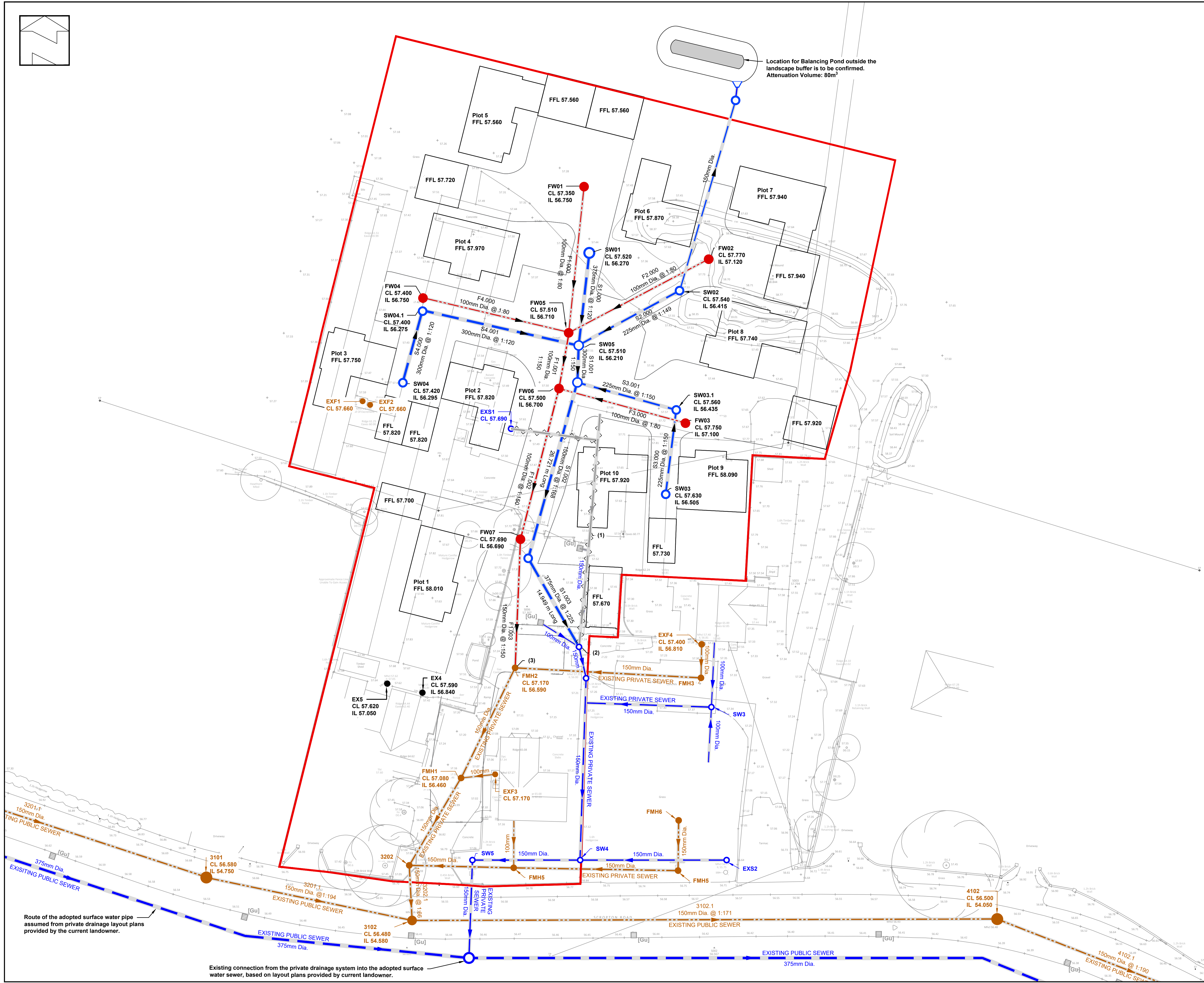
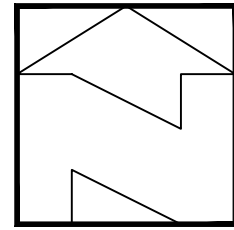
- 300 mm above the general ground level on site.
- 600mm above the estimated river or sea flood level.

All floor levels for the site are set at 300mm above the average ground level for each plot.

All pipes and manholes have been sized in accordance with the guidelines specified in The Building Regulations- Part H- Drainage and Waste Disposal, 2010.

- NB
- 1) Section of existing surface water sewer to be abandoned due to running underneath a proposed plot.
 - 2) Proposed connection to be made into existing surface water drainage network, under a Section 106 agreement with Severn Trent Water.
 - 3) An indicative location for an onsite attenuations tank that is to be sized accordingly in the detailed design process. Attenuation Volume of **80m³**
 - 4) Proposed connection to be made into existing foul water drainage network, under a Section 106 agreement with Severn Trent Water

Rev	Description	Date
Client:		
Alan Critchlow		
Project:		
Proposed Residential Development Scropton Road, Scropton		
Title:		
Proposed Foul and Surface Water Drainage Layout - Attenuation Tank Option		
Drg Size:	Scale:	Date:
A1	1:250	28/11/2018
Drg No:	Rev:	
ADC1863/DR/060	P1	



Key	
	Site Boundary
	Existing Surface water gravity sewer
	Existing Foul water gravity sewer
	Existing Private gravity sewer
	Proposed Adoptable Surface water gravity sewer
	Proposed Adoptable Foul water gravity sewer
	Existing Surface water gravity sewer to be abandoned or removed
	Proposed Balancing Pond feature.

All finished floor levels (FFL) have been set in accordance with PPG guidance:

Ground floor level should be a minimum of whichever is higher of:

- 300 mm above the general ground level on site.
- 600mm above the estimated river or sea flood level.

All floor levels for the site are set at 300mm above the average ground level for each plot.

All pipes and manholes have been sized in accordance with the guidelines specified in The Building Regulations- Part H- Drainage and Waste Disposal, 2010.

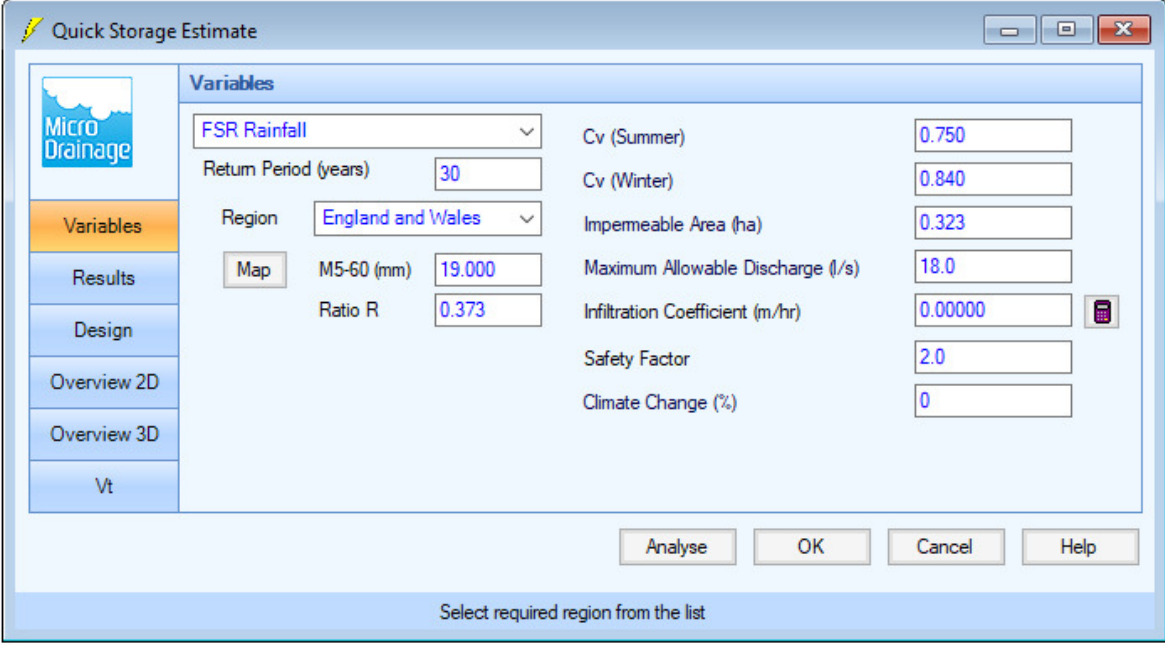
NB

- 1) Section of existing surface water sewer to be abandoned due to running underneath a proposed plot.
- 2) Proposed connection to be made into existing surface water drainage network, under a Section 106 agreement with Severn Trent Water.
- 3) Proposed connection into existing foul water drainage network, under a Section 106 agreement with Severn Trent Water.

Rev	Description	Date
Client:		
Alan Critchlow		
Project:		
Proposed Residential Development Scropton Road, Scropton		
Title:		
Proposed Foul and Surface Water Drainage Layout - Balancing Pond Option		
Drg Size:	Scale:	Date:
A1	1:250	28/11/2018
Drg No:	Rev:	
ADC1863/DR/061	P1	

APPENDIX L SURFACE WATER STORAGE CALCULATIONS

1 in 30 year - Parameters



Quick Storage Estimate

Variables

FSR Rainfall

Return Period (years)

Region

Map

M5-60 (mm)

Ratio R

Cv (Summer)

Cv (Winter)

Impermeable Area (ha)

Maximum Allowable Discharge (l/s)

Infiltration Coefficient (m/hr)

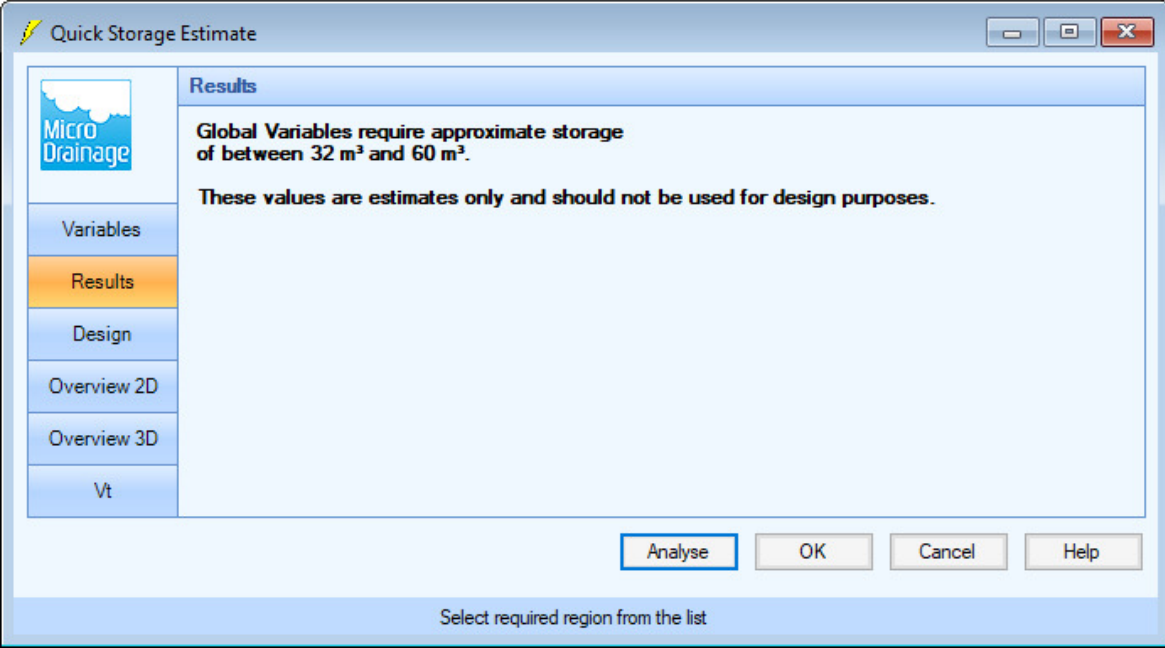
Safety Factor

Climate Change (%)

Analyse OK Cancel Help

Select required region from the list

1 in 30 year – Storage Requirements



Quick Storage Estimate

Results

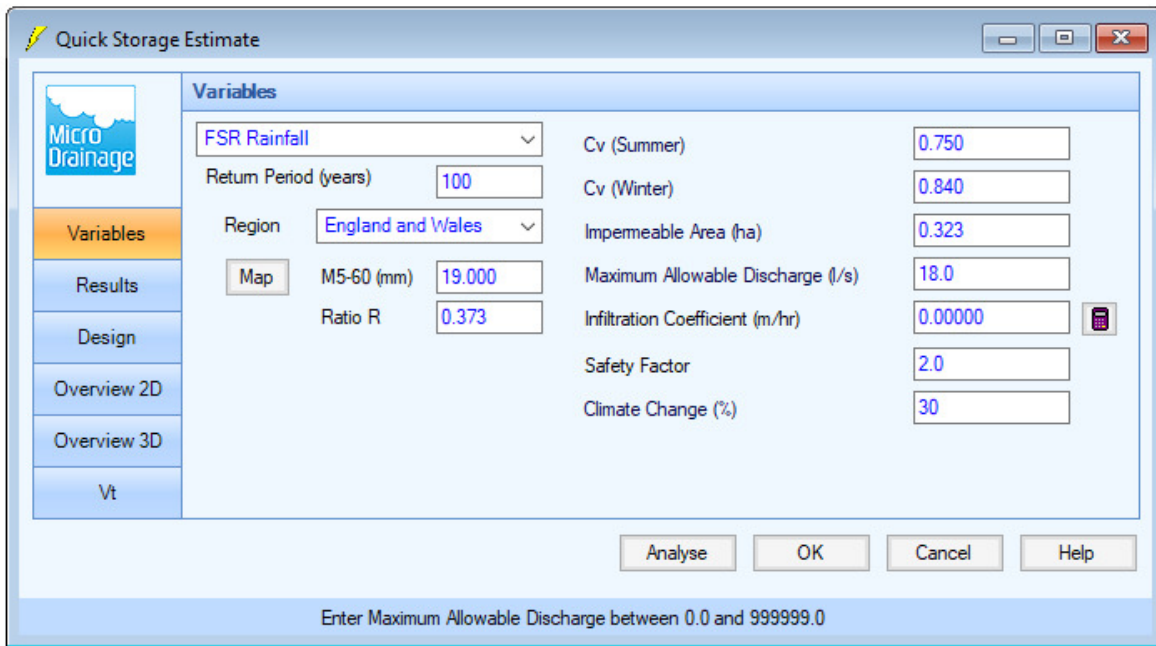
Global Variables require approximate storage of between 32 m³ and 60 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Select required region from the list

1 in 100 year + 30% climate change - Parameters



Quick Storage Estimate

Micro Drainage

Variables

FSR Rainfall (dropdown)

Return Period (years): 100

Region: England and Wales (dropdown)

Map (button)

M5-60 (mm): 19.000

Ratio R: 0.373

Cv (Summer): 0.750

Cv (Winter): 0.840

Impermeable Area (ha): 0.323

Maximum Allowable Discharge (l/s): 18.0

Infiltration Coefficient (m/hr): 0.00000

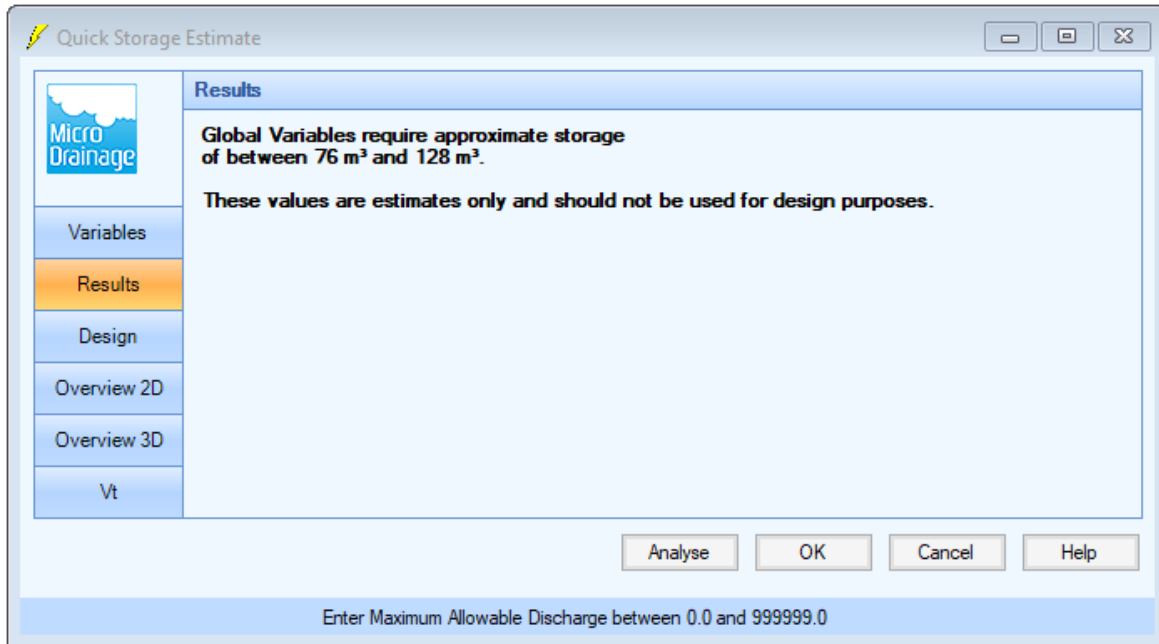
Safety Factor: 2.0

Climate Change (%): 30

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0

1 in 100 year + 30% climate change – Storage Requirements



Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 76 m³ and 128 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0