

Southampton to London Pipeline Project

Volume 7

Flood Risk Assessment

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Southampton to London
Pipeline Project

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Esso Petroleum Company, Limited

Flood Risk Assessment

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Executive Summary

This Flood Risk Assessment (FRA) accompanies the Esso Petroleum Company, Limited (Esso) application for development consent to construct, operate and maintain a replacement for its 90km (56 mile) aviation fuel pipeline. This FRA assesses the potential flood risk to the proposed Southampton to London Pipeline Project (the project) and the impact that it could have on flood risk elsewhere. In doing so, the FRA complies with the Overarching National Policy Statement for Energy (EN-1) (Department of Energy and Climate Change, 2011).

This FRA demonstrates compliance with the Sequential Test as required by Section 5.7.9 of NPS EN-1. As part of the project encroaches into Flood Zone 3 it also complies with the Exception Test, in accordance with Section 5.7.16 of NPS EN-1.

Esso Petroleum Company, Limited (Esso) intends to replace 90km of its 105km aviation fuel pipeline that runs from its Fawley Refinery near Southampton to Esso's West London Terminal storage facility in Hounslow.

In 2002, Esso replaced 10km of the existing pipeline between Hamble and Boorley Green in Hampshire. The current project is to replace the 90km between Boorley Green and Esso's West London Terminal storage facility in Hounslow. The replacement pipeline is 97km (60 miles) long, as it cannot follow the line of the existing pipeline along its whole length due to new developments and environmental constraints. The replacement pipeline would have a nominal internal diameter of 30cm.

The project comprises: the pipeline, construction of a new pigging station (to facilitate maintenance inspections) and installation of valves, pressure transducer, small cabinets for Cathodic Protection and pipeline marker posts. The pigging station, valves, Cathodic Protection transformer rectifier cabinets and pipeline markers are the only above ground features during the operational phase.

The temporary works associated with the construction phase include the excavation of the pipeline trench, construction of site access and haul roads, working compounds and logistics hubs along the route and launch and reception pits for trenchless crossings.

The FRA assesses the risk of flooding associated with all sources during construction and operation of the project. The overall risk of impact has been assessed for each source of flooding as a product of the likelihood of occurrence and severity of impact.

As the project passes through areas of predicted flood risk during the pipeline installation there is a risk to and from the project. There is potential for a significant effect on flood risk during construction if not mitigated. However, works to install and commission the pipeline are expected to last from grant of the Development Consent Order (DCO) until 2023 (although less time than this in each specific location), reducing the risk to and from the project. In addition, a number of mitigation measures are proposed that would reduce exposure to the project (including workers and plant) and third parties during installation. The crossing of 98 watercourses plus the temporary storage of materials within Flood Zone 3 have the potential to increase flood risk to the project and third parties. However, 26 watercourse crossings are



trenchless and elsewhere, the proposed mitigation measures would reduce this risk to an acceptable level.

The project would have a negligible impact upon flood risk during its 60-year design life. The replacement pipeline would be buried underground for its entire length, with a pigging station near Boorley Green the only new above ground structure aside from smaller elements comprising valve chamber structures, Cathodic Protection transformer rectifier cabinets and route markers. This pigging station is located within an area with a low or very low risk of flooding (subject to source).



1. Introduction

1.1 Background

- 1.1.1 Esso Petroleum Company, Limited (Esso) is making an application for development consent to replace 90km (56 miles) of its existing 105km (65 miles) aviation fuel pipeline that runs from the Fawley Refinery near Southampton, to Esso's West London Terminal storage facility in Hounslow. Within the Flood Risk Assessment (FRA), this replacement is referred to as the project.
- 1.1.2 The FRA has been undertaken to assess the potential flood risk to the project and its potential impact on flood risk elsewhere. The FRA takes into account both the risks during installation and during operation of the pipeline and associated infrastructure.
- 1.1.3 This FRA has been produced to support the application for development consent and the accompanying Environmental Statement (ES) under the Planning Act 2008. ES Chapter 8 Water (**application document 6.2**) incorporates an assessment of the potential impact of flood risk on the project.

1.2 Project Objectives

- 1.2.1 Background information to the project, including the need for the pipeline replacement and development of the project proposals, is provided in the ES (**application document 6.1-6.2**), Planning Statement (**application document 7.1**). This includes a Statement of Need, to support the application for development consent. All works for the installation and subsequent operation of the pipeline would take place within defined 'Order Limits'.
- 1.2.2 The following project objectives were developed as fundamental requirements for delivering a successful project:
- to replace the pipeline from Boorley Green to Esso's West London Terminal storage facility in Hounslow, via Alton in Hampshire, to connect to existing pipeline infrastructure;
 - to meet all the relevant planning requirements;
 - to maintain fuel supply during replacement; and
 - to develop and install a safe, buildable, operational and economically feasible pipeline.
- 1.2.3 After initial consideration of the effects of the project and their potential significance, consideration was given as to how those effects could be avoided, reduced or remedied. This is referred to as mitigation.



1.2.4 Details of the environmental mitigation measures that are required to reduce the potential significant adverse effects of the project are provided in this report. Each mitigation measure has been given a unique reference code to help track, manage and monitor the mitigation actions going forward.

1.3 Proposed Route

1.3.1 The replacement pipeline starts near Boorley Green at the end point of the previously replaced pipeline. The route runs generally in a northeast direction via Esso's Pumping Station in Alton. It terminates at Esso's West London Terminal storage facility.

1.3.2 The working width for the route is typically 30m. Where the new pipeline is routed adjacent to Esso's existing pipelines, a 36m wide Order Limits corridor is proposed to provide flexibility for detailed routing and construction methodologies for pipeline installation adjacent to these existing pipelines. Where specific width restrictions exist, for example for highway works in urban areas, the working width has been narrowed. When crossing through boundaries between fields which include hedgerows, trees or watercourses, the working width would be reduced to 10m to reduce habitat loss.

1.3.3 The project comprises:

- 97km of new pipeline to be routed via the Alton Pumping Station to deliver greater connectivity and resilience to the UK fuel supply network;
- a new "pigging" station at Boorley Green to allow the entry and exit points for Pipeline Inspection Gauges (PIG) during inspections;
- 14 remotely operated in-line valves along the pipeline to allow isolation for maintenance, and one Pressure Transducer to monitor pressure;
- 6 above ground cathodic protection (CP) transformer rectifier cabinets to supply power to the existing CP system;
- pipeline markers along the route at all road, rail and river crossings and boundaries and new red and black colour-coded flight marker posts to track the pipeline route when inspected by helicopter; and
- modifications to the PIG station at the Esso West London Terminal storage facility including installation of a new 40cm PIG receiver for the 30cm diameter PIGs.;

1.3.4 In addition the temporary works during installation include:

- temporary construction logistics hubs;
- temporary construction working compounds and laydown areas; and
- temporary construction site access roads (including bridges over watercourses).

1.3.5 When operational, the only above ground features would be the pigging station, valves, pressure transducer, Cathodic Protection transformer rectifier cabinets and route markers and paperwork associated with the replacement pipe which would have minimal impact on, or consequences from, flood risk.



1.4 Project Programme

- 1.4.1 Works to install and commission the pipeline are expected to start from grant of DCO and be completed early 2023. Certain advance works may take place prior to development consent where consented under alternative regimes, for example, the Town and Country Planning Act 1990.
- 1.4.2 The pipeline has a design life of 60 years.

1.5 FRA Objectives

- 1.5.1 This FRA has been developed to demonstrate the project's compliance with the flood risk requirements of the relevant National Policy Statements (see Section 2). The FRA defines the flood risk to, and arising from, the proposed development from all sources and provides details of the inbuilt measures that would mitigate any significant consequences on flood risk.
- 1.5.2 To meet NPS requirements this FRA:
- reviews flood risk from all sources within the Order Limits and assesses the potential impact to the project during construction and operation;
 - assesses how the project could impact upon all sources of flood risk during construction and operation;
 - includes a specific assessment of flood risk to and from the pigging station, construction compounds and temporary watercourse crossings; and
 - identifies measures to mitigate unacceptable consequences of the proposed development on flood risk elsewhere.
- 1.5.3 Due to the linear nature of the project, multiple flood sources recur within the Order Limits. This FRA is structured around defining categories of flood risk, assessing the risks to and arising from the pipeline for those categories and the mitigation measures to be implemented (where necessary) for each category.



2. Flood Risk Legislation and Policy Context

2.1.1 This section provides a summary of the assessment of flood risk to be conducted for the project and places it within the context of the flood risk legislation within England.

2.1 National Policy Statements (NPS) for Energy

2.1.1 NPS EN-1 sets out the Government's overarching policy with regard to the development of NSIPs in the Energy sector. It outlines the high-level objectives, policy and regulatory framework. It states that where an energy project is greater than 1ha in area, located within Flood Zone 2 or Flood Zone 3 (see Section 7.1 for a definition of these areas) or subject to sources of flooding other than from rivers or the sea, an FRA will be required.

2.1.2 A number of minimum requirements are identified in Section 5.7.5 of EN-1 that must be covered, including that the FRA should:

- be proportionate to the nature and scale of the development;
- consider the risks of flooding arising from the development as well as those to the development;
- take the effects of climate change into account;
- consider both the potential adverse and beneficial effects of flood risk management infrastructure, including raised defences, flow channels, flood storage areas and other artificial features, together with the consequences of their failure;
- consider the vulnerability of those using the site, including for safe access;
- consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and identify flood risk reduction measures, so that assessments are fit for the purpose of the decisions being made;
- consider the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes;
- include the assessment of the remaining (known as 'residual') risk after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular project;
- consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of the project may affect drainage systems;
- consider if there is a need to be safe and remain operational during a worst case flood event over the development's lifetime; and
- be supported by appropriate data and information, including historical information on previous events.



- 2.1.3 Section 5.7.9 of EN-1 further sets out that applications will be expected to show that the development is supported by an FRA, that the Sequential Test has been applied in site selection, that a sequential approach has been taken to minimise risk within the site and that in areas of flood risk, the site is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed for the lifetime of the development. Section 5.7.13 of EN-1 sets out the requirements of the Sequential Test and Sections 5.7.14 to 5.7.16 of EN-1 set out the requirements of the Exception Test.
- 2.1.4 NPS EN-4 covers the specific energy sector of gas supply infrastructure and gas and oil pipelines. In addition to the guidance in EN-1, EN-4 states generally that applicants should show how the proposal would be resilient to an increased risk of flooding due to climate change.
- 2.1.5 With specific reference to gas and oil pipelines, EN-4 notes that constructing pipelines creates corridors of surface clearance and excavation that can potentially affect watercourses, aquifers, water abstraction and discharge points, areas prone to flooding and ecological receptors. Pipeline impacts could include inadequate or excessive drainage, interference with groundwater flow pathways, mobilisation of contaminants already in the ground, the introduction of new pollutants, flooding, disturbance to water ecology, pollution due to silt from construction and disturbance to species and their habitats. Impacts during construction should be avoided as far as possible through route selection or mitigated if unavoidable and ground should be reinstated after construction.

2.2 The Sequential Test

- 2.2.1 NPS EN-1 refers to the Sequential Test (Section 5.7.13) which aims to steer new development away from areas of highest flood risk (Flood Zone 3) progressing towards the lowest designation (Flood Zone 1). Preference should be given to locating projects in Flood Zone 1 in England and if there is no reasonably available site in Flood Zone 1 then projects can be located in Flood Zone 2. If there is no reasonably available site in Flood Zones 1 or 2, then nationally significant energy infrastructure projects can be located in Flood Zone 3 subject to the Exception Test. Consideration of alternative sites should take account of the policy on alternatives set out in Section 4.4 of NPS EN-1.
- 2.2.2 The Exception Test is required because the project is located, in part, within Flood Zone 3. Compliance with the Sequential Test and Exception Test is provided in Appendix A.

2.3 The Exception Test

- 2.3.1 If it is not possible for the project to be located in zones of lower probability of flooding other than Flood Zone 3, the Exception Test can be applied. The test allows necessary development to progress in situations where suitable sites at lower risk of flooding are not available.



- 2.3.2 NPS EN-1 states that all three of the following elements need to be achieved for the Exception Test to be passed:
- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk;
 - the project should be on developable, previously developed land or, if it is not on previously developed land, that there are no reasonable alternative sites on developable previously developed land subject to any exceptions set out in the technology-specific NPSs; and
 - an FRA must demonstrate that the project will be safe, without increasing flood risk elsewhere subject to the exception below and, where possible, will reduce flood risk overall.
- 2.3.3 *'Exceptionally, where an increase in flood risk elsewhere cannot be avoided or wholly mitigated, the Infrastructure Planning Commission [now the relevant Secretary of State] may grant consent if it is satisfied that the increase in present and future flood risk can be mitigated to an acceptable level and taking account of the benefits of, including the need for, nationally significant energy infrastructure as set out in Part 3 of the Exception Test. In any such case the IPC [now the relevant Secretary of State] should make clear how, in reaching its decision, it has weighed up the increased flood risk against the benefits of the project, taking account of the nature and degree of the risk, the future impacts on climate change, and advice provided by the Environment Agency and other relevant bodies.'*
- 2.3.4 The Sequential and Exception Test Report is provided in Appendix A, demonstrating compliance with these requirements.

2.4 National Planning Policy Framework

- 2.4.1 The NPPF sets out the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so.
- 2.4.2 The NPPF does not contain specific policies for NSIPs. These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant NPS for major infrastructure, as well as any other matters that are relevant (which may include the NPPF).

2.5 Legislation

- 2.5.1 The following legislation applies to development and flood risk in England and has been considered when developing the FRA:
- Water Resources Act 1991: consolidated previous legislation including water resource management and water quality standards, and empowered the Environment Agency to create byelaws and regulate and manage works affecting designated Main Rivers.



- Land Drainage Act 1991: empowered Drainage Authorities to regulate works to ordinary watercourses (non-main rivers).
- Environment Act 1995: created a number of new agencies (including the Environment Agency) and set new standards for environmental management.
- Water Act 2003: extended the provisions of the Water Resources Act 1991 and the Environment Act 1995 for abstractions and discharges, water conservation and pollution control.
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2003: Focused on sustainable management and protection of freshwater resources; and
- Flood and Water Management Act 2010: Defines Risk Management Authorities (RMAs) and their responsibilities. These include a general duty to cooperate in the delivery of their flood risk management responsibilities. Designated Lead Local Flood Authorities (LLFAs) as RMAs, empowering them to identify and manage flood risks from surface water runoff, groundwater and ordinary watercourses. The Environment Agency is the RMA responsible for managing flooding from main rivers and the sea and has a responsibility to provide a strategic overview for all flooding sources and coastal erosion. Water Companies are designated as RMAs responsible for managing the risks of flooding from foul, combined or surface water sewer systems. Highway authorities are the RMAs responsible for managing flood risk associated with highways.

2.6 Flood Risk Management Authorities

2.6.1 Due to the length of the project there are multiple Flood Risk Management Authorities, including:

- Environment Agency;
- Hampshire County Council (as LLFA and Highways Authority);
- Surrey County Council (as LLFA and Highways Authority);
- Thames Water;
- Southern Water; and
- Highways England.

2.6.2 Although not an RMA under the Flood and Water Management Act (2010), the Basingstoke Canal Authority manages the Basingstoke Canal and has an important role in maintenance of this waterway to manage flood risk from this source.

2.6.3 The project is located within areas at risk of flooding due to reservoir failure. Undertakers of 'Large raised Reservoirs' under the Reservoirs Act (1975) have certain responsibilities to ensure their safe operation.



2.7 Consideration of Climate Change

- 2.7.1 NPS EN-4 Section 2.2.2 states that applicants should set out how the proposal will be resilient to increased risk of flooding as a result of climate change. Section 5.7.2 of NPS EN-1 also provides guidance on the consideration of the impact of climate change on flood risk, however the NPSs do not give specific guidance on climate change allowances to use in the assessment of flood risk.
- 2.7.2 In February 2016, the Environment Agency released 'Flood risk assessments: climate change allowances' guidance to support the NPPF (updated in 2018). This guidance provides allowances for the anticipated effects of climate change on fluvial flows, rainfall intensity, sea level rise and offshore windspeed and wave height. Allowances for other flood sources are not provided. This guidance has been used when developing the FRA (see section 4.1 for methodology).

Fluvial and Pluvial (Surface Water) Flood Sources

- 2.7.3 Meetings have been held with the Environment Agency over the project development. In the meeting on 12 September 2018, it was agreed that climate change allowances do not need to be factored into the assessment of fluvial and surface water flooding. This is due to the relatively short-term nature of the construction period (less than three years) and the fact that ground levels would be restored to existing levels following installation. This means that there would be no change to existing levels of flood risk post-construction. Consequently, the currently available datasets for fluvial and pluvial flooding are sufficient to inform the assessment of flood risk for the construction and operational phases of the project.

Groundwater Flood Sources

- 2.7.4 There is no guidance specifying predicted allowances for the effects of climate change on groundwater levels. However, the UK Climate Impacts Programme (DEFRA, 2018) indicates that, in the future, winters may be generally wetter and summers substantially drier for the whole of the UK.
- 2.7.5 The direct effect of climate change on groundwater resources depends primarily upon the change in the volume and distribution of groundwater recharge. If drier, warmer summers lead to the seasonal deficits in the moisture content of soils extending into the autumn, the winter groundwater recharge season may be shortened. This could be compensated, at least to some extent, by an increase in winter rainfall. However, aquifers are recharged more effectively by prolonged steady rain, which continues into the spring, rather than short periods of intense rainfall, which often result in a high proportion of rapid surface runoff rather than infiltration (UK Groundwater Forum, 2019).
- 2.7.6 As a consequence, the anticipated effects of climate change on groundwater levels in the UK may include:
- a long-term decline in groundwater storage;



- increased frequency and severity of groundwater droughts;
- increased frequency and severity of groundwater-related floods; and,
- mobilisation of pollutants due to seasonally high water tables.

2.7.7 During operation these effects could result in local impacts on the stream flows that are sustained in part by groundwater flow. If seasonally high groundwater levels are encountered, due to increased winter rainfall, then groundwater levels could rise into the pipeline trenches with the bedding material offering a preferential flow route for groundwater.

2.7.8 Given the temporary nature of the works during construction, it is considered that climate change would have no discernible impact upon groundwater flood risk.

2.8 Local Planning Policy, Guidance and Evidence Base

2.8.1 The project passes through nine local planning authority areas and two unitary authority areas:

- Eastleigh Borough Council;
- Winchester City Council;
- South Downs National Park Authority;
- East Hampshire District Council;
- Hart District Council;
- Rushmoor Borough Council;
- Surrey Heath Borough Council;
- Runnymede Borough Council;
- Spelthorne Borough Council;
- Hampshire County Council; and
- Surrey County Council.

2.8.2 Each of these authorities has its own planning policy, guidance and evidence base in relation to flood risk. These have been reviewed including:

- Local Plan policies pertinent to flood risk;
- Local Flood Risk Management strategies;
- Surface Water Management Plans;
- Flood Investigation (Section 19) Reports;
- Preliminary Flood Risk Assessments; and
- Strategic Flood Risk Assessments.



- 2.8.3 Even though not directly applicable to a Nationally Significant Infrastructure Project, a review of this information indicates that the project complies with the requirements of local planning policy.



3. Proposed Development

3.1 Introduction

- 3.1.1 Works to install and commission the pipeline are expected to last from grant of DCO until 2023 (advance works may take place prior to this where permitted under alternative regimes). The work would be undertaken in stages and include temporary above ground works to facilitate installation of the pipeline; providing access to the route, compounds for the storage of materials local to the pipeline route, and logistics hubs for receipt of materials prior to transportation to installation locations.
- 3.1.2 The replacement pipeline has a design life of 60 years and would be buried underground for its entire length with the exception of the pigging station and smaller elements such as valves, pressure transducer, cabinets and marker posts.

3.2 Construction Phase

- 3.2.1 The proposed Order Limits for the project include the pipeline route and other temporary working areas such as access routes, construction compounds and a small number of logistics hubs.
- 3.2.2 The working width for installation of the pipeline is typically 30m. Where the new pipeline is routed adjacent to Esso's existing pipelines, a 36m wide Order Limits corridor is proposed to provide flexibility for detailed routeing and construction methodologies for pipeline installation adjacent to these existing pipelines. Where specific width restrictions exist, for example for street works in urban areas, the working width has been narrowed. When crossing through boundaries between fields which include hedgerows, trees or watercourses, the working width would be reduced to 10m to reduce habitat loss (O1). For major road crossings, railways and some watercourses, specialist trenchless techniques would be used requiring additional working space, therefore the Order Limits have been widened.
- 3.2.3 The construction schedule has yet to be developed in detail, as this would be undertaken during the detailed design stage. For the purposes of assessment, a short-term duration is assumed to be less than six months based on the criteria set out in Chapter 3 Project Description and includes mobilisation and reinstatement.
- 3.2.4 Following construction, land used temporarily would be reinstated to an appropriate condition relevant to its previous use.



Temporary Construction Logistics Hubs

- 3.2.5 Six construction logistics hubs would be established in strategic locations before commencement of the main construction works for the purposes of accepting deliveries of pipe. The hubs would be used for the temporary storage of pipe prior to transfer by road to the pipeline installation areas. Each of the hubs would include a pipe laydown area, secure plant storage area, bunded fuel storage, single storey offices, staff welfare facilities and a vehicle parking area.
- 3.2.6 Conservatively, it has been assumed that the hubs would be retained for the whole of the construction phase and then reinstated to their existing land use (from grant of DCO until 2023, advance works may take place prior to this where permitted under alternative regimes).
- 3.2.7 The construction logistics hubs would vary in size and shape subject to their location, but would range in size from approximately two to five hectares. Any topsoil would be stripped and stockpiled around the hub perimeter within the site fence for later reinstatement. Existing hardstanding within the hub areas would be retained if suitable. Any new temporary surface of the hubs would consist of crushed stone over a geomembrane to permit the passage of rainfall, so the hubs would not need to include a positive drainage system, as rainfall would infiltrate through the temporary surface or run off.

Temporary Construction Compounds

- 3.2.8 Approximately 55 temporary compounds would be established along the route of the new pipeline before commencement of the main construction works for the storage of pipe, materials, plant and equipment. It has been conservatively assumed for the FRA that the compounds would be in place for the full duration of the construction period and then reinstated to their former land use. The fenced compounds would be accessed from the existing road network, via an access track if necessary, and would include staff welfare facilities, visitor parking, waste storage, and where necessary wheel washing areas.
- 3.2.9 Existing permeable areas within the temporary compounds would be converted to a surface consisting of a crushed stone surface over a geotextile membrane and would not include a positive drainage system. Rainfall would infiltrate or runoff as it would before the project. Where existing impermeable surfaces are present within temporary compounds these would be retained and used during the construction period and rainfall would continue to runoff as at present. Construction compound sizes would vary but would be approximately 40m x 60m for a typical rural construction compound.



Temporary Access Tracks

- 3.2.10 Temporary access tracks, of approximately 3.5m in width, would be provided to link the pipeline installation areas and haul roads to the local road network. Conservatively it has been assumed for this FRA that the access tracks would be retained throughout the construction duration. Where these temporary access tracks are across open ground, the topsoil would be stripped and the access track constructed by laying imported crushed stone on a geotextile membrane or some form of ground protection. Where the subsoil is unstable and with the agreement of the landowner, temporary access tracks may be created using a soil binder to stabilise the *in situ* subsoil to create a suitable surface. Reinstatement of the access track would be similar to the reinstatement of the pipeline working width.

Pre-Construction Land Drainage

- 3.2.11 The contractor would carry out the installation of header drains where required and, if necessary, divert existing land drains prior to installation of the pipeline, to local watercourses or highways drainage to prevent runoff entering the access and haul roads and the pipeline trench.

Topsoil Removal and Storage

- 3.2.12 Topsoil would be removed to the depth required as determined by ground conditions at the specific location and as per any specific mitigation commitments. This would normally be the full depth of topsoil present, which would not be expected to exceed 0.3m. The removed topsoil would be stored linearly to one side of the working width. At those locations where the working width is reduced, the topsoil would be stored at an alternative agreed location close by.

Haul Road Construction

- 3.2.13 The haul roads would be formed through most of the working area. Where soils are suitable, the haul roads would be formed from exposed subsoil.
- 3.2.14 The project would include appropriate surface water drainage measures in its final design for the haul roads and access tracks so they do not lead to a significant increase in flood risk.

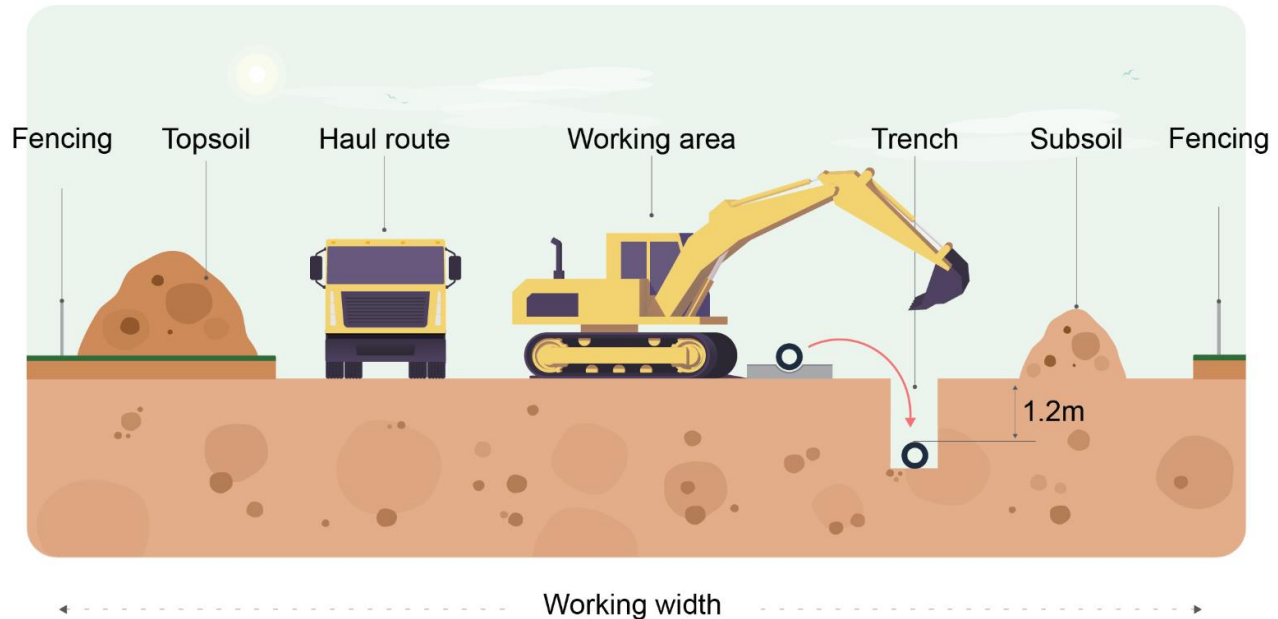
Utility Services

- 3.2.15 Surveys to establish the full extent of underground services and public utilities would be undertaken prior to commencing works. Any previously unidentified services may be diverted as necessary.

Trench Excavation and Backfill

- 3.2.16 An illustration of a typical layout of the open cut trench and working areas is included as Illustration 3.1.

Illustration 3.1: Typical Open Cut Trench Cross Section



- 3.2.17 The minimum depth from the top of the pipe to the ground surface would be 1.2m in open cut sections and deeper for trenchless crossings, where it is required to pass beneath obstacles (roads, rail, some watercourses). Typically, the pipeline would be buried deeper, with 1.5m from the top of the pipe to the ground surface, in roads and streets to account for other existing infrastructure such as utility pipes, cables and sewers. A new pigging station would allow the insertion and withdrawal of PIGs used for inspection and maintenance into and out of the pipeline;
- 3.2.18 Open cut techniques would be used for the majority of the route. In rural areas, the trench would be excavated with temporary storage of subsoil on the opposite side of the working width to previously removed topsoil. The subsoil stockpile (linear and discrete) would have breaks within it enabling flow of surface water.
- 3.2.19 Selected backfill or granular pipe bedding material would be placed within the excavation and, following pipe installation, suitable surround materials would be placed as required. The trench would then be backfilled with suitable subsoil from the temporary storage and compacted above the installed pipe.
- 3.2.20 The amount of trench opened in any one day would match the progress of the welding crew, so that a trench is not opened for a prolonged period before pipe installation. This would be typically be 90m in urban locations and 450m in rural locations.



- 3.2.21 Construction in urban areas would be more complex than rural areas due to constrained working widths and the increased likelihood that material excavated from the pipeline trench would require off-site disposal, i.e. material excavated when laying pipelines in or across roads cannot be reused, with suitable imported material having to be used for backfilling of the trench.

Dewatering

- 3.2.22 In some locations, groundwater levels may be too high to install the pipeline. In such locations, dewatering may be required to aid pipeline installation. Such discharges would need to comply with relevant consents and permissions.

Crossings

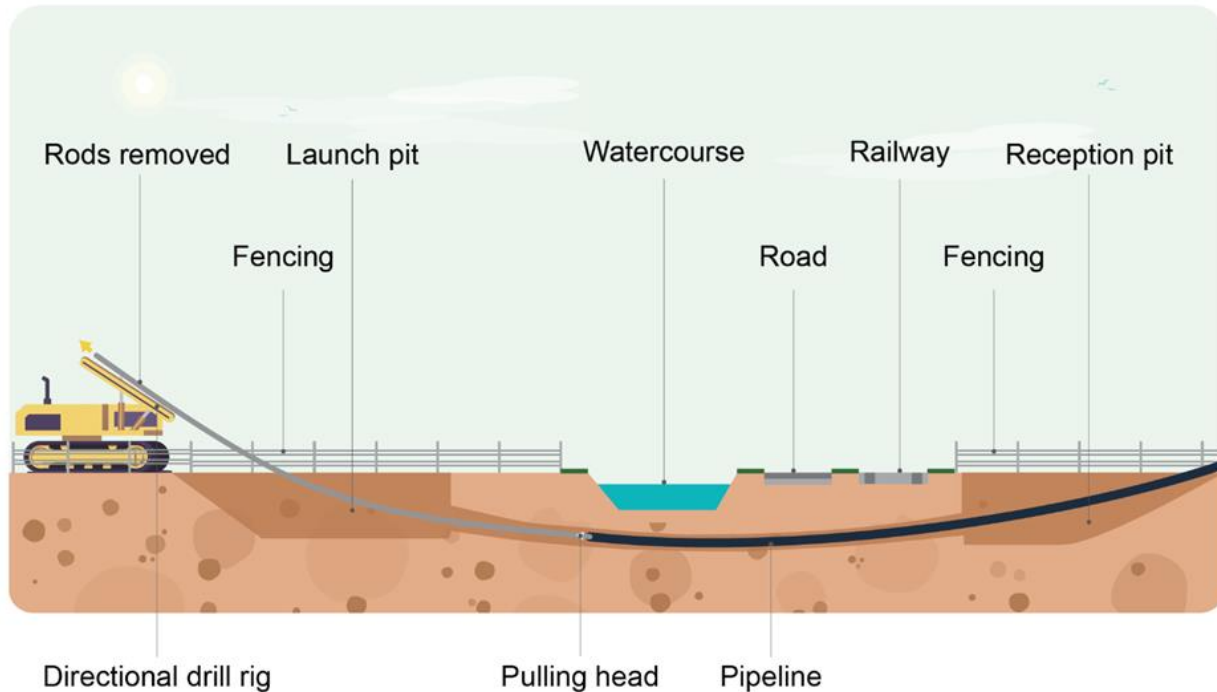
- 3.2.23 Crossings of watercourses including rivers, streams and ditches would typically be open cut, however a number of watercourses would require trenchless techniques. These include watercourses which carry a large flow, are strategic man-made reservoir channels, are adjacent to roads and railways or other obstacles that require a trenchless crossing or have sensitive ecology where it would not be practicable to use open cut.
- 3.2.24 The choice of technique at any crossing is dependent on site-specific factors including ground conditions, the space available for pipe stringing (welding) either side of the obstruction, and the sensitivity of the obstruction to potential settlement. The crossing schedule (see Appendix B) identifies the proposed type of crossing where this has been determined. The draft DCO contains requirements for certain pre-construction approvals and the project will consult as necessary to obtain such approvals. Where the appropriate authorisation is not provided under the DCO, the project will seek such further consents, permits, licences and authorisations as may be required.

Open Cut Trench Crossings of Watercourses

- 3.2.25 The typical approach for open cut trench crossings of watercourses is described here.
- 3.2.26 A flume pipe (or pipes) would be installed into the bed of the watercourse, sized to allow the flow of the watercourse through it during the works. The watercourse would be dammed at each end of the flume to form a dry area in between. This would create a temporarily culverted section of the watercourse in the area of the crossing.
- 3.2.27 A vehicle haul road would be constructed over one half of the flume. A trench would then be excavated under the other half of the flume and the pipe installed at least 1m below the true cleaned bottom of the watercourse/ditch. If required, any concrete protection slabs would be installed at a minimum depth of 1m below the river bed to maintain a soft substrate in the watercourse channel if required. Once the watercourse bed and banks are reinstated and all works complete, the flume would be removed, allowing the watercourse to flow naturally.

Horizontal Directional Drilling (HDD) Technique

Illustration 3.2: Illustration of Typical HDD Cross Section



- 3.2.28 HDD is a trenchless method of pipeline installation (see Illustration 3.2). A series of flexible rods would be driven through the earth from a 'launch pit' to form a small bore. A mud slurry would be used as a hydraulic fluid and coolant which would be collected and disposed of off-site in accordance with any applicable requirements.
- 3.2.29 As the rods progress through the earth, extra rods would be added until the drill head emerges at the 'reception pit' (on the other side of the obstacle to be passed). At the reception pit, the drill head would be removed and a larger one attached. This would continue to enlarge the tunnel until it is a size greater than the pipe.
- 3.2.30 A length of pipeline would be laid out and welded (pipe stringing) beyond the crossing. The welded pipe would then be pulled back through the tunnel completing the operation.

Auger Bore Technique

- 3.2.31 Auger bore is a trenchless method used over relatively short distances and usually at shallow depths. Shallow launch and reception shafts would be dug on either side of the obstacle. An auger (an Archimedes screw or helix on a shaft) would bore horizontally to install a sleeve pipe beneath the obstacle and connect each pit.



Pipeline Hydrostatic Testing

- 3.2.32 Installed lengths of the pipeline would be subjected to a hydrostatic test procedure, where the pipeline length is filled with water, pressurised to a level greater than the maximum operating pressure of the installed pipe initially for four hours and then for a period of 24 hours. This test further measures the integrity of the pipeline as a whole, with any deficiency or loss during the test leading to investigation, replacement and retest until a satisfactory test condition is achieved.
- 3.2.33 It is expected that water for hydrotesting would be sourced from a local water supply for each of the test sections. Should this not be available, water would be tankered in. On completion of the hydrostatic tests, the water would be discharged at three locations: Boorley Green, Alton, and Esso's West London Terminal. Appropriate discharge consents would be sought for the discharge of the water to suitable public sewers. If discharge consents cannot be obtained, the used test water would be tankered away and disposed of with a sewerage undertaker.

Reinstatement

- 3.2.34 On completion of construction, land drains would be reinstated to maintain the integrity of pre-existing land drainage patterns. The working width would then be cleared, any subsoil reinstated and loosened, and topsoil re-laid and seeded as required. Any excess excavated material would be removed and disposed of off-site.

3.3 Construction Programme

- 3.3.1 The construction schedule has yet to be developed in detail, as this would be undertaken during the detailed design stage. For the purposes of assessment, a short-term duration is assumed to be less than six months based on the criteria set out in Chapter 3 Project Description and includes mobilisation and reinstatement.
- 3.3.2 The construction schedule has yet to be developed in detail, as this would be undertaken during the detailed design stage. For the purposes of assessment, a short-term duration is assumed to be less than six months based on the criteria set out in Table 3.1 and includes mobilisation and reinstatement.
- 3.3.3 Throughout the installation of the pipeline there would be a number of work fronts. A work front is a specific area or location where a crew, generally comprising up to 10 construction workers, are carrying out a particular aspect of the main pipeline construction activities, including topsoil stripping, trench excavation, pipe installation and backfilling of trenches. There may be several work fronts operating simultaneously. Each work front would typically continue in the same direction, south to north, but starting from a different point.



3.3.4 Trenchless techniques are proposed in a number of locations. The duration of such techniques varies according to the length of the pipe being installed and the technique used. For example, with horizontal directional drilling (HDD), the construction of a 100m long crossing would take around four to five weeks, with a further two weeks required per 100m increase in the length of the crossing. This also assumes that the works to install trenchless crossings would not be unduly restricted with regards to working hours and weather conditions. Certain activities would require continual 24 hour working, for example the pipe pulling phase for a HDD. If working hours for trenchless crossings are restricted, then the installation would take longer.

3.3.5 The construction schedule is based on a number of key assumptions for pipeline installation in differing terrain. These assumptions are presented in Table 3.1

Table 3.1: Key Working Assumptions

Assumption	Open Areas	Urban Areas
Pipe length laid per week	450m	90m
Excavated spoil off-site	Limited	Yes
Standard construction working	Monday – Saturday 07:00 to 19:00	
Typical pipe lengths	12m	3-6m
Road closures for open cut pipeline crossings of carriageways	Up to three working days, Class B roads and lower.	
Traffic management	Traffic signals to be provided where pipe is laid along or adjacent to carriageways. Mostly two-way working.	

3.4 Operational Phase

3.4.1 The replacement pipeline would be buried underground for its entire length with the exception of the pigging station and smaller elements such as valves, cabinets and marker posts. During the operational phase the buried pipeline has no effect on flood risk and only the above ground infrastructure needs to be considered.

3.4.2 The project includes the following above ground elements during operation:

- a pigging station near Boorley Green (NGR: 451613 114820) would allow the insertion and withdrawal of PIGs used for inspection into and out of the pipeline;
- fourteen remotely operated valves installed along the route of the pipeline to allow isolation for maintenance or in case of emergency. Twelve of the valves, and a pressure transducer whose primary purpose is to monitor pressure, would each be installed in a sub-surface chamber with limited visible elements, located within a fenced enclosure, approximately 7m x 5m in size;
- a Cathodic Protection (CP) system would be used to protect the pipeline against corrosion. The CP system is buried underground with the exception of the six CP transformer rectifier cabinets. The CP system would mainly use existing *in situ*



infrastructure. Where possible the cabinets for the existing pipeline would be refurbished and reused and internal components replaced; and

- the replacement pipeline would be marked at intervals along the pipeline and at all watercourse and road crossings and boundaries with standard marker posts. In the absence of the above the spacing would typically range from every 500m in rural areas to every 50m in high-density residential areas. Marker posts are a legal requirement, to indicate the presence of a pipeline below the ground.

3.4.3 The existing pigging station at Esso's West London Terminal storage facility would be modified, including installation of a new PIG receiver at the end of the replacement pipeline.

3.4.4 The new pigging station at Boorley Green would be located within a fenced compound approximately 23m x 30m in size (excluding its access track) with secure fencing up to 3m high incorporating a double access gate for vehicles. The above ground features would be the PIG launcher and receiver pipes protruding from the ground. The site would include a small bund around the pipework to contain any liquids from the pipeline that may emerge with the PIG. The areas outside the bunded area would be concrete and not positively drained. Any runoff from this area and the access track from the public highway would drain to surrounding grassed areas.

3.5 Potential Impacts

3.5.1 Each flood risk section includes a summary of the potential interaction with the project, however in summary the key flood risks during construction are:

- displacement of flood water by the siting of plant, equipment and material stockpiles within areas at risk of flooding potentially increasing flood risk elsewhere;
- haul road crossings of watercourses may temporarily reduce the conveyance capacity of and, as a result, increase the flood risk upstream and to the works;
- modification of existing runoff rates and volumes as a result of vegetation loss, temporary soil removal and the creation of less permeable areas which results in areas of reduced permeability, increased flows in receiving watercourses, potentially increasing flood risk;
- compartmentalisation of the floodplain due to temporary soil storage;
- redirection of existing predicted surface flow paths along trenches and due to temporary soil storage;
- interception and disruption of groundwater flow paths due to the pipeline trench; and
- temporary stockpiling of arisings from the pipeline trench, possibly modifying local flow paths increasing flood risk and resulting in the deposition of sediments in watercourses and culverts, further increasing flood risk to local receptors.



- 3.5.2 During the operational phase the project could, if not mitigated, result in an increase in flood risk by:
- increasing runoff from the new pigging station at Boorley Green; and
 - modifying groundwater flows.



4. Approach to Assessment of Impact

4.1 Assessment Approach Summary

- 4.1.1 In accordance with the NPS, the impact (risk) of flooding to and from the project from all sources has been assessed for both the construction and operational phases. It is a bespoke approach, based on the 'source – pathway – receptor' model. All three elements would need to be present for a risk to be realised, assessing the likelihood and severity of flooding from all sources to produce an overall risk classification for each source. The following sources have been considered in the assessment of risk:
- coastal/tidal;
 - fluvial (rivers);
 - surface water (pluvial);
 - groundwater;
 - reservoirs;
 - canals;
 - water infrastructure failure (sewers, water mains); and
 - flood defence failure.
- 4.1.2 Due to the linear nature of the project, multiple flood sources recur within the Order Limits. Acknowledging this, this FRA is structured around defining categories of flood risk, assessing the risks to and arising from the pipeline for those categories and the mitigation measures to be implemented (where necessary) for each category.
- 4.1.3 This FRA has adopted a proportionate assessment of flood risk to and from the project in accordance with EN-1 and EN-4. The assessment considers a range of flood events based on readily available information (see Section 6).
- 4.1.4 The assessment of the project's risk from, and its potential to exacerbate flooding, combines the likelihood of flooding with the potential severity of a flood event to define the risk classification. If the risk (without incorporating mitigation measures) has been assessed as medium or high mitigation measures are then incorporated and the severity and risk reassessed. The likelihood of flooding is not deemed to change as a result of mitigation.



4.2 Likelihood of Flooding

4.2.1 When assessing the likelihood of flooding to the project, the risk is predominantly present during the construction phase. As work in any specific area are of short duration, the following equation (from the Institute of Hydrology, 1978) was used to define the likelihood of occurrence of a specific storm event.

$$R = 1 - (1 - 1/T)^L$$

Where:

R is the risk of occurrence

L is the construction phase of the project

T is the return period in years

4.2.2 The same approach was taken to assess the probability of occurrence for a range of storm events during operation, which for the purposes of this FRA is assumed to be 60 years. Table 4.1 shows the probability of these events occurring.

Table 4.1: Probability of Occurrence

Design Storm Event (Annual Probability)	Construction (Two Years) Probability	Operation (60 Years Assumed) Probability
1 in 5 (20%)	0.36	1.00
1 in 10 (10%)	0.19	1.00
1 in 20 (5%)	0.10	0.95
1 in 30 (3.3%)	0.07	0.87
1 in 75 (1.33%)	0.03	0.55
1 in 100 (1%)	0.02	0.45
1 in 200 (0.5%)	0.01	0.26
1 in 1,000 (0.1%)	0.002	0.06

4.2.3 This FRA does not include an assessment of proposed drainage systems as the project does not include any positive drainage systems. The provision of pervious surfaces across the project (haul roads, access roads, logistics hubs and compounds) would not require a drainage system as rainfall will continue to infiltrate to ground as it does at present.

Fluvial and Surface Water Flooding

4.2.4 Where a source of flooding is present, the likelihood of the flood event occurring is defined as indicated in Table 4.2 for fluvial and surface water flood risk.

Table 4.2: Estimating the Likelihood of Occurrence of Fluvial and Surface Water Flood Risk

Likelihood	Construction Phase	Operation Phase
High	None - see Paragraph 4.2.5	Flood Zone 3b or surface water flooding occurring with a greater than a 1 in 30 (3.3%) annual chance
Medium	Flood Zone 3b or surface water flooding occurring with a greater than a 1 in 30 (3.3%) annual chance	Flood Zone 3a or surface water flooding between 1 in 100 (1%) and 1 in 30 (3.3%) annual chance
Low	Flood Zone 3a or surface water flooding between 1 in 100 (1%) and 1 in 30 (3.3%) annual chance	Flood Zones 1 or 2 or surface water flooding of less than a 1 in 100 (1%) annual chance
Very low	Flood Zones 1 or 2 or surface water flooding of less than a 1 in 100 (1%) annual chance	Flood Zone 1 or surface water flooding of less than 1 in 1,000 (0.1%) chance

4.2.5 The likelihood of these events occurring during the construction phase is significantly reduced compared with the full operational period (Table 4.1). The assessment of impact takes the reduced risk into account by categorising the likelihood of such events as medium during construction and high during operation to reflect the variation in risk due to the duration of exposure as shown in Table 4.2.

Other Sources

4.2.6 The assessments of the likelihood of flooding for sources not included in Table 4.2 are included in the relevant section for that source.

4.3 Severity of Impact

4.3.1 A pathway is the route by which the flood source could impact receptors. An example includes inundation of the floodplain or water draining into a trench. Receptors include construction workers, plus people and property within the area.

4.3.2 Where all three parts of the model are present (source, pathway and receptor) the severity of the potential impact on receptors has been defined. The definition of severity of impact is summarised in Table 4.3.

Table 4.3: Estimating the Severity of Impact to Receptors

Severity	Definition
Large	Risk to life, flooding of residential property, evacuation required, extensive areas affected
Moderate	Disruption to communities, flooding of non-residential property, local evacuation may be necessary
Low	Some local disruption (minor road)
Very low	Inconvenience (field flooding or local ponding)



4.4 Overall Risk

4.4.1 The overall risk of flooding during the construction and operational phases is a product of the likelihood of occurrence and the severity of impact as indicated in Table 4.4.

Table 4.4: Matrix for Assessing Overall Risk of Impact

		Likelihood of Occurrence			
		Very low	Low	Medium	High
Severity of Impacts	Large	Medium	Medium	High	High
	Moderate	Low	Medium	Medium	High
	Low	Low	Low	Medium	Medium
	Very low	Very low	Low	Low	Low

4.4.2 The assessment of overall risk of impact is included in each flood risk source section and collated in Section 15. Mitigation measures are proposed where the assessment of risk is medium or high to reduce the risk to a low or very low level.

4.5 Coastal and Tidal Flood Risk

4.5.1 The closest coastlines/tidal sources to the Order Limits are:

- Southampton Water and the tidal reach of the River Itchen over 8km southwest of the southernmost extent of the Order Limits; and,
- Tidal River Thames approximately 9.5km east (at Teddington Lock) of the northern end of the Order Limits.

4.5.2 All of the Order Limits lie within Flood Zone 1 for coastal and tidal flood source, consequently it is not anticipated that the project would interact with tidal or coastal sources of flooding and this source of risk has therefore been scoped out of the assessment of impact.

5. Summary of Hydrological and Hydrogeological Features

5.1.1 A plan of the project Order Limits is included as ES Figure 1.1.

5.2 Location Description

5.2.1 The route is largely rural in the south and more developed/urban in the north. To aid design development and environmental assessment, the route was broken down into eight separate sections (Section A to Section H). A description of the eight sections of the route (A to H) is provided in Table 5.1.

Table 5.1: Section Summary

Section	Location	National Grid Reference		Land Use Summary
		Start	End	
A	Boorley Green to Bramdean	451187 114368	462431 127579	Largely rural in nature and runs through agricultural land. Most of this section is within the South Downs National Park (SDNP).
B	Bramdean to South of Alton	462431 127579	472192 137633	Largely rural, similar to Section A.
C	South of Alton to Crondall	472192 137633	480045 148251	Largely rural with long stretches passing through agricultural land.
D	Crondall to Farnborough	480045 148251	485307 154833	Both rural and urban areas. There are a number of Sites of Special Scientific Interest (SSSI) and European designated wildlife sites.
E	Farnborough to Bisley and Pirbright Ranges	485307 154833	490954 158796	Both rural and urban areas with a significant proportion used for military training.
F	Bisley and Pirbright Ranges to M25	490954 158796	503404 165927	The pipeline runs through both rural and urban areas and also a number of SSSIs such as Colony Bog and Bagshot Heath.
G	M25 to M3	503404 165927	505877 167154	Largely urban area but also includes Chertsey Meads (undeveloped water meadow).
H	M3 to Esso's West London Terminal storage facility	505877 167154	507128 173378	Largely urban area.

5.3 Hydrological Features

5.3.1 The Order Limits cross numerous watercourses as indicated in Figures C1 to C98.



Section A (Boorley Green to Bramdean)

- 5.3.2 Section A crosses four catchments, comprising Ford Lake Stream, Horton Heath Stream, Upper Hamble and Itchen (Cheriton Stream), but does not cross the Main River Hamble.
- 5.3.3 The Order Limits crosses Ford Lake Stream (within the Horton Heath Stream catchment), a tributary of the River Hamble. Ford Lake Stream flows from the northwest in a southeasterly direction until it joins the River Hamble. There are two Ordinary Watercourses (OWs) that are crossed at Durley (both tributaries of Ford Lake Stream).
- 5.3.4 Within the Upper Hamble catchment there are three OWs (tributaries of the River Hamble) crossed by the project which flow northwest to southeast to their confluence with the River Hamble.
- 5.3.5 An OW tributary of Cheriton Stream is crossed within the Itchen (Cheriton Stream) catchment. Where the route crosses the watercourse, it flows from southeast in a northwesterly direction.

Section B (Bramdean to South of Alton)

- 5.3.6 Section B crosses the catchments of the Itchen (Cheriton Stream), River Arle, and Caker Stream.
- 5.3.7 No watercourses are crossed within the Itchen (Cheriton Stream) or River Arle catchments.
- 5.3.8 Within the Caker Stream catchment four watercourses are crossed:
- the OW headwaters of the Lavant Stream which flow south to north in an ephemeral channel and
 - three further OW tributaries of the Lavant Stream, two of which flow east to west near Chawton House, with the third draining in a northerly direction.

Section C (South of Alton to Crondall)

- 5.3.9 Section C crosses the catchments of the Caker Stream, River Wey (North) and River Hart.
- 5.3.10 At the crossing of the Caker Stream the watercourse flows from the south in a northerly direction to join the Lavant Stream. There are also five further crossings of OW tributaries of the Caker Stream which all flow from the south or southeast in a northerly or northwesterly direction.
- 5.3.11 Within the North Wey catchment six watercourses are crossed:
- an OW tributary of River Wey near Neatham which flows in a northerly direction is crossed approximately 0.7km south of its confluence with the River Wey;



- the River Wey (Main River) which flows from the southwest in a northeasterly direction;
- an OW tributary of the River Wey to the southwest of Upper Froyle draining in a southeasterly direction from an on-line reservoir;
- The Ryebidge Stream (OW), which arises to the north of Upper Froyle and drains in a southerly direction to converge with the River Wey approximately 500m downstream of the Order Limits;
- an unnamed OW draining through a reservoir/pond to the east of Lower Froyle/Coldrey Farm, is crossed as it flows east before it enters the head of the reservoir/pond; and,
- an unnamed OW flowing from west to east to the north of Bentley.

5.3.12 No watercourses within the River Hart catchment are crossed within Section C.

Section D (Crandall to Farnborough)

5.3.13 Section D crosses the catchments of the River Hart, Fleet Brook and Cove Brook.

5.3.14 Nine OW tributaries of the River Hart are crossed. These drain catchments to the east and south of the Order Limits, in the vicinity of Ewshot, draining in a westerly or northerly direction.

5.3.15 Within the Fleet Brook catchment an OW (near Naishes Lane) which flows to the northwest and joins the River Hart is crossed. Further east, the OW headwaters of Fleet Brook are crossed near Fleet Business Park as it drains to the north as part of the River Wey catchment.

5.3.16 Gelvert Bottom is a Main River which flows south to north across the Order Limits and flows along the eastern border of Fleet before discharging into Fleet Pond. The Gelvert Bottom (and two associated OW tributaries) is a natural watercourse approximately 5.6km long. The crossing point is approximately 3.6km from its source.

5.3.17 The Basingstoke Canal is crossed at Norris Bridge in Fleet. The canal flows from west to east and is on the boundary of Cove Brook catchment.

5.3.18 The final watercourse within the Fleet Brook catchment crossed is an OW in the east of Cody Technology Park. As with the watercourse near Naishes Lane, it is likely that this watercourse drains to Ively Brook within the Cove Brook catchment.

5.3.19 Three watercourses in the Cove Brook catchment are crossed. Two of these drain land in the vicinity of Cody Technology Park, flowing away from the Order Limits in a southeasterly direction as direct tributaries of Cove Brook. A further OW flows through the former Southwood Golf Course from west to east as a tributary of Ively Brook.



Section E (Farnborough to Bisley and Pirbright Ranges)

- 5.3.20 Section E crosses the catchments of the Cove Brook and the River Blackwater.
- 5.3.21 The Order Limits cross the Cove Brook catchment in a northerly direction until they cross the Cove Brook and turn east.
- 5.3.22 The Ively Brook passes through the former Southwood Golf Course in Farnborough. The watercourse flows west to east across the Order Limits, before flowing north and joining the Cove Brook Stream.
- 5.3.23 Cove Brook flows from the south in a northerly direction before converging with the River Blackwater approximately 3km north of the Order Limits. The Cove Brook Flood Storage Area (FSA) on the west bank of watercourse within amenity land is also crossed.
- 5.3.24 The Order Limits crosses an OW in Queen Elizabeth Park within the Cove Brook catchment. This watercourse flows in a combination of open channel and culverts in a predominately westerly direction.
- 5.3.25 Within the River Blackwater (Aldershot to Cove Brook confluence at Hawley) catchment four watercourses are crossed. The first of these is the River Blackwater which flows from the southeast to the northwest through the Order Limits. A Main River tributary of the River Blackwater which flows from the northeast to the southwest past SC Johnson in Frimley is crossed three times.

Section F (Bisley and Pirbright Ranges to M25)

- 5.3.26 Section F crosses the catchments of the River Blackwater, Addlestone Bourne, Hale/Mill Bourne, and the Chertsey Bourne.
- 5.3.27 No watercourses are crossed within the River Blackwater and Addlestone Bourne catchments.
- 5.3.28 Within the Hale/Mill Bourne catchment the project crosses four OW tributaries of Windle Brook. These watercourses predominately flow in a northeasterly direction towards their confluences with Windle Brook.
- 5.3.29 The Windle Brook (Main River) within the Hale/Mill Bourne catchment flows in a southeasterly direction to become the Hale Bourne.
- 5.3.30 Further east within the Hale/Mill Bourne (Bagshot to Addlestone Bourne confluence near Chobham) catchment the project crosses Clappers Brook (OW) which flows in a southeasterly direction until it meets Windle Brook approximately 1km downstream of the Order Limits.
- 5.3.31 The Order Limits also crosses the (ordinary watercourse) headwaters of tributaries to the River Bourne. These watercourses typically flow in a southeasterly direction.



- 5.3.32 A small section of the route passes through Chertsey Bourne catchment where there are two Ordinary Watercourses which flow south to north as tributaries of the River Bourne.
- 5.3.33 The remainder of Section F passes through the upstream reaches of the Chertsey Bourne catchment, crossing five OW tributaries. These watercourses flow from south to north through the Order Limits to their confluence with the Chertsey Bourne.

Section G (M25 to M3)

- 5.3.34 Section G crosses through the Chertsey Bourne catchment that flows into the River Thames.
- 5.3.35 The Order Limits crosses five ordinary watercourse tributaries of The Bourne between the M25 and the railway line serving Chertsey station. These watercourses drain Addleston Moor. Where the Bourne is crossed near Dumsey Eyot the watercourse is flowing in a southeasterly direction.

Section H (M3 to Esso's West London Terminal Storage Facility)

- 5.3.36 Section H continues through the River Thames catchment for approximately 1.2km, crossing one OW which flows north to south through an area of agricultural land.
- 5.3.37 This section of the project passes through the catchments of the River Ash and Portlane Brook.
- 5.3.38 The Queen Mary Reservoir Intake (QMRI) channel and the Staines Reservoir Aqueduct (SRA) are also crossed. North of this, the River Ash is crossed near Ferndale Lane where it flows from west to east and an OW tributary (which flows north to south) of the River Ash near Ashford Close.
- 5.3.39 Section H of the project does not cross any watercourses within the Portlane Brook catchment.

5.4 Geology and Hydrogeology

- 5.4.1 The study area is split into four groundwater study areas (GWSA) (A-D), based on the geology and associated groundwater environment. The geology and hydrogeological character of these four study areas is summarised in the following sections. Aquifer designations are based on Defra Magic Map (2018), see Table 6.1.
- 5.4.2 Parts of the project are located within areas where there is potential for groundwater flooding to occur at the ground surface (British Geological Survey (BGS), 2018). A fuller assessment is included in Section 9.



Groundwater Study Area A (Boorley Green to Bishop's Waltham)

- 5.4.3 Groundwater Study Area A (GWSA-A) extends from Boorley Green in Hampshire to the southern boundary of the Chalk Principal aquifer at Bishop's Waltham covering part of Section A. This area passes over Palaeogene geological deposits which mostly form Secondary A aquifers (permeable strata capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of baseflow to rivers).
- 5.4.4 The main bedrock geology and aquifers within groundwater section A include: Wittering Formation (Secondary A aquifer, part of the Bracklesham Group sedimentary rocks comprising sand, silt and clay); Whitecliff Sand Member and Durley Sand Member (Secondary A aquifers, both part of the London Clay Formation); London Clay Formation (Non-aquifers, mostly comprising clay, with silt and sand); and Lambeth Group (Secondary A aquifer comprising sedimentary rocks, forming sand, silt and clay deposits).
- 5.4.5 The majority of the London Clay Formation is of little significance as an aquifer, due to its mainly clay nature. However, the sandier upper part of the formation, especially the Whitecliff Sand Member, provides permeable horizons.
- 5.4.6 The superficial Secondary A aquifers in this study area are formed by River Terrace Deposits and alluvium associated with watercourses to the north of Boorley Green, such as Ford Lake Stream.
- 5.4.7 Within this area the Chalk is present beneath the overlying lower permeability London Clay and Lambeth Group bedrock (this section of the Chalk aquifer is known as the confined Chalk). At the northern edge of GWSA-A, the Chalk is overlain only by the Lambeth Group deposits (rather than the Lambeth group and London Clay) and as such, if the Lambeth Group deposits are sufficiently permeable there may be hydraulic connection of groundwater in the Lambeth Group and Chalk.

Groundwater Study Area B (Bishop's Waltham to Crondall)

- 5.4.8 Groundwater Study Area B (GWSA-B) crosses the Chalk principal aquifer from Bishop's Waltham to Crondall. This covers part of Section A and all of Sections B and C and a small part of Section D.
- 5.4.9 Most of groundwater Area B is Chalk Formation of the South Downs and is classified as a principal aquifer. The Chalk in this area is at the ground surface or beneath superficial deposits (i.e. it is 'unconfined' Chalk) and is a major source of drinking water in the area. The BGS Permeability Index (British Geological Survey, 2018) defines this area of Chalk Formation as having mixed flow type (intergranular and fracture flow) with high to moderate permeability.



- 5.4.10 There is a small section of the Order Limits in the vicinity of Alton passing over the Upper Greensand Formation which also forms a Principal aquifer. Watercourses which run through an area of Upper Greensand Formation include Lavant Stream, Caker Stream, Ordinary Watercourse W018 - Tributary of River Wey (near Neatham), the River Wey and OW W022 – tributary of River Wey (near Lower Froyle).
- 5.4.11 There is a Secondary A alluvium aquifer associated with watercourses which cross the Chalk near Alton in Section C. This includes the Caker Stream and an ordinary watercourse tributary of River Wey (near Neatham).
- 5.4.12 Secondary Undifferentiated aquifers are more widespread than other aquifers, with head deposits associated with small streams forming these aquifers over much of the Chalk south of Alton.
- 5.4.13 A small number of springs are identified in the study area between West Tisted and to the north of Alton, including three springs associated with the Peck Copse Groundwater Dependent Terrestrial Ecosystem. To the north of Alton, the BGS data show several springs associated with the River Wey with a further concentration of springs being associated with the northern boundary of the Chalk where the Chalk becomes confined.
- 5.4.14 Due to the Chalk having a low effective porosity (i.e. the fractures), groundwater levels in the Chalk can vary greatly over the course of the year. This can be by as much as 20 to 30m with the highest seasonal water levels typically occurring in late winter or early spring. In general, the groundwater level is closer to the ground surface within valleys and near to watercourses than in the interfluves.
- 5.4.15 Those springs that occur on the dip slope of the Chalk are at the bottom of valleys where the water table intersects the surface (BGS, 1997). During the summer and autumn months, when the water table is falling, these springs dry up successively down the valley. In winter, as the water table rises, the springs become active at increasingly higher levels (these seasonal streams are known as 'bournes'). In those catchments, where the Chalk groundwater remains connected with the watercourses year round, the Chalk groundwater provides baseflow to the watercourse. Such watercourses remain flowing all year.

Groundwater Study Area C (Crandall to Chertsey South)

- 5.4.16 Groundwater Study Area C (GWSA-C) extends from Crandall to Chertsey South, around 500m west of the M25. This covers most of Section D, all of Section E and most of Section F. This area passes over Palaeogene geological deposits which mostly form Secondary A aquifers, including the Bracklesham Group.



- 5.4.17 The main bedrock geology and aquifers within GWSA-C include: Lambeth Group (Secondary A aquifer, comprising sedimentary rocks, forming sand, silt and clay deposits); London Clay Formation (Non-aquifer, comprising mostly clay, with silt and sand); Bagshot Formation (Secondary A aquifer, comprising sedimentary rocks part of the Bracklesham Group forming coarse to fine-grained sand deposits); Windlesham Formation (Secondary A aquifer, comprising sedimentary rocks part of the Bracklesham Group forming sand, silt and clay deposits); and Camberley Sand Formation (Secondary A aquifer, comprising sedimentary rocks part of the Bracklesham Group forming coarse to fine-grained sand deposits).
- 5.4.18 There are limited superficial deposits across GWSA-C. However, superficial deposits are present associated with the major river valleys. These include Gelvert Bottom, Ively Brook, Cove Brook, River Blackwater, Windle Brook and a tributary of River Blackwater. These are likely to be relatively thin deposits. In terms of superficial aquifers, Secondary A aquifers are present in this area. These are formed by alluvium associated with the Cove Brook and with River Terrace Deposits and alluvium from the River Blackwater and Mill Bourne.
- 5.4.19 Beneath this section, the Chalk is overlain by low permeability Lambeth Group and London Clay deposits which will act as a confining layer for the Chalk groundwater. Over most of GWSA-C, the depth to the confined Chalk aquifer is considerable and as such, excavations for the pipeline, even at the deepest river crossings, would not encounter the confined Chalk and a significant level of protection would remain.

Groundwater Study Area D (Chertsey South to Esso's West London Terminal Storage Facility)

- 5.4.20 Groundwater Study Area D (GWSA-D) extends from Chertsey South (within Section G) to Esso's West London Terminal storage facility (Section H), covering a small part of Section F and all of Sections G and H. This area passes over Principal aquifers associated with superficial sand and gravel deposits.
- 5.4.21 The main bedrock geology and aquifers within GWSA-D include: Bagshot Formation (Secondary A aquifer, part of the Bracklesham Group); Claygate Member (Secondary A aquifer); and London Clay Formation (Non-aquifer).
- 5.4.22 Superficial deposits are extensive across GWSA-D, and include: Alluvium Silt (Secondary A aquifer, associated with river deposits that are primarily encountered in the vicinity of the River Thames); Kempton Park Gravel Member (Principal aquifer, comprising sand, and gravel beds); Shepperton Gravel Member (Principal aquifer comprising sand and gravel beds); Lynch Hill Gravel Member (Secondary A aquifer, comprising sand and gravel beds, with local lenses of silt, clay or peat); Head deposits of clay, silt, sand and gravel (Secondary Undifferentiated aquifer); and Langley Silt Member (Non-aquifer, comprising clay and silt beds).



- 5.4.23 GWSA-D has been defined based on the superficial deposits as these deposits form Principal aquifers. As such, in this length of the route the bedrock deposits are of less importance than the superficial deposits in terms of shallow groundwater.
- 5.4.24 Superficial deposits of silt, sand and clay underlie the Main Rivers. Main Rivers within this section include The Bourne, River Thames and River Ash. Ordinary Watercourse W085 - tributary of Chertsey Bourne (near St Peter's Hospital) is also within this section.
- 5.4.25 London Clay deposits act as a confining layer for the Chalk groundwater. A log for a borehole at Staines Reservoir shows the Chalk being encountered at 88m depth and a log for a borehole in Stanwell as being 96m deep. Excavations for the pipeline, even at the deepest river crossings, would not encounter the confined Chalk.
- 5.4.26 Several flooded gravel pits are present within this Study Area. Water in these pits is very likely to be connected to the groundwater in the surrounding gravel aquifers. This would indicate that groundwater is at a relatively shallow depth.

6. Data Collection and Stakeholder Liaison

6.1 Data Collection

6.1.1 The FRA has relied upon the flood risk information summarised in Table 6.1 to inform the assessment of impact:

Table 6.1: General Data Sources

Dataset	Source	Date Accessed
'Flood Map for Planning'	Environment Agency – https://data.gov.uk/dataset/cf494c44-05cd-4060-a029-35937970c9c6/flood-map-for-planning-rivers-and-sea-flood-zone-2	October 2018*
Risk of Flooding from Surface Water (RoFSW) extent and depth mapping	Environment Agency – https://data.gov.uk/dataset/bed63fc1-dd26-4685-b143-2941088923b3/flood-map-for-planning-rivers-and-sea-flood-zone-3	May 2018
'Risk of Flooding from Reservoirs' mapping	Environment Agency – https://data.gov.uk/dataset/95ea1c96-f3dd-4f92-b41f-ef21603a2802/risk-of-flooding-from-surface-water-extent-3-3-percent-annual-chance	May 2018
Recorded Flood Outlines	Environment Agency – https://data.gov.uk/dataset/8b82987d-3616-4e46-8edb-2973e8b82ad7/risk-of-flooding-from-surface-water-extent-1-percent-annual-chance	May 2018
Areas Benefiting from Flood Defences (ABD)	Environment Agency – https://data.gov.uk/dataset/1f3d6e13-40f1-4d12-99de-77132bc19c47/risk-of-flooding-from-surface-water-extent-0-1-percent-annual-chance	May 2018
Flood Storage Areas (FSA)	Environment Agency – https://data.gov.uk/dataset/c62e2f9c-c003-4cc5-9b06-a6d88fc9a9a8/risk-of-flooding-from-surface-water-depth-3-3-percent-annual-chance	May 2018
Spatial Flood Defences	Environment Agency – https://data.gov.uk/dataset/44b23af2-fd0d-4da1-8acd-ad912c98f6e1/risk-of-flooding-from-surface-water-depth-1-percent-annual-chance	May 2018
Geological mapping from BGS	Environment Agency – https://data.gov.uk/dataset/b391e876-4571-44f9-85c5-3485ddf6333a/risk-of-flooding-from-surface-water-depth-0-1-percent-annual-chance	May 2018
Lower Thames Flood Risk Map hydraulic model results (Environment Agency, 2009)	Environment Agency – https://data.gov.uk/dataset/4d3cc201-01ee-4ad9-a1cb-4777a8c55a00/reservoir-flood-map-maximum-flood-outline-extent-afa113	April 2018
River Blackwater Flood Study Final Flood Mapping hydraulic model results (Environment Agency, 2007)	Environment Agency - https://data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines	April 2018
Surrey Heath Borough Council – Flood Zone – 3a	Environment Agency - https://data.gov.uk/dataset/eea328e7-2eea-4cbf-bd6b-	April 2018

Dataset	Source	Date Accessed
	c66121981ba1/flood-map-for-planning-rivers-and-sea-areas-benefiting-from-defences	
Surrey Heath Borough Council – Flood Zone – 3b	Environment Agency - https://data.gov.uk/dataset/cae4e24c-0342-48aa-8a93-d727ce582b3c/flood-map-for-planning-rivers-and-sea-flood-storage-areas	June 2018
Rushmoor Borough Council – Flood Zone – 3a	Environment Agency - https://data.gov.uk/dataset/6884fcc7-4204-4028-b2fb-5059ea159f1c/spatial-flood-defences-including-standardised-attributes	June 2018
Rushmoor Borough Council – Flood Zone – 3b	Rushmoor Borough Council – https://www.rushmoor.gov.uk/	May 2018
Ordnance Survey Rivers	OS Open Rivers Dataset	May 2018
Environment Agency Main Rivers	Statutory Main River Map	May 2018
Aquifer Designations	Defra Magic Map https://magic.defra.gov.uk/magicmap.aspx	January 2018

* The Flood Map for Planning was checked in February 2019 and no material changes within the Order Limits were identified.

6.1.2 Information on recorded groundwater levels in boreholes has been obtained directly from the Environment Agency.

6.2 Consultation with Statutory Organisations

6.2.1 There have been meetings with relevant statutory authorities to improve the understanding of key flood risk issues relevant to the project. These have included the Environment Agency, in their capacity as the responsible authority for Main Rivers and development within areas of Flood Zone 2 and 3; and Hampshire County Council and Surrey County Council in their capacities as the LLFAs responsible for local sources of flooding, including Ordinary Watercourses, surface water flooding and groundwater flooding.

6.2.2 Further flood risk information has been made available by the LLFAs as scheduled in Table 6.2.

Table 6.2: Flood Risk data supplied by LLFAs

Hampshire County Council	Surrey County Council
Asset locations including (Drainage, Discharge Outlets, Grips, Gullies, Petrol Interceptors, Pumps, Soakaways and Weirs/Kerbs)	External Property Flooding - Indicative by road
Recorded Highway Flooding	Highway Flood Enquiry Locations
Flood and Water Management Enquiries	Historic Flood Incidents - Indicative by road
Flood Investigations 2012-15	Internal Property Flooding - Indicative by road
-	Published Wetspots

7. Fluvial Flood Risk

7.1 Introduction

- 7.1.1 This section describes the risks posed by fluvial flooding. It describes how fluvial flooding may impact the construction and operation of the pipeline and how the construction and operation of the pipeline may increase flood risk. The activities that could exacerbate fluvial flood risk are the numerous watercourse crossings required to install the pipeline and the proposed temporary storage of materials within Flood Zone 3.
- 7.1.2 Fluvial flood risk areas are defined by the Environment Agency's Flood Map for Planning (Environment Agency, 2019), which defines Flood Zones 1, 2 and 3 in England as follows:
- Flood Zone 1 is defined as land having a less than 1 in 1,000 (<0.1%) Annual Exceedance Probability (AEP) of flooding from rivers and/or the sea;
 - Flood Zone 2 is defined as land having between a 1 in 200 (0.5%) and 1 in 1,000 (0.1%) AEP of flooding from the sea or land between a 1 in 100 (1%) and 1 in 1,000 (0.1%) AEP of flooding from rivers; and
 - Flood Zone 3 is defined as land having more than a 1 in 200 (0.5%) AEP of flooding from the sea or land having more than a 1 in 100 (1%) AEP of flooding from rivers.
- 7.1.3 These Flood Zones refer to the probability of river flooding, ignoring the presence of flood defences.
- 7.1.4 In addition, Flood Zone 3 is further divided into Flood Zone 3a and Flood Zone 3b, where
- Flood Zone 3a is defined as land having more than a 1 in 100 (1%) AEP of flooding from rivers; and
 - Flood Zone 3b (the Functional Floodplain) is defined in Planning Practice Guidance (PPG) (DCLG, 2012b) as '*land where water has to flow or be stored in times of flood.*' Such areas are identified by Local Planning Authorities in their SFRA, typically defined as the area at risk of flooding from a 1 in 20 (5%) AEP event, plus areas formally identified for storage of flood water.
- 7.1.5 Only Rushmoor Borough Council and Surrey Heath Borough Council were able to provide the extent of Flood Zone 3b for their administrative areas. These covered Ively Brook (Section E), Cove Brook (Section E), River Blackwater (Section E), Hale Bourne (Section G) and Clappers Brook (Section F). In all other areas, the SFRAs for the Local Planning Authorities determine that until demonstrated otherwise, Flood Zone 3a should be adopted as a proxy for Flood Zone 3b.



7.1.6 Watercourses have been identified using Ordnance Survey (OS) watercourse data (OS, Open Rivers, 2018) and the Environment Agency’s Main River dataset (Environment Agency, 2016). Watercourses encountered during construction that are not included in these datasets would be treated in the same fashion and be subject to appropriate mitigation.

7.1.7 As indicated in Table 4.2 the likelihood of fluvial flooding is based on the published Flood Zones. Flood Zones may not be present for all watercourses because they have not been hydraulically modelled. In such circumstances the Risk of Flooding from Surface Water (RoFSW) mapping has been adopted as a surrogate to identify an area of risk for the assessment of likelihood.

7.2 Potential Effects

7.2.1 The project traverses all Flood Zones along its route as shown in ES Figure 7.1. The extent of the project’s interaction with each Flood Zone is indicated in Table 7.1, based on the extent of the Order Limits. The presence of Flood Zones and the subsequent assessment of likelihood is based on the Environment Agency’s Flood Map for Planning, see Table 6.1.

Table 7.1: Project Interaction with Flood Zones

Flood Zone	Area (ha)	Proportion of Order Limits Area (%)
1	333	80
2	55	13
3a	26	6
3b	5	1

7.2.2 No impact of the project on flood risk is expected during the operational phase as there are minimal above ground structures. However, there is the potential for increased risks during the construction phase. If not mitigated, construction activities could exacerbate flood risk by:

- reducing floodplain storage due to storage of materials;
- compartmentalisation of the floodplain;
- entrainment of stockpiled excavation arisings reducing capacity of watercourses and sewers;
- temporary obstacles redirecting flow paths;
- conveyance of flood water along open excavations; and
- reduction in channel conveyance capacity by temporary watercourse crossings.

7.2.3 Undertaking works in areas at risk from fluvial flooding could also impact on the personnel and works. This is considered in this section.



7.3 Risk to the Project

Construction Phase

- 7.3.1 The likelihood of flooding for each Flood Zone to inform the assessment of risk is included in Table 4.2.
- 7.3.2 In areas of Flood Zone 1 the chance of fluvial flooding in any one year is less than 1 in 1,000 (0.1%) AEP (see paragraph 7.1.2). During the construction period the likelihood of occurrence is 0.002% and has consequently been categorised as very low (see Section 4.1). Considering the very low risk, no additional measures are proposed beyond good construction practice to reduce the risk from fluvial flooding in Flood Zone 1.
- 7.3.3 An assessment has been made of all 98 watercourse crossings involved to deliver the project to determine the fluvial flood risk to and from the project. Each assessment details the assessed likelihood of flooding, severity of impact and the subsequent level of risk to the project which is documented in the schedule in Appendix B Watercourse Crossing Schedule. Based on this assessment, there are 39 crossings within locations with a medium or high likelihood of flooding.
- 7.3.4 The severity of impact from fluvial sources during construction to those parts of the project within Flood Zones 2, 3a and 3b varies depending on the method implemented to cross the Flood Zone as summarised in Table 7.2. There may be watercourses not included in the Environment Agency’s Flood Zone mapping due to their small size. These watercourses would pose a correspondingly small risk, however they would be subject to the same mitigation measures as larger watercourses included in the mapping.

Table 7.2: Severity of Impact to Project by Watercourse Crossing Method

Crossing Method	Severity of Impact
Trenchless outside Flood Zone 2 and 3	Very low
Trenchless (launch and receptor sites inside Flood Zones 2 or 3)	Large
Open cut in Flood Zones 2 or 3	Large

- 7.3.5 Of the 39 crossings, 14 are traversed using a trenchless approach with the launch and receptor sites within Flood Zone 1 and are consequently assessed as low risk and no further mitigation is proposed. The remaining 25 crossings have been assessed as large severity and therefore are attributed a medium or high risk of flooding to the project during the construction phase, prior to the consideration of mitigation measures.



- 7.3.6 An assessment has been made of all 61 construction compounds and logistics hubs crossings involved to deliver the project to determine the fluvial flood risk to and from the project. Each assessment details the assessed likelihood of flooding, severity of impact and the subsequent level of risk to the project which is documented in the schedule in Appendix D. Based on this assessment, there are 4 crossings within locations with a medium likelihood of flooding as they are located in Flood Zone 3. The remainder are located in Flood Zones 1 or 2 and have a very low likelihood of flooding.
- 7.3.7 The severity of impact is considered to be large for any construction compound and logistics hub located in Flood Zones 2 or 3. Consequently there are 17 construction compounds and logistics hubs that are assessed as medium or high risk prior to the consideration of mitigation measures.

Operational Phase

- 7.3.8 With the exception of the pigging station (located in Flood Zone 1), valve compounds, pressure transducer, CP cabinets and marker posts all elements of the pipeline are below-ground, consequently there is a negligible risk to the project from fluvial flooding during the operational phase and no mitigation measures are proposed.

7.4 Risk from the Project

Construction Phase

- 7.4.1 Where the proposed method of crossing Flood Zones 2 and 3 is trenchless and a haul road would not be provided, there would be no above-ground works within the floodplain. There are 26 crossings where this is proposed (see Appendix B Watercourse Crossing Schedule). In such locations the proposed project would have a negligible potential to impact on flooding elsewhere, therefore the severity of impact has been assessed as very low and consequently, risk has been assessed as low. No further mitigation is proposed.
- 7.4.2 Where a haul road would be provided across a watercourse, likelihood of fluvial flooding during the construction period has been assessed. As described in Section 4.2.5 the likelihood of occurrence takes into account the relatively short construction duration at any specific watercourse and this varies from very low to medium. The severity of impact has been assessed dependent on the receptors that are present in the vicinity of the watercourse crossing and this varies from very low to large. These assessments are documented in the Watercourse Crossing Schedule in Appendix B and the specific watercourse crossing reports in Appendix C.
- 7.4.3 Of the 98 watercourse crossings, 17 crossings have been assessed with a medium or high risk of the temporary haul road crossing increasing flood risk to receptors based on the assessment criteria summarised in Section 4 due to the potential impact of temporary haul roads prior to the consideration of mitigation measures as summarised in Table 7.3.

Table 7.3: Watercourse Crossings with Unmitigated Medium or High Risk

Ref	Watercourse	Easting	Northing	Location	Section
WCX 006	Unnamed Watercourse	453569	118010	Wintershill Road	A
WCX 007	Unnamed Watercourse	453735	118311	Winchester Road	A
WCX 008	Unnamed Watercourse	470548	135486	Track East of Woodside Lane	B
WCX 012	Caker Stream	472575	137804	Southwest of Truncheaunts Farm	C
WCX 032	Unnamed Watercourse	481072	150301	Dares Lane	D
WCX 035	Unnamed Watercourse	481748	151223	Naishes Lane	D
WCX 036	Unnamed Watercourse	482012	151475	Beacon Hill Road	D
WCX 047	Ively Brook	485309	154843	Formerly Southwood Golf Course	E
WXC 048c	Cove Brook	485761	155935	West Heath Road	E
WCX 049	Unnamed Watercourse	486557	156036	Cabrol Road	E
WCX 058b	River Blackwater	488013	157408	SC Johnson Factory	E
WCX 058c	Unnamed Watercourse	488639	157744	Balmoral Drive	E
WCX 063	Unnamed Watercourse	492951	161502	Red Road	F
WCX 065	Unnamed Watercourse	494149	161808	Blackstroud Lane East	F
WCX 072	Unnamed Watercourse	496989	163552	Windsor Road	F
WCX 106	Unnamed Watercourse	506062	171670	Woodthorpe Road	H
WCX 112	Unnamed Watercourse	495947	162989	Windlesham Road	F

7.4.4 There are a number of locations where the project could encroach into, and temporarily store soil within, Flood Zone 3. An assessment has been made of the potential impact on flood risk at such locations following the standard impact assessment methodology summarised in Section 4, as summarised in Table 7.4.

Table 7.4: Encroachment into Flood Zone 3

Watercourse	Section	Works	Likelihood	Severity	Justification	Risk
Lavant Stream	B	Haul road access to main Order Limits route	Medium	Very low	Increased flood risk would affect agricultural land only.	Low
Caker Stream	C	Haul road, working areas along pipeline and pipeline trench				
Tributary of River Wey	C					
Tributary of River Wey	D					
Tributary of River Hart	D					
Ively Brook	D			Large	Potential to increase flood risk to major	High



Watercourse	Section	Works	Likelihood	Severity	Justification	Risk	
			High		road and residential properties.	High	
Cove Brook*	E			Large	Potential to reduce capacity or effectiveness of Cove Brook Flood Storage Area.		
Cove Brook *	E						
Cove Brook *	E						
Cove Brook	E			Very low	FZ3 extent only covers a small part of the Order Limits, arisings stockpiles can be located outside FZ3.	Low	
River Blackwater	E			Very low	Woodland only receptor		
River Blackwater	E	Construction compound at Frimley Green Road		Very low	Majority of compound outside FZ3.		
Windle Brook	F	Haul road, working areas along pipeline and pipeline trench			Low	Increased flood risk would affect a minor road only.	Medium
River Thames	G	Haul road, working areas along pipeline, pipeline trench and compound at Chertsey Meads			Large	Located within the River Thames floodplain which is extensive and arisings stockpiles are unlikely to significantly increase flood levels.	High
River Thames	H	Haul road, working areas along pipeline and pipeline trench					
River Ash	H	Haul road, working areas along pipeline, trench and compound at Shepperton Road					

* There are multiple entries for the Cove Brook as the project enters its attributed Flood Zone at multiple locations

- 7.4.5 Based on the criteria included in Table 4.2 the likelihood of flooding during construction has been assessed as medium at all the locations listed in Table 7.5 because they are within Flood Zone 3a. The severity of impact has been assessed based on the proximity and nature of receptors that could experience an increase in flood risk because of the project. The risk has therefore been assessed in accordance with the criteria in Table 4.4. Further assessment has been undertaken and the effect of mitigation measures considered for those locations where the unmitigated risk has been assessed as either medium or high.
- 7.4.6 An assessment and suggested mitigation has been made of the volume of soil stored based on the haul road, pipeline trench and working areas within Flood Zone 3 compared to the estimated volume of floodwater within Flood Zone 3 in order to provide an indication of the proportion of floodplain that could be temporarily removed during construction as indicated in Table 7.5. Full details of the mitigation measures are provided in Section 13 with all of the measures summarised in Table 13.2.

Table 7.5: Mitigation of Flood Risk Due to Encroachment

Watercourse	FZ3 Volume	Haul Road		Pipeline Trench and Working Areas		Haul Road, Trench and Working areas % of FZ3	Mitigation Measures
		Soil Vol.	% of FZ3	Soil Vol.	% of FZ3		
Ively Brook	311	18	6%	108	35%	41%	W7
Cove Brook	13,679	103	1%	387	3%	4%	W8, W9
Cove Brook	13,189	215	2%	810	6%	8%	
Cove Brook	299	26	9%	99	33%	42%	
Clappers Brook	39,927	368	1%	2,223	6%	6%	W1, W5, G184, W6
Windle Brook	21,572	352	2%	2,127	10%	11%	
River Thames	1,892,300	1,076	0.1%	6,886	0.4%	0.4%	
River Thames	2,987,425	925	0.03%	4,593	0.2%	0.2%	
River Ash	963,701	594	0.1%	4,541	0.5%	0.5%	

All volumes are in m³

- 7.4.7 When comparing the volume of floodplain lost, a conservative approach has been adopted:
- The volume of Flood Zone 3 has been determined by identifying the discrete flood cell which the Order Limits cross, obtaining the 1 in 100 (1%) annual chance event flood water level from relevant hydraulic modelling results for the watercourse that the Flood Zone 3 area relates to and using a LiDAR digital terrain model to calculate the volume below the flood level within the flood cell. The peak flood water level has been identified by taking an average of the upstream and downstream peak flood water levels to give a representative estimate of the Flood Zone 3 volume.
 - The volume of loss does not take into account the additional volume provided by the excavation of the haul and access roads and the pipeline trench. While not at



the same level as that lost, this would potentially provide additional volume of storage, potentially significantly reducing the proportion of floodplain lost compared to that stated in Table 7.5.

- The assessment assumes that the soil stockpiles are below the estimated peak water level. If they extended above such a level, they would not be occupying floodplain.

- 7.4.8 As stated in Section 3 the intention would be to reinstate the pipeline trench and working areas as soon as is practicable following installation, possibly retaining only the haul road for a longer duration. The intention would be to reinstate the haul road when it is no longer required to provide access and consequently it is likely to be in place for less than the full construction duration conservatively assumed by this FRA. As a result, the volume of floodplain temporarily removed within Flood Zone 3 by the project at the crossings listed in Table 7.4 would be reduced during construction.
- 7.4.9 In addition, Table 7.4 makes reference to the proposed approach to installation at these crossings and how the potential impact upon flood risk would be reduced. The crossing of Ively Brook (NGR: 485309 154843), crossing reference WCX047 would include the relocation of temporary soil stockpiles outside Flood Zone 3 prior to reinstatement as the width of Flood Zone 3 is relatively small (mitigation reference W7), approximately 15m.
- 7.4.10 Where the width of Flood Zone 3 is larger, other mitigation measures are proposed. The crossing of Cove Brook Flood Storage Area would require particular consideration to maintain the integrity of the flood defence during the works as detailed in Section 7.4.17 which would also address the risk posed by encroachment into Flood Zone 3.
- 7.4.11 The intention for the crossing of the River Thames flood zone (including the River Ash) would be to manage the storage of soil stockpiles as listed in Table 7.5 to ensure minimal exacerbation of flood risk. Once the trench and working areas are reinstated the residual volume of soil stored (from the haul road) would be relatively small compared to the floodplain volume of the River Thames at this location as indicated in Table 7.5.
- 7.4.12 The total length of the pipeline within Flood Zone 3 attributed to the River Thames (including The Bourne and the River Ash) is approximately 7.3km. However, this section of pipeline would be excavated in stages; based on an assumed working length of 25m, the resultant volume of material from the working areas and pipeline trench (approximately 35m³) would be stored in the floodplain but would be insignificant compared to the size of the River Thames floodplain and would not be expected to cause a significant loss of floodplain volume.
- 7.4.13 Given constraints on working room in urban areas it is less likely that excavated material could be retained adjacent to the excavation. This would reduce the volume of arisings that would require storage in Flood Zone 3 and consequently their potential to increase flood risk to other parties.



- 7.4.14 As a result of these proposed mitigation measures the assessed risk of impact of encroachment in Flood Zone 3 would reduce to low.
- 7.4.15 The pipeline crosses Cove Brook Flood Storage Area (FSA) located to the west of Farnborough, Hampshire (NGR: 485447 155215), Section E. The FSA falls under the auspices of the Reservoirs Act 1975 as its capacity is approximately 95,000m³. The water is retained by a 900m long earth embankment on the eastern bank of the Cove Brook. At the northeastern end of the embankment it includes a 2.5m high concrete reinforced spillway approximately 2.5m high and 1m wide.
- 7.4.16 By crossing the FSA the pipeline trench therefore crosses an area designated as Flood Zone 3b. Excavation of the trench has the potential to provide a preferential flow path for flood water to escape that would ordinarily be contained within the FSA. This presents a potential increase in flood risk to nearby receptors including residential properties and businesses.
- 7.4.17 To mitigate this risk the following mitigation measures would be incorporated to reduce the time spent within the FSA and to maintain the integrity of the water retaining structure:
- Works on the Cove Brook FSA would be scheduled taking advantage of long-term forecasts making use of dry weather conditions (W8); and
 - The Cove Brook FSA embankment dam would be reinstated to its former condition as soon as is practicable (W9).
- 7.4.18 Discharges to watercourses to dispose of water from dewatering activities would be performed under consent from either the Environment Agency or the LLFA. The licences would require the controlled discharge of water to the receiving watercourse at a rate that would not increase flood risk.

Operational Phase

- 7.4.19 As the pigging station would be the only significant above ground structure in the operational phase (and is located within Flood Zone 1), the risk of the project exacerbating fluvial flood risk to third parties has been assessed as very low and no mitigation measures are proposed. Below ground infrastructure has no impact on flood risk.

7.5 Proposed Good Practice and Additional Mitigation

Construction Phase

- 7.5.1 Where the assessed risk to or from the project as a result of the crossing of a watercourse is greater than 'low' a watercourse crossing report has been developed to document the assessment of risk. These reports are included in Appendix C Watercourse Crossing Reports.



- 7.5.2 A range of mitigation measures have been incorporated to reduce the risk that the project does not exacerbate flood risk to other parties. These include specific mitigation measures which are listed in Section 13. The implementation of these measures would reduce the overall risk to and from the project at those crossings with an unmitigated risk assessed as medium or high to low.
- 7.5.3 As a result of the proposed mitigation measures and the reasons listed in this section, the severity of impact as a result of the project would reduce to low. Consequently, the assessment of risk to third parties at the 17 locations listed in Table 7.3 would be reduced to low compared to the unmitigated case.

Operational Phase

- 7.5.4 No mitigation measures are proposed for the operational phase, see Paragraphs 7.3.8 and 7.4.19.

7.6 Assessment of Risk

- 7.6.1 During the construction phase the primary risks would be an increase in flood risk as a result of temporary watercourse crossings and encroachment into the floodplain, reducing flood storage capacity. These would be addressed by construction approaches to ensure crossings do not increase flood risk, and the temporary stockpiling of materials in the floodplain would be managed to reduce impact as summarised in Table 7.6 and Table 7.7.
- 7.6.2 Parts of the project would be located within areas at significant risk of flooding during the construction phase, however there is a significantly lower likelihood of an extreme event occurring during the construction period. Therefore, the worst-case assessment is of a medium risk of flooding to the project during construction. The mitigation measures outlined in Section 7.5 would reduce the risk to the project, to low.
- 7.6.3 As the pipeline is below ground during operation (except for the pigging station which lies within Flood Zone 1, valve compounds, cathodic protection cabinets and marker posts), no part of the operational phase of the project has the potential to impact on fluvial flood sources and exacerbate flooding to third parties. The severity of impact of the operational phase of the development has therefore been assessed to be very low.
- 7.6.4 Considering the range of likelihoods (very low to high) and the severity of impact associated with the operational phase of the project (very low) the risks of exacerbating flooding to neighbouring property is very low to low. Therefore no measures are proposed to mitigate for the operational phase of the project with regards to fluvial flood sources as summarised in Table 7.6 and Table 7.7. Full details of the mitigation measures are provided in Section 13 with all of the measures summarised in Table 13.2.



Table 7.6: Fluvial Flood Source Impact Summary to the Project

Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (Pre-mitigation)	Mitigation Measures	Risk with Mitigation
Construction							
Flood Zone 1	No pathway	-	Very low	Very low	Very low	None Required	Very low
Flood Zone 2	Works within Floodplain	Construction Workers	Very low	Large	Medium	G127, W3, W4, G182, G183, W5, G184, W6, W7, G185, W8, W9	Low
Flood Zone 3a			Low		Medium		Low
Flood Zone 3b			Medium		High		Low
Operation							
Flood Zone 1	No pathway	-	Very low	Very low	Low	None Required	Very low
Flood Zone 2	No Pathway	No Receptor	Low				
Flood Zone 3a	No Pathway	No Receptor	Medium				
Flood Zone 3b	No Pathway	No Receptor	High				

Table 7.7: Fluvial Flood Source Impact From the Project

Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (pre-mitigation)	Mitigation Measures	Risk with Mitigation
Construction							
Flood Zone 1		Residential properties and businesses, woodland, pasture	Very low	Very low to large	Very low Very low to high	G127, W3, W4, G182, G183, W5, G184, W6, W7, G185, W8, W9	Very low to low
Flood Zone 2			Very low				
Flood Zone 3a			Low				
Flood Zone 3b			Medium				



Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (pre-mitigation)	Mitigation Measures	Risk with Mitigation
Operation							
Flood Zone 1	No pathway	-	Very low	Very low	Very low	None required	Very low
Flood Zone 2	No Pathway	-	Low				
Flood Zone 3	No Pathway	-	Medium				
Flood Zone 3B	No Pathway	-	High				

8. Surface Water Flood Risk

8.1 Introduction

- 8.1.1 Areas at risk from surface water flooding are defined by the Environment Agency's RoFSW map (Refer to ES Figure 7.1). The RoFSW map defines flood risk from surface water for the:
- 1 in 30 (3.33%) Annual Probability (high risk) rainfall event;
 - between the 1 in 30 (3.33%) and 1 in 100 (1%) Annual Probability (medium risk) rainfall events;
 - between the 1 in 100 (1%) and 1 in 1000 (0.1%) Annual Probability (low risk) rainfall event; and,
 - less than the 1 in 1000 (0.1%) Annual Probability (very low risk) rainfall event.
- 8.1.2 The likelihood of occurrence of these events during the construction phase has been summarised in Table 4.2.
- 8.1.3 The assessment of risk from and to surface water considers pipeline and haul/access road overland flow path with predicted areas of risk. It also considers where the project traverses predicted overland surface water flow paths which are not attributed to an identified overland flow path. These overland flow paths are listed in Table 8.1 and identify flow paths based on the predicted extents of the 3.33% (1 in 30) AEP event.

Table 8.1: Surface Water Overland Flow Paths

Easting	Northing	Section	Description
462411	127559	A	Surface water flow route crossing the Order Limits along A272.
467606	133598	B	Surface water flow route crossing the Order Limits along Hawthorne Road.
480138	148321	D	Surface water flow route crossing the Order Limits from east to west within open agricultural land.
480538	148818	D	Surface water flow route crossing the Order Limits from southeast to northwest within open agricultural land.
482050	151754	D	Surface water flow route crossing the Order Limits from south to north across the southern edge of a playing fields to the east of Beacon Hill Road.
485562	155747	E	Surface water ponding on Cove Road
485682	155811	E	Surface water ponding on Nash Close
486991	156196	E	Surface water ponding to the west of the A325.
487500	156681	E	Surface water ponding to the west of Ship Lane.
487212	157068	E	Surface water ponding at junction of Ship Lane and Ringwood Road.
488233	157322	E	Surface water flow route crossing the Order Limits from east to west within woodland.



Easting	Northing	Section	Description
488515	157654	E	Surface water flow route along alignment of the Order Limits from east to west along Balmoral Drive.
492699	161470	F	Surface water flow route along alignment of the Order Limits from east to west along Red Road.
493566	161762	F	Surface water ponding on Windsor Road.
495826	162891	F	Surface water flow route southwards along Order Limits to the south of Windlesham Road.
496576	163330	F	Surface water flow route eastwards along Steep Hill
496912	163535	F	Surface water ponding along Windsor Road
499914	165147	F	Surface water ponding on western side of Accommodation Road
501938	165245	F	Surface water flow route leaving Foxhills golf course.
506605	171929	H	Surface water ponding on Station Road.

8.2 Potential Effects

8.2.1 The project traverses all surface water flood risk zones along its route. The extents of the Order Limits within each surface water risk zone are summarised in Table 8.2. The categorisation of likelihood of occurrence reflects the duration of construction period and therefore areas categorised as high risk by the RoFSW mapping are categorised as medium likelihood as indicated in Table 8.2.

Table 8.2: Project Interaction with RoFSW Zones

RoFSW Zone (AEP)	Likelihood During Construction	Area (ha)	Proportion of Order Limits Area (%)
3.33% (1 in 30)	Medium	350	84
3.33 – 1% (1 in 30 – 100)	Low	45	11
1 – 0.1% (1 in 100 – 1000)	Very low	16	4
<0.1% (>1 in 1,000)	Negligible	7	2

8.3 Risk to the Project

Construction Phase

8.3.1 There is potential for surface water flooding to impact upon the project and place workers at risk during construction should a storm event occur. A surface water event could lead to flooding of the works and the pipeline trench. Given the nature of surface water flooding which is often driven by intense short-duration, high-intensity rainfall there may be limited warning time and difficulty in predicting the location of an event increasing the risk to workers.

8.3.2 The construction compound and logistics hubs have been included in the assessment identifying those that are located on a surface water flow path, see Appendix D.



- 8.3.3 The risk of surface water flooding during construction has been assessed as low to those parts of the Order Limits outside the 3.33% (1 in 30) AEP surface water extent, refer to Table 4.2. Consequently, no mitigation measures are proposed in these areas beyond good construction practice measures set out in the Register of Environmental Actions and Commitments (REAC) in Environmental Statement Chapter 16, which are secured through DCO requirements such as the Code of Construction Practice (CoCP).
- 8.3.4 As with fluvial flooding, the typical construction practices to be implemented throughout the Order Limits of stockpiling topsoil and excavation of a trench into which the pipeline would be installed, have a low sensitivity to flooding, and hence the risk to the installation of the pipeline is considered to be low. The layout of site offices within hubs and compounds would be elevated above ground level to provide flood resilience.

Operational Phase

- 8.3.5 With the exception of the pigging station which is located within an area of very low (<0.1% AEP) risk of surface water flooding, valve compounds, cathodic protection cabinets and marker posts, all elements of the pipeline are below-ground, consequently there is a negligible risk that the project would be impacted by surface water flooding during the operational phase. Considering the risk, no surface-water-specific measures are proposed for the operational phase of the project.

8.4 Risk from the Project

Construction Phase

- 8.4.1 Works during the construction phase have the potential to exacerbate the risk of surface water flooding to third parties. The temporary placement of arisings and aggregate stockpiles have the potential to impede and redirect overland flow paths. The entrainment of sediment from areas where topsoil has been stripped and soil storage areas could reduce conveyance capacity if deposited in local flow paths or sewers. Pre-earthworks drainage systems also have the potential to divert flows and intensify flow at points of discharge.
- 8.4.2 The vegetation and soil stripping and the potential compaction of the haul and access roads due to the movement of plant could reduce ground permeability and thereby increase flood risk by increasing the volume and rate of runoff. Furthermore, entrainment of sediment from the haul and access roads could be deposited in the route of flow paths that could reduce their capacity potentially increasing flood risk.

Operational Phase

- 8.4.3 The pigging station and the chamber covers at valve compounds would include an impermeable surface that would not be positively drained. Rainfall from these surfaces would runoff to the adjacent agricultural land where it would be expected to infiltrate.



8.5 Proposed Mitigation

Construction Phase

- 8.5.1 Good practice construction measures are set out in the REAC within Chapter 16 Environmental Management and Mitigation of the ES (**application document 6.1-6.2**), which would mitigate the impact on surface water flood risk to other parties.
- 8.5.2 A range of good practice and additional mitigation measures has been incorporated to ensure that the project does not increase flood risk to other parties. These include specific measures which are listed in Section 13. The implementation of these measures would reduce the overall risk to and from the project.
- 8.5.3 In light of the mitigation measures it is considered that the potential for the project to impact on surface water flooding during construction and exacerbate flood risk to other parties would be low.
- 8.5.4 Notwithstanding these measures an assessment of flow path crossings has been undertaken (see Appendix C) which considers the risks associated with works in areas of surface water flooding.

Operational Phase

- 8.5.5 No mitigation measures are proposed for the operational phase, see Sections 8.4.3 and 8.3.5.

8.6 Assessment of Risk

- 8.6.1 The project would be located within areas predicted to experience surface water flooding during construction, potentially placing workers and plant at risk. Consequently, the likelihood of flooding has been assessed at worst as medium given the construction period.
- 8.6.2 The project has the potential to increase surface water flood risk to other parties during construction through the temporary crossing of overland surface water flow paths. Temporary crossings or the storage of materials in areas of risk could reduce conveyance capacity, exacerbating risk to other parties. In addition, there is the potential for the project to increase runoff rates and redirect flow paths.
- 8.6.3 A combination of good practice and additional mitigation measures are proposed to address the risk during the construction phase (see Section 8.5) and consequently the risk to and from the project would be reduced to low or very low when they are taken into account.
- 8.6.4 There are no significant changes to existing risks to or from the project during the operational phase. The only sizeable above-ground element would be the pigging station which is not located within an area of predicted surface water flooding.



8.6.5 The assessment of the surface water flood risk impact to and from the project during the construction and operation phases is summarised in Table 8.3 and Table 8.4. Full details of the mitigation measures are provided in Section 13 with all of the measures summarised in Table 13.2.

Table 8.3: Assessment of Surface Water Flood Risk to the Project

Source	Pathway	Receptors	Likelihood of Occurrence	Severity	Risk (Pre-mitigation)	Mitigation	Risk (Post-mitigation)
Construction							
RoFSW very low	Works in flood extent	Construction workers	Very low	Low	Low	None Required	Low
RoFSW low			Very low				
RoFSW medium			Low				
RoFSW high			Medium	Large	High	W2, W3, W5, W6, G126, G184	Low
Operation							
RoFSW very low	None	None	Very low	N/A	Very low	None required	Very low
RoFSW low			Very low				
RoFSW medium			Low				
RoFSW high			Medium				

Table 8.4: Impact of the Project to Surface Water Flood Risk

Source	Pathway	Receptors	Likelihood of Occurrence	Severity	Risk (Pre-mitigation)	Mitigation	Risk (Post-mitigation)
Construction							
RoFSW very low	None	N/A	Very low	Low	Low	None Required	Low
RoFSW low	Surface water flow path	Third parties					
RoFSW medium						Low	
RoFSW high			Medium	Large	High	W2, W3, W5, W6, G126, G184	Low
Operation							



Source	Pathway	Receptors	Likelihood of Occurrence	Severity	Risk (Pre-mitigation)	Mitigation	Risk (Post-mitigation)
RoFSW very low	None	None	Very low	N/A	Very low	None required	Very low
RoFSW low			Low				
RoFSW medium			Medium				
RoFSW high							



9. Groundwater Flood Risk

9.1 Summary

- 9.1.1 Groundwater flooding is defined by the British Geological Survey (BGS, 2018) as ‘*the emergence of groundwater at the ground surface away from perennial river valleys or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels and groundwater flows is exceeded*’.
- 9.1.2 BGS defines three categories of susceptibility to groundwater flooding:
- A: Limited potential for groundwater flooding;
 - B: Potential for groundwater flooding of property situated below ground level; and
 - C: Potential for groundwater flooding to occur at the ground surface.
- 9.1.3 BGS does not assign a likelihood to these categories, therefore a likelihood of occurrence based on these categories has been defined in Table 9.1. The construction phase duration is limited (Section 3.1.1) and therefore has a reduced likelihood of an extreme event occurring compared to the 60-year operational phase.

Table 9.1: Estimating the Likelihood of Occurrence of Groundwater Flood Risk

Likelihood	Construction	Operation
High	None	Potential for groundwater flooding to occur at the surface
Medium	Potential for groundwater flooding to occur at the surface	Potential for groundwater flooding of property situated below ground level
Low	Potential for groundwater flooding of property situated below ground level	Limited potential for groundwater flooding
Very low	Limited potential for groundwater flooding or not considered to be prone to groundwater flooding	Not considered to be prone to groundwater flooding

- 9.1.4 In addition to the susceptibility to groundwater flooding dataset, records of groundwater level from Environment Agency boreholes and boreholes installed as part of the ground investigation for this project have been used to assess the potential for the project to interact with groundwater.

9.2 Potential Effects

- 9.2.1 The distribution of the categories of susceptibility to groundwater flooding across the project during construction is shown in Table 9.2.

Table 9.2: Extent of Groundwater Flood Risk to the Project

BGS Definition of Flooding	Area (ha)	Proportion of Order Limits Area (%)
Not considered to be prone to groundwater flooding	27	6
A: Limited potential for groundwater flooding	260	62
B: Potential for groundwater flooding of property situated below ground level	47	11
C: Potential for groundwater flooding to occur at the surface	85	20

9.2.2 The following sections describe available data for groundwater levels and the susceptibility of the project to groundwater flooding within the four groundwater study areas that are described in Section 3.

Groundwater Study Area A (Boorley Green to Bishop's Waltham)

9.2.3 Environment Agency data on groundwater levels for GWSA-A show that there are two groundwater monitoring boreholes within the study area. These are in the north of the study area to the west of Bishop's Waltham (Section A) where the Chalk becomes confined by the Lambeth Group. The measured water levels (Table 9.3) show that the Chalk is confined by the overlying Lambeth Group deposits and artesian pressures can be encountered. There is a relatively large variability in groundwater levels in the Chalk borehole as expected given its confined nature. However, water levels are frequently lower than in the overlying deposits.

Table 9.3: Groundwater Levels Recorded by the Environment Agency Within GWSA-A

Borehole Name	NGR	Aquifer Monitored	Period of Record	Maximum Groundwater Level Recorded	
				mbgl*	mAOD
Wintershill (Chalk)	453848 118214	Chalk	2001 to 2017	0.0	42.0
Wintershill (Tertiary)	453854 118218	Lambeth Group	2005 to 2017	0.0	42.0

* metres below ground level

9.2.4 For the Wintershill (Tertiary) borehole, water levels are generally higher than in the underlying Chalk aquifer, except during the highest levels. For this borehole, groundwater levels are very close to the ground surface and annual cyclicity in groundwater levels is in the order of 0.5m.



- 9.2.5 Generally, it would be anticipated that groundwater levels are shallowest in the watercourse valleys, particularly for the tributary of the River Hamble in the vicinity of Ford Lake Valley (Section A). This is where the groundwater flood susceptibility map (ES Figure 9.1, Sheet 1 of 4) shows there is the potential for groundwater flooding at the surface. A further smaller area where there is susceptibility to groundwater flooding at the surface is present at Wintershill to the west of Bishop’s Waltham (Section A). This area corresponds with the shallow groundwater levels recorded in the Environment Agency monitoring boreholes at Wintershill.
- 9.2.6 The ground investigation has installed two boreholes in GWSA-A as shown in Table 9.4. A groundwater level data logger has been installed in BH124.

Table 9.4: Groundwater Levels Recorded in Ground Investigation Boreholes Within GWSA-A

Borehole Number	Easting	Northing	Horizon Monitored	Groundwater Strike*		Maximum Groundwater Level Recorded	
				mbgl	mAOD	mbgl	mAOD
BH124	453609	117844	Clay	No strike recorded		0.28	32.88
BH126	451487	114768	Clay	No strike recorded		-0.94 (artesian conditions)	15.07

* Groundwater strike is the level at which groundwater is encountered when drilling the borehole

- 9.2.7 Based on the above groundwater level information, within GWSA-A shallow groundwater levels which may be intercepted by the trench excavated to install the pipe, are most likely to occur at the following locations:
- Ford Lake Valley, although a trenchless crossing would be used here for much of the area where the shallowest groundwater levels are likely to be present (Crossing WCX 002a – Section A); and
 - Wintershill to the west of Bishop’s Waltham (Crossing WCX 006 – Section A).

Groundwater Study Area B (Bishop’s Waltham to Crondall)

- 9.2.8 GWSA-B crosses the Chalk which forms a Principal aquifer (Figure 9.2, Sheet 2 of 4). There is a small section of the study area in the vicinity of Alton passing over the Upper Greensand Formation which also forms a Principal aquifer. The Chalk in this area is at the ground surface or beneath superficial deposits (i.e. it is ‘unconfined’ Chalk) and is a major source of drinking water in the area. Although chalk has a high porosity, the intergranular permeability is very low as the pores do not drain under gravity (BGS, 1997). Groundwater flow in the Chalk is therefore mainly controlled by fracture flow. The most important flow horizons are concentrated near the top of the Chalk. There is little flow deeper than 50mbgl. Transmissivity (the product of aquifer permeability and aquifer thickness) within the Chalk tends to be greater in the valleys than in the interfluves (the land between the valleys of adjacent watercourses).



- 9.2.9 Groundwater level data for the unconfined Chalk aquifer are shown on the historical hydrogeology map (BGS, 1979) to vary from 35m AOD on the southern Chalk boundary to 120m AOD to the southeast of Alton. The Environment Agency Mole groundwater model (Entec, 2011) shows a high groundwater level in the Chalk in the winter of 2001 when maximum groundwater levels within the study area were modelled to be in the order of 125m AOD to the southeast of Alton.
- 9.2.10 There is a regional groundwater flow direction from north to south in the southern portion of the Chalk (Sections A and B) and south to north in the northern portion (Section C). The groundwater divide occurs around Alton. A series of springs emerge from the Chalk on its northern boundary with the adjoining Lambeth Group deposits. The Ashley Head Spring is present within the groundwater study area close to the village of Crondall (Section D). Further significant spring flows occur in the headwaters of the River Itchen and River Alre at New Alresford (Section B). These features show that groundwater is close to the surface at these locations at least on a seasonal basis.
- 9.2.11 EA data on groundwater levels for GWSA-B show that there are 17 groundwater monitoring boreholes within this study area. The measured water levels (Table 9.5) show that generally the depth to groundwater is greater than the depth that the pipeline trench would penetrate. The shallowest groundwater level recorded has been in the Farringdon Station (southwest of Alton, Hampshire) borehole at 2.47mbgl. This measured thin unsaturated zone agrees with the BGS flood susceptibility data which show there is a susceptibility of groundwater flooding at the surface in this area associated with a dry valley running north to south. The seasonal change in groundwater levels each year in this borehole is variable, with some years showing less than 10m, and others a much larger range (in excess of 20m).

Table 9.5: Groundwater levels recorded by the Environment Agency within GWSA-B

Borehole Name	NGR	Aquifer Monitored	Period of Record	Maximum Groundwater Level Recorded	
				mbgl	mAOD
Street End	SU5563820009	Chalk	1996		111.89
Lomer Farm Kilmeston	SU5898923642	Chalk	1964 to 2017	32.50	120.50
Parrs Barn, Firas 9	SU6000025150	Chalk	1981 to 2017	49.47	100.53
Kilmeston Roadside	SU0591902482	Chalk	1988 to 2018	22.30	95.70
Parsonage Farm Bramdean	SU0632502815	Chalk	1964 to 2018	8.11	93.89
West Tisted, Firas 1	SU0648402974	Chalk	1981 to 2017	78.57	91.43
Long Houses, Bramdean	SU6329629063	Chalk	1963 to 2017	31.28	94.72
Soames Place Ropley	SU0655503065	Chalk	1965 to 2018	39.82	98.18
Hawthorn, Firas 19	SU6772933502	Chalk	1981 to 2017	48.69	105.31
Kitfield, Four Marks	SU6673533687	Chalk	1987 to 2017	41.83	121.17
Lyeway Lane, Firas 1	SU6546031741	Chalk	1981 to 2017	54.48	98.52



Borehole Name	NGR	Aquifer Monitored	Period of Record	Maximum Groundwater Level Recorded	
				mbgl	mAOD
Woodside OBH Chalk	SU0700503622	Chalk	2008 to 2017	5.23	117.14
Woodside OBH_Greensand	SU0700503621	Upper Greensand	2008 to 2017	10.45	111.52
Farringdon Station	SU7045934899	Chalk	2008 to 2017	2.47	118.23
Malms Farm	SU0752204100	Upper Greensand	2008 to 2016	12.36	94.12
6 Cottages Clean	SU0794704866	Chalk	2008 to 2018	4.22	88.12
Montgomerys Farm	SU0780604664	Chalk	2008 to 2018	41.89	127.17

9.2.12 The susceptibility to groundwater flooding map (ES Figure 9.1, Sheet 2 of 4) shows where shallow groundwater potentially occurs. This gives rise to the potential for groundwater flooding to occur at the surface, or potential for flooding of property situated below ground level. The groundwater flooding map shows potential for shallow groundwater at the following locations:

- at the southern edge of the Chalk (Section A, NGR: 453971, 118669);
- in a valley known as Betty Mundy's Bottom (Section A, NGR: 458182, 122488);
- in the River Alre valley to the east of Bramdean (Section A-B boundary, NGR: 462409, 127561);
- in the area of Alton associated with the Lavant and Caker Streams and River Wey (Section C, NGR: 470145, 135687 to NGR: 477251, 144457);
- a small valley to the north of Bentley (Section C, NGR: 473826, 139375 to NGR: 477938, 145435); and
- near the village of Crondall at the northern boundary of the Chalk (Sections C and D, NGR 478970, 146783 to NGR: 480377, 148468).

9.2.13 The Environment Agency, East Hampshire District Council, Mole and Test and Itchen groundwater modelling studies (ENTEC UK, 2008), (Environment Agency, Date Unknown) model groundwater levels in the Chalk in GWSA-B. Illustration 9.1 shows the modelled water levels for a point along the Order Limits in the south of the study area. Illustration 9.2 shows the modelled water levels for a point near Crondall where the Order Limits pass through an area identified as being susceptible to flooding at the surface.

Illustration 9.1: Modelled Groundwater Levels Over Time Within GWSA-B for the Itchen and Test and EHCC Models

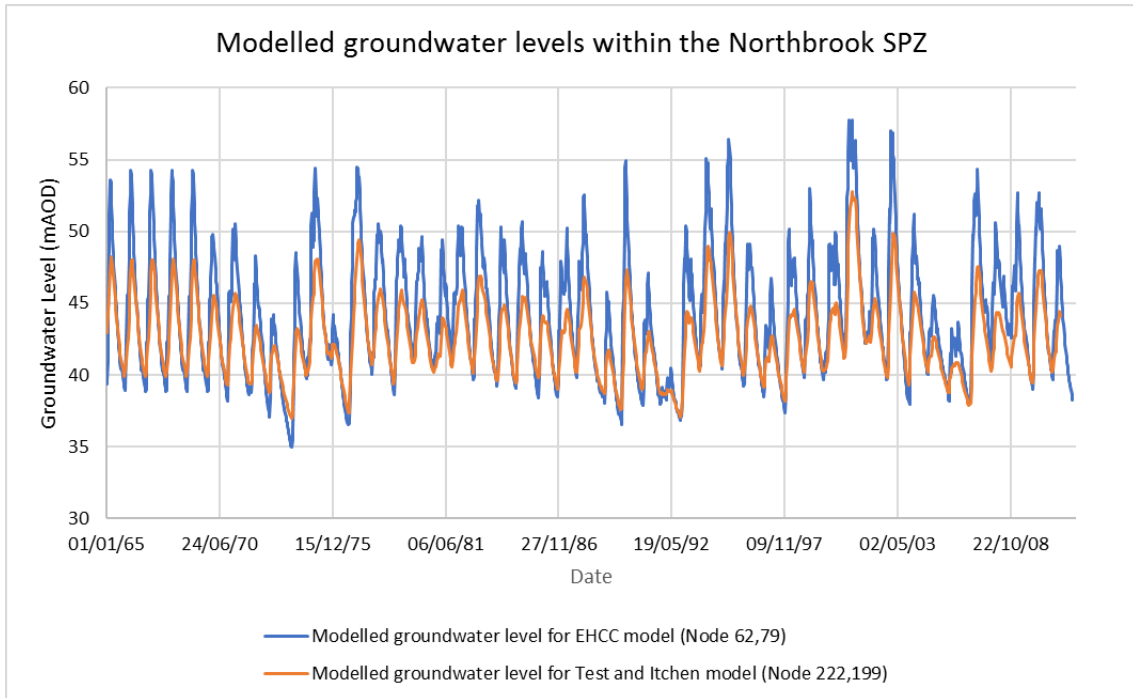
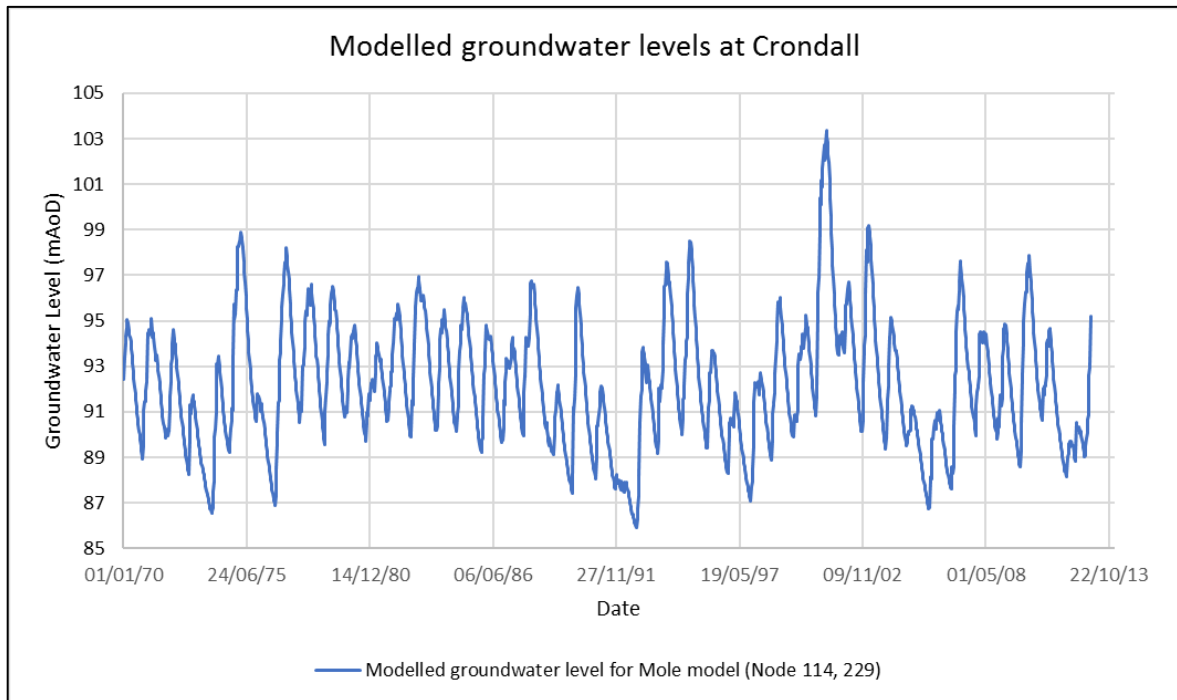
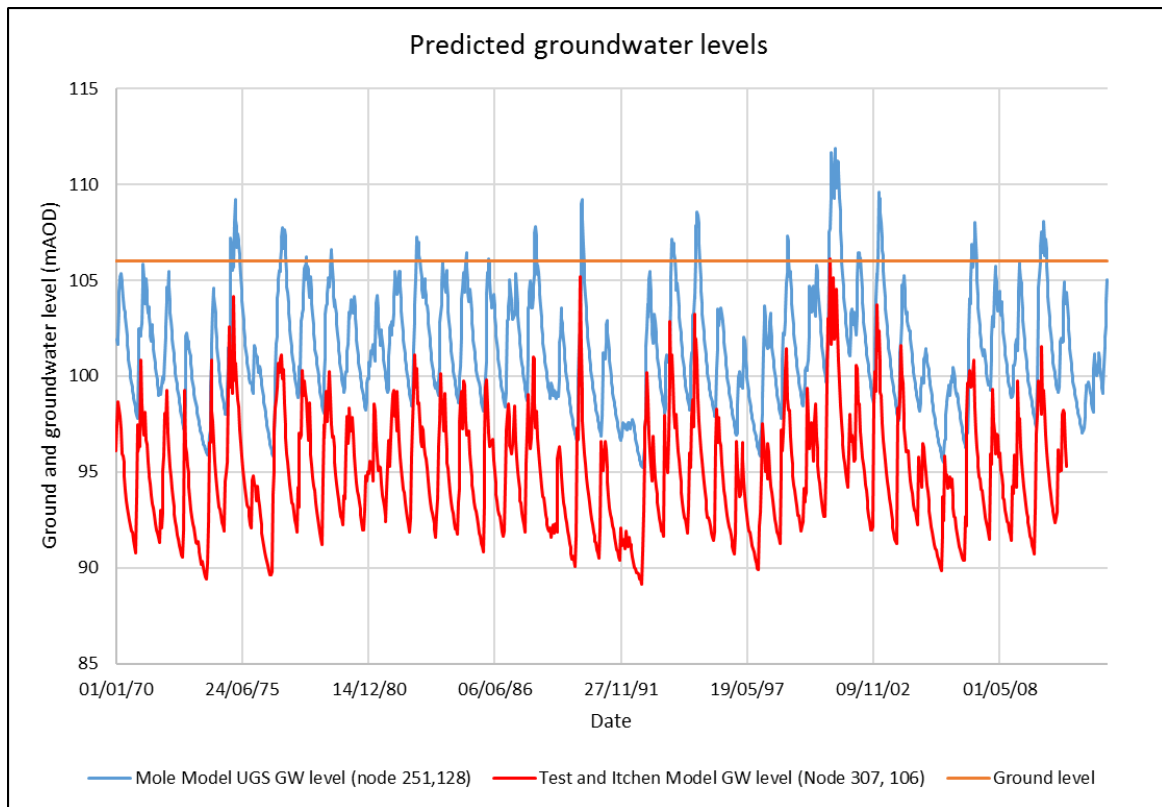


Illustration 9.2: Modelled Groundwater Levels Over Time Within GWSA-B for the Mole Model



- 9.2.14 The groundwater model results show that over much of the area groundwater levels are deep, which does correspond with the majority of actual monitoring points for the Chalk. The model shows the shallowest levels are recorded at the edge of the Chalk near to where it becomes confined on the northern and southern boundaries of the study area. Shallow groundwater levels are also modelled in the river valleys, particularly the River Wey.
- 9.2.15 Of particular note for shallow groundwater is the area near Upper Froyle and Lower Froyle where the pipeline runs along the boundary of the Chalk and Upper Greensand aquifers. Here, the Mole and Test and Itchen groundwater model shows that potentially, during high groundwater levels, the water table moves above the ground level. For the Test and Itchen groundwater model, only in the most extreme high groundwater level event in 2001 does the groundwater level exceed the ground level (Illustration 9.3). However, for the Mole model the groundwater levels in the Upper Greensand are shown to exceed the ground levels in many winters. This area does correspond to an area identified in the flood susceptibility maps as having potential for groundwater flooding to occur at the surface.

Illustration 9.3: Modelled Groundwater Levels in the Vicinity of Froyle



- 9.2.16 The ground investigation has installed ten boreholes in GWSA-B as shown in Table 9.6. Groundwater level data loggers have been installed in eight of these boreholes.

Table 9.6: Groundwater Levels Recorded in Ground Investigation Boreholes Within GWSA-B

Borehole Number	NGR	Horizon Monitored	Groundwater Strike		Maximum Groundwater Level Recorded	
			mbgl	mAOD	mbgl	mAOD
BH67	480065 148080	Chalk	No strike recorded		15.62	86.29
BH69	474628 141543	Clay (weathered bedrock)	1.60	96.98	2.42	96.16
BH98	474783 141440	Sandstone (Upper Greensand)	2.80	88.62	2.46	88.96
BH101	474709 140774	Sandstone (Upper Greensand)	No strike recorded		6.55	93.47
BH102	472968 139007	Chalk	No strike recorded		No data available	
BH103	471422 137091	Chalk	No strike recorded		No data available	
BH104	467215 133164	Chalk	No strike recorded		Dry at 20.25mbgl on all monitoring occasions and on logger	
BH119	462743 127311	Chalk	No strike recorded		8.64	80.31
BH122	454523 119478	Chalk	No strike recorded		Borehole dry at 20.18mbgl on all monitoring occasions	
BH128	470405 136086	Chalk	No strike recorded		7.29	107.48

9.2.17 Based on the above groundwater level information, within GWSA-B, shallow groundwater levels which may be intercepted by the trench excavated to install the pipe, are most likely to occur at the following locations:

- in the vicinity of the A272 to the east of Bramdean (although the crossing of the road is by trenchless techniques) (NGR: 462399, 127552);
- in the vicinity of the A32 to the south of Chawton (although the crossing of the road is by trenchless techniques) (NGR: 470128, 135669 to NGR: 470532, 135959);
- the area of Chalk aquifer to the east and northeast of Alton in the Wey Valley shown on the groundwater flood susceptibility maps as having potential for groundwater flooding at the surface (NGR: 473968, 139593 to NGR: 476167, 143086) and
- in the vicinity of Crondall near to where the Chalk aquifer becomes confined (NGR: 479271, 147243 to NGR: 480377, 148468).

Groundwater Study Area C (Crandall to Chertsey South)

9.2.18 EA data on groundwater levels for GWSA-C show that there is one groundwater monitoring borehole within this study area. The measured water levels (Table 9.7) show that the shallowest groundwater level recorded in this borehole is 4.75mbgl. This borehole is close to the edge of Chobham Common, an area known to be dependent upon groundwater. This measured thin unsaturated zone agrees with the BGS flood susceptibility data which identify that there is a susceptibility of groundwater flooding to below-ground property in this area.

Table 9.7: Groundwater Levels Recorded by the Environment Agency Within GWSA-C

Borehole Name	NGR	Aquifer Monitored	Period of Record	Highest Groundwater Level Recorded	
				mbgl	mAOD
Brock Cottage OBH	496490 163340	Bracklesham Group	2008 to 2017	4.75	41.98

9.2.19 Generally, groundwater levels are shallowest in the valleys. This is particularly true for the tributary of the River Blackwater near Frimley Green (Section E), where the BGS groundwater flooding susceptibility mapping (ES Figure 9.1, Sheet 3 of 4) shows there is the potential for groundwater flooding of below-ground property. A further smaller area where there is susceptibility to groundwater flooding at the surface is to the east of Frimley. Further shallow groundwater could be expected from Bagshot Heath to the east of Chobham Common (Section F). Here much of the route runs through areas susceptible to groundwater flooding.

9.2.20 The Environment Agency's Mole groundwater modelling study does model groundwater levels in the confined Chalk in GWSA-C. However, as the pipeline trench would not reach the confined Chalk (including at any trenchless crossing points), the water level data from the models are not relevant to the project.

9.2.21 The ground investigation has installed 10 boreholes in GWSA-C as shown in Table 9.8. Data loggers have been installed in all of these boreholes although data are still required to be downloaded from them.

Table 9.8: Groundwater Levels Recorded in Ground Investigation Boreholes Within GWSA-C

Borehole Number	NGR	Horizon Monitored	Groundwater Strike		Maximum Groundwater Level Recorded	
			mbgl	mAOD	mbgl	mAOD
BH34	498612 164440	Dominantly silty sand	No strike recorded		2.44	37.75
BH35	497779 164074	Slightly silty sand	No strike recorded		1.08	37.66
BH37	496242 163052	Slightly silty sand	3.70	35.17	2.36	36.51
BH39	493920 161645	Clayey sand	No strike recorded		3.12	48.37



Borehole Number	NGR	Horizon Monitored	Groundwater Strike		Maximum Groundwater Level Recorded	
			mbgl	mAOD	mbgl	mAOD
BH55	487051 156209	Slightly silty sand	3.75	69.18	5.40	67.53
BH56	485742 155974	Slightly silty sand	1.40	60.57	1.56	60.41
BH59	485281 154829	Silty sand	1.65	61.03	0.47	62.21
BH138	498072 164226	Sand	0.8	39.2	0.08	39.01
BH151	487989 157433	Sandy gravel	1.40 3.18	62.15 60.37	1.22	62.33
BH155	487494 156660	Slightly silty sand	3.1	61.98	2.32	62.76

9.2.22 Based on the groundwater level information in Table 9.8, within GWSA-C, shallow groundwater levels which may be intercepted by the trench excavated to install the pipe, are most likely to occur at the following locations:

- in the vicinity of Folly Bog SSSI to the south of Lightwater (NGR: 492900, 161514 to NGR: 492997, 161492);
- at the crossing of the Windle Brook to the north of West End (NGR: 494085, 161845 to NGR: 494870, 162185);
- in the vicinity of Windlesham Road and the B383 to the northwest of Chobham (NGR: 495789, 162649 to NGR: 496782, 163487); and
- at Chobham Common SSSI (although the shallowest areas would use trenchless crossings (NGR: 497524, 163899 to NGR: 498866, 164549).

Groundwater Study Area D (Chertsey South to Esso's West London Terminal)

9.2.23 The groundwater flood susceptibility map (ES Figure 9.1, Sheet 4 of 4) shows there is the potential for groundwater flooding of below-ground property and at the surface for much of the length of the route in GWSA-D (Section G). It is therefore anticipated that shallow groundwater levels would be encountered for almost the entire length of the GWSA-D Order Limits, from the north of Addlestone to Esso's West London Terminal storage facility (Sections G and H).

9.2.24 The ground investigation has installed ten boreholes in GWSA-D as shown in Table 9.9. Data loggers have been installed in all of these boreholes although data are still required to be downloaded from them. The data collected indicates that groundwater strikes are encountered at shallow depth with the shallowest strike being 0.83mbgl in BH10.

Table 9.9: Groundwater Levels Recorded in Ground Investigation Boreholes Within GWSA-D

Borehole Number	NGR	Horizon Monitored	Groundwater Strike		Maximum Groundwater Level Recorded	
			mbgl	mAOD	mbgl	mAOD
BH01	506861 173357	No installation	No strike recorded		No data available	
BH03	506647 172493	Made ground (very sandy clay)	2.10	13.49	2.14	13.45
BH04	506611 172293	Made ground (gravelly clay)	4.5	13.21	4.09	13.62
BH06	506515 172057	Very gravelly sand	No strike recorded		1.83	13.56
BH08	505795 171330	Slightly silty clay	1.7	11.96	0.83	12.83
BH09	505882 171036	Silty clay	1.7	11.71	0.62	12.79
BH10	506308 170724	Sand and gravel	0.83	11.97	0.13	12.67
BH25	505975 166819	Very sandy gravel	13.5	-2.07	0.55	10.88
BH26	505990 166652	Sand and gravel	1.26	10.19	0.88	10.57
BH29	505011 165824	Sandy silty clay and silty sand	No strike recorded		1.09	9.81

9.2.25 It should be noted that GWSA-D includes a number of landfills.

9.2.26 Based on the above groundwater level information, within GWSA-D, shallow groundwater which may be intercepted by the trench excavated to install the pipe, are most likely to occur at the following locations:

- the area where the proposed trench crosses the Bourne and Chertsey Meads SSSI to the east of Chertsey (NGR: 505352, 166110 to NGR: 505501, 166094); and
- the entire length of the proposed pipeline route north of the River Thames to Esso's West London Terminal storage facility (NGR: 505956, 166614 to NGR: 507099, 173354).

9.3 Risk to the Project

Construction Phase

9.3.1 Any groundwater entering open excavations during construction may present a hazard to construction workers, either through depth of water or the potential to destabilise the sides of the excavation.



- 9.3.2 Any groundwater encountered by the works would be managed in accordance with good practice set out in the REAC. This would include (as necessary) dewatering open excavations and treating the water (where necessary) prior to disposal in a controlled manner.
- 9.3.3 Where extreme groundwater flooding is encountered (i.e. groundwater flooding at the ground surface for several weeks) no works within affected areas would take place.
- 9.3.4 In all locations the severity of impact of groundwater flooding to construction activities has been assessed as very low: the onset of groundwater flooding is not anticipated to be rapid, operatives would be in open excavations for limited periods of time, consequently the impact is likely to be constrained to delays to the installation programme and or minor earthworks. The likelihood of occurrence of groundwater flooding varies from medium to low. Therefore, the resulting risk to the project during construction from groundwater flooding is therefore very low to low. Consequently, no further mitigation measures are proposed.

Operational Phase

- 9.3.5 The design measures incorporated to ensure the integrity of the pipeline over its lifetime mean there is a negligible potential for groundwater to ingress into the pipe. Consequently, the severity of impact of groundwater flooding to the project is very low. The likelihood of occurrence of groundwater flooding during operation of the pipeline varies from high to very low depending on location. Therefore, the risk from this source to the whole of the pipeline during operation is considered to be very low to low.
- 9.3.6 The pigging station at Boorley Green is the only sizable above ground structure during the operational phase and lies within an area with low likelihood of groundwater flooding (other features would be limited to valve chamber covers, marker posts and cabinets). There are no flood-sensitive elements of the pigging station located at or below ground level, therefore the severity of groundwater flooding to the pigging station has been assessed as very low and the risk of groundwater flooding to the pigging station is low and mitigation measures are not considered necessary.

9.4 Risk from the Project

Construction Phase

- 9.4.1 The pipeline would be installed at a shallow depth relative to the normal range of groundwater movement. However, there is limited potential for the construction phase of the project to impact on groundwater flooding. Potential mechanisms are: dewatering activities and creating preferential flow pathways for groundwater along the excavated trench and/or pre-construction and construction phase drainage systems.



- 9.4.2 During construction, groundwater removed from open excavations would be discharged to ground, local watercourses or sewers (in that order of preference) following (in all cases) suitable management measures to minimise discharge of silt. Where discharged to ground, groundwater would naturally attenuate to local levels with no net impact on local groundwater levels, hence the severity of the impact is assessed to be very low and the risk of increasing groundwater flood risk is low or very low.
- 9.4.3 In areas where groundwater is encountered within the pipeline trench there is a potential to transfer groundwater flows to areas of catchments that may not normally receive them. Where flows from groundwater enter the works under normal conditions the rates of flow are anticipated to be relatively low compared to surface water flows with which they may ultimately combine. Under such circumstances the unmitigated diversion of groundwater is anticipated to result in a low severity of impact. As the likelihood of groundwater flooding varies from very low to medium, the risk as a result of the project is low to medium if unmitigated. Mitigation measures to reduce this risk are outlined in Section 9.5.
- 9.4.4 If, however, groundwater levels are elevated above their typical range or naturally high groundwater levels are encountered, considerable flows could be diverted by the trench, resulting in a moderate severity of impact. Given the very low to medium likelihood of groundwater flooding, this would result in a low to medium risk if unmitigated. Mitigation measures to reduce this risk are outlined in Section 9.5.
- 9.4.5 At trenchless crossings there is potential that excavations for access pits and the bores required for the pipes could connect two aquifers that are currently not connected, for example, if the bores went through a clay layer between two aquifer units. This could then lead to cross contamination of an aquifer. However, the assessment of trenchless crossings and their interaction with groundwater found no locations where this could occur (ES Appendix 8.2 Detailed Trenchless and Targeted Trench Assessments).
- 9.4.6 Trenchless crossings also have the potential to release artesian water and this is also considered for the trenchless crossings in ES Appendix 8.2. One crossing has been identified where this could occur, at Ford Lake Valley. Here the likelihood of groundwater flooding during construction is considered to be medium and the severity of impact, low. Therefore, the risk of the project increasing groundwater flood risk at this location is medium if unmitigated. Mitigation measures to reduce this risk are outlined in Section 9.5.

Operational Phase

- 9.4.7 In areas where groundwater is expected to rise to the level of the base of the pipeline trench, there is a potential to transfer groundwater flows to areas of catchments that may not normally receive them. Under such circumstances the unmitigated diversion of groundwater is anticipated to result in a moderate severity of impact. Given the very low to high likelihood of groundwater flooding to the operation of the pipeline, this would result in a low to high risk if unmitigated. Mitigation measures to reduce this risk are outlined in Section 9.5.



9.5 Proposed Good Practice and Additional Mitigation

Construction Phase

- 9.5.1 To reduce the risk of the pipeline trench causing preferential transfer of groundwater, water stops (or 'stanks') in the open trench in areas where groundwater is predicted to occur near the surface – identified by BGS groundwater zone C – '*potential for groundwater flooding to occur at the surface*' (see Table 9.2) to reduce the potential for lateral movement of groundwater. Stanks would be installed at intervals determined as appropriate on site during construction in areas predicted to be at elevated risk of groundwater flooding. Temporary stanks would be installed within the trench prior to undertaking dewatering/ draining activities, to prevent migration of water within the trench (G134), reducing the risk of impact of the project on groundwater flood risk, to low.
- 9.5.2 To reduce the effects of connection of two aquifers that are currently separated by a low permeability layer or release of artesian pressure, the design of the HDD crossings would include a bentonite, or similar, sleeve to maintain the integrity of the excavation between the removal of the plant and the insertion of the pipeline that would prevent a pathway from one aquifer to another or cause artesian water to reach the surface. This would need to be applied at Ford Lake Valley where artesian pressures were recorded. This would reduce the likelihood of occurrence to low and therefore the risk of the project increasing groundwater flood risk at this location, to low.

Operational Phase

- 9.5.3 To reduce the risk of the pipeline trench causing preferential transfer of groundwater during the operational phase, stanks would be installed in the open trench in areas where groundwater is encountered during construction, or would be expected to enter the trench during the operational phase in either normal or extreme groundwater conditions (O7). These are defined as areas with high or moderate likelihood of flooding from groundwater during the operational phase (i.e. BGS classifications: Potential for groundwater flooding to occur at the surface or Potential for groundwater flooding of property situated below ground level). The stanks would prevent the preferential movement of groundwater along the pipeline route and minimise the risk of emergence in areas otherwise not prone to groundwater flooding, reducing the ultimate risk of impact of the project on groundwater flood risk, to low.



9.6 Assessment of Risk

9.6.1 The risk of groundwater flooding to the project during construction varies between low and very low and because of the anticipated slow onset of groundwater flooding the severity of impact is very low. During operation there are no aspects of the project that could be impacted by groundwater flooding and therefore again the severity of impact is assessed as very low. Consequently, the risk of groundwater flooding impacting the project during construction and operation is either low or very low. The risk of groundwater flooding to the project for the construction and operation phases is summarised in Table 9.10 and Table 9.11 along with proposed good practice measures to reduce risk where appropriate. Full details of the mitigation and good practice measures are provided in Section 13 with all of the measures summarised in Table 13.2.

Table 9.10: Groundwater Flood Source Impact Summary To the Project

Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (Pre-mitigation)	Mitigation Measures	Risk with Mitigation
Construction							
Low-permeability formations present at the ground surface	No pathway	Construction Workers Earthworks Trenchless launch and receptor pits	Very low	Very low	Very low	None proposed	Very low
Limited potential for groundwater flooding	Works with areas at risk of groundwater flooding Groundwater ingress to excavations and working area		Low	Very low	Low	G28	Low
Potential for groundwater flooding of property situated below ground level			Medium		Low		
Potential for groundwater flooding to occur at the surface			High		Low		
Operation							
All groundwater flood sources	No pathway	-	Very low	Low	Low	O7	Very low



9.6.2 During both construction and operation there is a risk that the project could affect groundwater flood risk, through either disposal of dewatering flows or introducing new flow routes for groundwater along the pipeline trench. However, with appropriate good practice measures, the risk of these impacts can be reduced to low. The risk of the project exacerbating groundwater flooding during the construction and operation phases is summarised in Table 9.11 along with proposed measures to reduce risk where appropriate. Any disposal of dewatering may require consent from the Environment Agency.

Table 9.11: Groundwater Flood Source Impact Summary From the Project

Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (Pre-mitigation)	Mitigation Measures	Risk with Mitigation
Construction							
All groundwater flood sources	Dewatering	Various	Medium	Very low	Low	None proposed	Low
	Groundwater flow diversion via pre-construction and construction phase drainage		Low	Low	Low	None proposed	Very low
	Pipeline trench creating preferential flow paths		Low	Low	Low	O7	Very low
Operation							
All groundwater flood sources	Pipeline trench creating preferential flow paths	Various	Low	Low	Low	O7	Very low



10. Reservoir Flood Risk

10.1 Summary

- 10.1.1 The Environment Agency produces plans of areas at risk of flooding in the event of a major reservoir breach, which are included in ES Figure 10.1 (sheets 1-15).
- 10.1.2 The mapping includes predicted extreme flood extents from a modelled worst credible breach from reservoirs that fall under the auspices of the Reservoirs Act 1975, i.e. those with the capacity to hold over 25,000m³.

10.2 Potential Effects

- 10.2.1 There are sections of the project within areas predicted to flood should reservoirs fail as summarised in Table 10.1.

Table 10.1: Locations at Risk of Reservoir Flooding

Location	Potential Source	Easting	Northing
Church Crookham	Unidentified	482056	151771
Northeast of Church Crookham	Lake west of Brakesbury Hill	482966	153070
Farnborough	Unidentified	485744	155834
Farnborough Green	Unidentified	487596	157200
East of Lightwater	Unidentified	494457	162064
Chertsey to Hounslow	West London reservoirs	Extensive	

- 10.2.2 The SFRAs along the route of the project have been reviewed and do not identify any further reservoirs not already included on the Environment Agency mapping.

10.3 Risk to the Project

- 10.3.1 The largest area of risk from reservoir failure to the project originates from the West London reservoirs (ES Figure 10.1). Other locations are at risk although the extent of their interaction with the project is significantly smaller. While there is a risk of flooding the likelihood is assessed to be very low. The Reservoirs Act 1975 requires regular inspections and carrying-out of remedial works as directed by the inspecting engineer, consequently the likelihood of an uncontrolled release (breach) from a reservoir is extremely unlikely.
- 10.3.2 The severity of impact of reservoir flooding to the project has been assessed as moderate because there could be a risk to life (construction workers) if they are within one of the areas at risk of reservoir flooding should a failure occur, as there could be limited warning. However, the overall risk to the project has been assessed as low because of the very low likelihood of occurrence due to the inspection and maintenance works required of such structures.

10.4 Risk from the Project

10.4.1 The project is unlikely to affect the severity of a reservoir failure to other parties given the volumes of water involved in an uncontrolled release, therefore the severity of impact arising from the proposed project is assessed as low, and very low in areas not predicted to flood from a reservoir breach.

10.5 Proposed Good Practice and Additional Mitigation

10.5.1 The good practice measures set out in the REAC would be secured through DCO requirements such as the Code of Construction Practice (ES Appendix 16.1).

10.5.2 A range of good practice measures have been incorporated to ensure that the project does not exacerbate flood risk to other parties. These include specific measures which are listed in Section 13. The implementation of these measures would reduce the overall risk to and from the project.

10.5.3 In addition to the measures listed in Section 13 it is anticipated that the Order would include protective provisions covering working arrangements in the vicinity of reservoirs as requested by the reservoir undertaker.

10.5.4 In light of the good practice and additional mitigation measures it is considered that the potential for the project to impact on surface water flooding during construction and exacerbate flood risk to other parties would be low.

10.6 Assessment of Risk

10.6.1 For both the construction and operational phases, the overall risk of flooding to the project from reservoir failure is considered to be low or very low. The proposed works are not anticipated to have any impact upon the likelihood or severity of reservoir failure flood risk. The assessment is summarised in Table 10.2 and Table 10.3. Full details of the mitigation measures are provided in Section 13 with all of the measures summarised in Table 13.2.

Table 10.2: Reservoir Flood Source Impact Summary To the Project

Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (Pre-mitigation)	Measures	Risk with Mitigation
Construction							
Outside area at risk	-	-	Very low	Very low	Very low	None required	Very low
Reservoir failure	Predicted flow path	Construction workers	Very low	Depth of <300mm Low	Low	G28, G127	Very low



Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (Pre-mitigation)	Measures	Risk with Mitigation
		Construction compounds Excavations Trenchless launch and receptor sites Plant and equipment		Depth of 0.3m – 2.0m Moderate	Low		Very low
				Depth of > 2.0m Large	Medium		Low
Operation							
Outside of an area at risk	-	-	Very low	Very low	Very low	None required	Very low
Reservoir failure	Predicted flow path	None	Very low	Very low	Very low	None required	Very low

Table 10.3: Reservoir Flood Source Impact Summary From the Project

Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (Pre-mitigation)	Mitigation Measures	Risk with Mitigation
Construction							
Outside an area at risk	-	-	Very low	Very low	Very low	None required	Very low
Reservoir failure	Predicted flow path	Various	Very low	Low	Low	None required/proposed	Low
Operation							
Outside an area at risk	-	-	Very low	Very low	Very low	None required	Very low
Reservoir failure	Predicted flow path	-	Very low	Very low	Very low	None required/proposed	Very low



11. Canal Flood Risk

- 11.1.1 There are no publicly available sources of information defining areas at risk in the event of a canal breach. To identify areas of the Order Limits potentially at risk from canal structural failure, information on the location of canals has been used in conjunction with terrain data and details of the proposed method for crossing the canal.
- 11.1.2 There is one canal within the Order Limits (Basingstoke Canal) and two canal-like structures (Queen Mary Reservoir Intake (QMRI) and Staines Reservoir Aqueduct) as indicated on Figure C38, Figure C87 and Figure C88 respectively.

11.2 Risk to the Project

Basingstoke Canal

- 11.2.1 Basingstoke Canal is crossed at Norris Bridge, near Fleet (NGR: 483336 153554). At this location the canal is in a cutting, with the banks of the canal at approximately 78m AOD. The ground either side of the canal rises steeply to a minimum of 83m AOD.
- 11.2.2 The proposed method of crossing Basingstoke Canal is by HDD, approximately 240m with the southern launch site near NGR: 483269, 153475 and the northern reception site near NGR: 483357, 153654. The launch/reception sites are at elevations of approximately 86m AOD and 83m AOD, respectively. The HDD passes approximately 6m below the invert of the canal.
- 11.2.3 Given the method proposed to cross the canal the likelihood of a breach and therefore the risk of flooding is assessed to be very low. The elevation and position of the trenchless launch/receptor sites well above the height of the canal results in a very low severity associated with a breach. Should the HDD technique cause a failure of the canal lining system, the HDD bore would flood to a level coincident with the resting water level in the canal (i.e. below the canal bank level of 78m AOD) and hence no water from the canal would flood the Order Limits or the launch and receptor working areas. As a further precaution, workers should not be within the launch or reception pits when boring is undertaken. The risk to the project associated with the crossing of the Basingstoke Canal is assessed to be very low.
- 11.2.4 Similarly, by virtue of the position of all elements of the pipeline in the vicinity of Basingstoke Canal being located below ground level, there is very low risk to the operational phase of the pipeline from the Basingstoke Canal.

Queen Mary Reservoir Intake

- 11.2.5 The QMRI is crossed by the Order Limits at NGR: 505578, 169439. As with the Basingstoke Canal the QMRI is located at a lower elevation than adjacent land. The top of bank level for the QMRI is approximately 12m AOD with the land rising to the north and south to a level of 13m AOD.



- 11.2.6 The method proposed to cross the QMRI is a 50m auger bore from a drive pit on the south side at an elevation of 13m AOD to a reception pit on the northern bank at a similar elevation. The auger bore passes approximately 3m below the invert of the QMRI.
- 11.2.7 The likelihood of the auger bore causing a breach of the canal is very low. However, should the auger bore technique cause a failure of the QMRI lining system, the aperture of the auger bore would flood with the flood water reaching equilibrium at the resting water level of the QMRI (<12m AOD), consequently the water within the launch/reception sites could be greater than 2m deep presenting a hazard to construction workers. The severity of the impact of a breach is therefore large and resulting risk assessed as medium. Consequently, the contractor shall develop emergency/evacuation plans and brief staff on the actions to take in the event that water levels within the launch/reception sites begin to rise (G179).
- 11.2.8 The connectivity of the QMRI to the River Thames makes the QMRI prone to fluvial flooding. Flood risk from the QMRI is identified in the Environment Agency Flood Map for Planning. The auger bore launch and reception pits are located within Flood Zone 3.
- 11.2.9 Therefore, the likelihood of a flood event is considered to be high. The severity of flood water entering into a launch/receptor site during the works is large resulting in a high risk to construction workers. Mitigation measures associated with the auger bore beneath the QMRI would be the same as those required for mitigating risks from fluvial sources.
- 11.2.10 The contractor(s) would subscribe to the Environment Agency's Floodline service (G127) which provides advance warning of potential local flooding events to reduce the risk to the QMRI is crossed when a flood event is not forecast on the River Thames and the site would be evacuated when a flood alert is in place. Consequently the likelihood of the QMRI flooding the Order Limits is considered to be very low and the resulting risk is assessed to be medium.
- 11.2.11 Similarly, by virtue of the position of all elements of the pipeline in the vicinity of the QMRI being located below ground level, there is negligible risk to the operational phase of the pipeline from the QMRI.

Staines Reservoir Aqueduct (SRA)

- 11.2.12 The Order Limits cross the SRA at NGR: 506132 170679 via the Ashford Road. From inspection of topographic data and photographs of the SRA in the vicinity of the proposed crossing, the SRA appears to be embanked relative to surrounding ground levels. The top of bank for the SRA appears to be 14m AOD with land to the north and south lying at approximately 13m AOD.



- 11.2.13 The method proposed for crossing the SRA is trenchless (method to be determined) with launch/receptor sites near grid references NGR 506123, 170656 and NGR 506171, 170796 (150m length). Following best working practice, it is not anticipated that the crossing would affect the SRA, consequently the risk of flooding from the project is considered to be very low.
- 11.2.14 The likelihood of flooding of the project due to failure of the SRA is considered to be very low. The SRA is owned and managed by Thames Water and is subject to regular inspection and if necessary, maintenance, therefore the likelihood of failure and consequent flooding is considered to be very low. The crossing via a trenchless technique would ensure that the project would not threaten the integrity of the SRA and result in flooding to other parties. Should a breach occur, the severity of impact is considered to be large with the flood water posing a risk to construction workers and local receptors.
- 11.2.15 Similarly, by virtue of the position of all elements of the pipeline in the vicinity of the SRA being located below ground level there is negligible risk to the operational phase of the pipeline from the SRA.

11.3 Risk from the Project

Basingstoke Canal

- 11.3.1 The construction or operation phases of those parts of the project that interface with the Basingstoke Canal present a negligible potential to impact on flooding from this source or exacerbate flooding to neighbouring land uses. At the crossing location the canal is in a cutting, therefore any flooding would be confined locally (there is no pathway for flood water to affect receptors).
- 11.3.2 Considering the very low impact on flooding from Basingstoke Canal and the very low likelihood of occurrence (very low risk) no measures are proposed to mitigate the risk from the project aside from good practice mitigation set out in the REAC.

Queen Mary Reservoir Intake

- 11.3.3 The construction or operation phases of those parts of the project that interface with QMRI similarly present a negligible potential to impact on flooding from this source and exacerbate flooding to neighbouring land uses. The project does not impinge upon reservoir structures.
- 11.3.4 Considering the very low impact on flooding from QMRI and the very low likelihood of occurrence (very low risk) no measures are proposed to mitigate the risk from the project.

Staines Reservoir Aqueduct

- 11.3.5 The project would cross the SRA via a trenchless technique. Consequently, the risk of impact from the project is considered very low both during construction and operational phases.

11.4 Proposed Good Practice and Additional Mitigation

- 11.4.1 The good practice measures set out in the REAC would be secured through DCO requirements such as the CoCP. A range of mitigation measures has been incorporated to ensure that the project does not exacerbate flood risk to other parties. These include specific mitigation measures which are listed in Section 13. The implementation of these good practice and additional mitigation measures would reduce the overall risk to and from the project.
- 11.4.2 In light of the measures it is considered that the potential for the project to impact on surface water flooding during construction and exacerbate flood risk to other parties would be low.

11.5 Assessment of Risk

- 11.5.1 The assessment of risk to the project as a result of canal failure is summarised in Table 11.1. Based on the maintenance operations of the Canal and River Trust, the risk to the project is considered to be low or very low. Full details of the mitigation measures are provided in Section 13 with all of the measures summarised in Table 13.2.

Table 11.1: Canal Flood Source Impact Summary To the Project

Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (Pre-mitigation)	Mitigation Measures	Risk with Mitigation
Construction							
Basingstoke Canal	Breach of canal causing flooding of surrounding area	Construction workers	Very low	Very low	Very low	None required	Very low
Queen Mary Reservoir Intake	Breach of intake causing flooding of launch/reception site		Very low	Large	Medium	G28, G127	Low
	Flooding of launch/reception sites from River Thames		Medium	Large	Medium		



Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (Pre-mitigation)	Mitigation Measures	Risk with Mitigation
Staines Reservoir Aqueduct	Breach of aqueduct causing flooding of surrounding area		Very low	Large	Medium	None required	Low
Operation							
Basingstoke Canal	No pathway	-	Very low	Very low	Very low	None required	Very low
Queen Mary Reservoir Intake	No pathway	-	Very low	Very low	Very low	None required	Very low
Staines Reservoir Aqueduct	No pathway	-	Very low	Very low	Very low	None required	Very low

11.5.2 The risk of flooding as a result of the project is summarised in Table 11.2. The proposed crossing methods would ensure that the project would not interact with these features and therefore the overall risk has been assessed as low or very low.

Table 11.2: Canal Flood Source Impact Summary From the Project

Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (Pre-mitigation)	Mitigation Measures	Risk with Mitigation
Construction							
Basingstoke Canal	Breach of canal causing flooding of surrounding area	Various	Very low	Very low	Very low	None required	Very low
Queen Mary Reservoir Intake	Breach of intake causing flooding of surrounding area	Various	Very low	Very low	Very low	None required	Very low
Staines Reservoir Aqueduct	Breach of aqueduct causing flooding of surrounding area	Various	Very low	Very low	Very low	None required	Very low
Operation							
Basingstoke Canal	-	-	Very low	Very low	Very low	None required	Very low
Queen Mary Reservoir Intake	-	-	Very low	Very low	Very low	None required	Very low



Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (Pre-mitigation)	Mitigation Measures	Risk with Mitigation
Staines Reservoir Aqueduct	-	-	Very low	Very low	Very Low	None required	Very low



12. Water Infrastructure

12.1 Summary

- 12.1.1 Water infrastructure covers all aspects of water supply and wastewater infrastructure, including foul and surface water sewers, pumping stations, treatment works and other associated infrastructure. The failure of water supply reservoirs and their intake structures is addressed in Sections 10 and 11 respectively.
- 12.1.2 There are no publicly available sources of information defining areas at risk in the event of a breach of sewers, drainage systems or water mains. Therefore the assessment of risk is based on previous experience of working with such infrastructure.

12.2 Potential Effects

- 12.2.1 There is the potential for the excavation activities along the route of the pipeline to result in strikes of sewers, water mains and other water infrastructure, particularly in urban areas due to the higher prevalence of such features. Strikes could result in flooding and contamination issues in the case of striking a foul sewer, and flooding if a surface water sewer or water main were struck. The duration of such events is likely to be limited due to the impact, if not repaired, upon water company operations, although local receptors could be affected particularly in urban areas.

12.3 Risk to the Project

- 12.3.1 Excavations in the vicinity of all utilities would proceed with caution and on being exposed would either be protected and/or diverted to facilitate the installation of the pipeline. The likelihood of striking a sewer/drainage system or water main supply is therefore considered to be low and no further mitigation measures are proposed.
- 12.3.2 The design measures to ensure the integrity of the pipeline over its operational lifetime mean there is a very low severity of impact for flooding from sewers/ drainage systems and mains water supply infrastructure. Consequently, the risk from this source to the whole of the pipeline during operation is considered to be very low and no further mitigation measures are proposed.



12.4 Risk from the Project

- 12.4.1 Whilst the likelihood of striking water-related infrastructure is low, the severity of impact would depend on the nature of the utility and its location relative to receptors. Throughout the length of the Order Limits the nature of the infrastructure encountered (gravity sewers to pressurised foul mains and potable networks) and the sensitivity of the receptors, varies. However, the principal risk is consistent insofar as it is the flooding to property potentially requiring local evacuation. As a consequence the severity of the impact is considered to range from very low to moderate.
- 12.4.2 Services searches and scans (see ES Chapter 3 Project Description) would be undertaken prior to any excavations that would be expected to identify any below-ground water infrastructure, thereby reducing the overall risk of flooding to low. Furthermore it is anticipated that the water and sewerage undertakers would require the inclusion of protective provisions with the order regarding working arrangements to protect asset integrity.
- 12.4.3 By virtue of the position of all elements of the pipeline in the vicinity of sewers/ drainage systems and mains water supply infrastructure being located below ground level, there is negligible risk of the operational phase of the project and disposal of water from hydrotesting exacerbating flooding from this source.

12.5 Proposed Good Practice and Additional Mitigation

- 12.5.1 Full services searches and testing would be undertaken prior to breaking ground as set out in the ES Chapter 3 Project Description. Any temporary discharges to sewers during construction would require consent from the sewerage undertaker (G128) . The permissible discharge would be at such a rate so as not to increase flood risk. These arrangements would apply to any surface water or groundwater requiring disposal and to the volumes of water to be disposed of following the completion of hydrostatic testing of the pipeline.
- 12.5.2 Considering the negligible potential to impact on flood risk from sewers/drainage systems and mains water supply infrastructure during operation, no measures are proposed to mitigate the risk from the project. Consequently, the severity of impact associated with the controlled disposal of water to a local sewer is considered to be very low, with a resulting risk of low.

12.6 Assessment of Risk

- 12.6.1 A summary of the risk of flooding to, and from, the project, with and without mitigation for water infrastructure is included in Table 12.1 and Table 12.2. Full details of the mitigation measures are provided in Section 13 with all of the measures summarised in Table 13.2.

Table 12.1: Water Infrastructure Summary of Risk To the Project

Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (Pre-mitigation)	Mitigation Measures	Risk with Mitigation
Construction							
Sewers and water supply infrastructure	Strike of pipe/breach by earthworks, flooding earthworks	Construction workers	Low	Low	Low	None	Low
Operation							
Sewers and water supply infrastructure	Leak of infrastructure	Pipeline	Low	Very low	Low	None	Low

Table 12.2: Water Infrastructure Summary of Risk From the Project

Source	Pathway	Receptor	Likelihood of Occurrence	Severity of Impact	Risk (Pre-mitigation)	Mitigation Measures	Risk with Mitigation
Construction							
Sewers and water supply infrastructure	Strike of pipe/breach by earthworks	Various	Low	Very low to moderate	Low to medium	G128 and design	Low
Sewers	Disposal of water encountered or required by works	Various	High	Very low	Low	G128 and design	Very low
Operation							
Sewers and Water Supply Infrastructure	No pathway	-	Very low	Very low	Very low	None	Very low



13. Flood Risk Management and Mitigation Measures

- 13.1.1 Where the risk to or arising from the project is very low, no specific measures are considered necessary to reduce risks beyond following the good practice measures as set out in the REAC.
- 13.1.2 The REAC sets out measures that would serve to manage and further reduce the risk to and arising from the project throughout its entire length during the construction phase. A full list of measures is included in Section 13.2.
- 13.1.3 Given that the completed pipeline is entirely below ground, except for the pigging station, Alton pumping station, the Esso West London Terminal storage facility, valve compounds, cathodic protection cabinets and marker posts, the project would have a negligible impact upon flood risk in the operational stage.
- 13.1.4 The conclusion of the assessment of risk to and from the project during the construction phase has identified the need for the implementation of mitigation measures to address the potential for the project to exacerbate flood risk. This section summarises such measures which would be developed further in the detailed design stage of the project.

13.2 Proposed Mitigation Measures

- 13.2.1 The REAC (which would be implemented through DCO requirements) sets out a number of general good practice flood risk reduction measures that the contractor would be expected to implement during construction. These apply to a number of activities as follows:
- The contractor(s) would subscribe to the Environment Agency's Floodline service which provides advance warning of potential local flooding events. The contractor(s) would implement a suitable flood risk action plan which would include appropriate evacuation procedures should a flood occur or be forecast (G127).
 - Construction workers would undergo training to increase their awareness of environmental issues. Topics would include but not be limited to:
 - dust management and control measures;
 - location and protection of sensitive environmental sites and features;
 - adherence to environmental buffer zones;
 - noise reduction measures;
 - working with potentially contaminated materials;
 - flood risk response actions; and
 - agreed traffic routes, access points (G28); and
 - (W1) The extent of Flood Zone 3 and risk of flooding from surface water (RoFSW) would be identified and marked where appropriate.

13.2.2 In addition to these project-wide measures the following sections provide measures or design approaches to specific elements to mitigate flood risk impacts.

Compounds and Logistics Hubs Drainage

13.2.3 A sequential approach was adopted for the location of compounds and logistics hubs. When all environmental constraints (and the additional traffic movements that would result, should all compounds be located outside Flood Zone 3) are taken into account, this is considered to be the optimum approach. There are three proposed compounds located within Flood Zone 3 as summarised in Table 13.1.

Table 13.1: Construction Compounds Within Flood Zone 3

Ref	Compound/Hub	Easting	Northing
09	Frimley Green Road Compound (partial, 5%)	487987	157719
22	Mead Lane Compound	505589	166046
34	Shepperton Road Compound North (partial)	505708	168470

13.2.4 The proposed mitigation measures are collated at the end of this section in Table 13.2. The table includes the reference number for each measure, which has been referred to throughout this document.

13.2.5 To minimise any impact upon flood risk, the following measures would be implemented at compounds located within Flood Zone 3:

- Screening and fencing within logistics hubs and construction compounds would be designed to reduce impedance of flood water. Subject to any commitments regarding great crested newts (W2).
- Where new or additional surfacing is required on any access tracks and compound areas, these would be permeable surfaces where ground conditions allow (G126).
- Temporary buildings within Flood Zone 3 and high and medium (RoFSW) would be elevated above the 1 in 10 (10%) AEP event peak water level, or, a minimum of 300mm if this is not practicable (W3).
- The contractor(s) would subscribe to the Environment Agency’s Floodline service which provides advance warning of potential local flooding events. The contractor(s) would implement a suitable flood risk action plan which would include appropriate evacuation procedures should a flood occur or be forecast (G127).
- Topsoil and subsoil would be stockpiled for as short a duration as practicable within Flood Zone 3 and RoFSW high and medium areas (W5).

Watercourse Crossings

13.2.6 The design of temporary watercourse crossings would be developed during the detailed design phase of the project. The intention would be to incorporate the following elements into the design of these temporary crossings to reduce the risk of exacerbating flood risk:



- Afflux at temporary main river and ordinary watercourse crossings would be maintained at less than 100mm (W4).
- Headwalls to temporary circular culverts would be constructed to the appropriate standard (G182).
- Natural substrate would be provided through temporary watercourse crossings box culverts (G183).

Trench Excavation and Soil Stockpiling

- 13.2.7 The excavation of the pipeline trench would require the temporary storage of topsoil and subsoil. Following pipe installation, the trench would then be backfilled with suitable subsoil arisings. To reduce vehicle movements and to reduce the risk of soil mixing, it is proposed to store these materials adjacent to the trench.
- 13.2.8 Consideration has therefore been given as to how this can be undertaken while maintaining existing flow paths and avoiding the compartmentalisation of the floodplain. Wherever practicable, stockpiles would be located outside Flood Zone 3 (e.g. the crossing of the Ively Brook), however, given the wide expanse of such areas in the River Thames floodplain, such opportunities are limited in this location. As a result, the following approaches are proposed to minimise the potential of exacerbating flood risk:
- Topsoil and subsoil would be stockpiled for as short a duration as practicable within Flood Zones 3 and RoFSW high and medium areas (W5).
 - Stockpiles would not be located within 10m of any Main Rivers or Ordinary Watercourse crossings (G184).
 - Stockpiles in Flood Zone 3 or areas of high or medium surface water flood risk would not exceed 25m between breaks. Breaks in between stockpiles would be at least 5m. Breaks would be located opposite each other on either side of the excavation where practicable (W6).
 - Stockpiles would not be stored within Ively Brook Flood Zone 3, east of the A327 (W7).
- 13.2.9 Constrained working widths within urban areas (where the proximity of receptors is greatest) would limit opportunities to retain arisings at the excavation location. Consequently, there is an increased likelihood that material excavated would require off-site disposal, i.e. material excavated when laying pipelines in or across roads cannot be reused. This would reduce the potential for arisings to either disrupt surface water flow paths or reduce floodplain storage. In such locations the proposed development would again have negligible potential to impact on flooding.

Temporary Haul Roads and Access Tracks

- 13.2.10 Haul roads would be formed through most of the working area. Where soils are suitable, the haul roads would be formed from the exposed subsoil. Soil binders may be used to with the landowner's consent.



- 13.2.11 The construction of access routes for plant and materials would require the stripping of topsoil and the provision of soil binder, crushed stone or bogmats to provide a stable surface for plant. Such routes should not become compacted and consequently impermeable because the intention is that vehicle movements would be limited as the pipeline installation progresses. However, it is acknowledged that there is a risk of the ground becoming compacted due to the movement of plant, reducing its permeability. In such circumstances and where appropriate, cross-fall would be installed on access and haul roads, to direct runoff away from the pipeline trench (G186).
- 13.2.12 Temporary haul and access road construction material within Flood Zone 3 and high and medium (RoFSW) would be removed at the end of the construction phase and the ground surface would be reinstated to pre-project levels (G185).

Pigging Station

- 13.2.13 The pigging station would be the only sizeable above-ground feature during the operation phases (other features would be limited to valves, pressure transducer, marker posts and cabinets). The station would be at negligible risk of flooding and consequently would not exacerbate risk to other parties because it is located:
- in Flood Zone 1 (very low risk) for fluvial and coastal and tidal sources;
 - within an area with a less than 1 in 1,000 (0.1%) annual probability of flooding from surface water;
 - in an area with a limited potential for groundwater flooding;
 - outside any area at risk from reservoir flooding; and
 - in a rural area and sufficiently far from water infrastructure, reservoirs and canals, as not to be at significant risk.
- 13.2.14 The pigging station would include an impermeable concrete surface. Given the local geology is clay, silt and sand and the size of the station it would not produce a significant increase in runoff from the existing state. Runoff would flow towards arable agricultural land and infiltrate to ground.

13.3 Groundwater

- 13.3.1 Where required, water stops or 'stanks' would be installed at intervals through the pipe bedding and side fill (O7) in order to intercept groundwater flowing along the pipeline bedding material and prevent the creation of new groundwater flow paths.

13.4 Summary

13.4.1 A summary of the proposed mitigation measures is included in Table 13.2.

Table 13.2: Summary of Proposed Good Practice and Additional Mitigation Measures

Ref	Measure	Applicable Location
G127	The contractor(s) would subscribe to the Environment Agency's Floodline service which provides advance warning of potential local flooding events. The contractor(s) would implement a suitable flood risk action plan which would include appropriate evacuation procedures should a flood occur or be forecast.	General/site-wide
G28	Construction workers would undergo training to increase their awareness of environmental issues. Topics would include but not be limited to: <ul style="list-style-type: none"> • dust management and control measures; • location and protection of sensitive environmental sites and features; • adherence to environmental buffer zones; • noise reduction measures; • working with potentially contaminated materials; • flood risk response actions; and • agreed traffic routes, access points. 	General/site-wide
W1	The extent of Flood Zone 3 and risk of flooding from surface water (RoFSW) would be identified and marked where appropriate.	Flood Zone 3 and high, medium RoFSW areas
W2	Screening and fencing within logistics hubs and construction compounds would be designed to reduce impedance of flood water. Subject to any commitments regarding great crested newts.	Compounds and Hubs
G126	Where new or additional surfacing is required on any access tracks and compound areas, these would be permeable surfaces where ground conditions allow.	Compounds and Hubs
W3	Temporary buildings within Flood Zone 3 and high and medium (RoFSW) would be elevated above the 1 in 10 (10%) AEP event peak water level, or, a minimum of 300mm if this is not practicable.	Compounds and Hubs
W4	Afflux at temporary Main River and Ordinary Watercourse crossings would be maintained at less than 100mm.	Watercourse crossings
G182	Headwalls to temporary circular culverts would be constructed to the appropriate standard.	Watercourse crossings
G183	Natural substrate would be provided through temporary watercourse crossings box culverts.	Watercourse crossings
W5	Topsoil and subsoil would be stockpiled for as short a duration as practicable within Flood Zones 3 and RoFSW high and medium areas.	Flood Zone 3 and high, medium ROFSW areas
G184	Stockpiles would not be located within 10m of any Main River or Ordinary Watercourse crossings.	Watercourse crossings
W6	Stockpiles in Flood Zone 3 or areas of high or medium surface water flood risk would not exceed 25m between breaks. Breaks in between stockpiles would be at least 5m. Breaks would be located opposite each other on either side of the excavation where practicable.	Flood Zone 3 and high, medium ROFSW areas



Ref	Measure	Applicable Location
W7	Stockpiles would not be stored within Ively Brook Flood Zone 3, east of the A327.	Ively Brook
G185	Temporary haul and access road construction material within Flood Zone 3 and high and medium (RoFSW) would be removed at the end of the construction phase and the ground surface would be re-instated to pre-project levels.	Haul and access roads
G186	Where appropriate cross-fall would be installed on access and haul roads to direct runoff, away from the pipeline trench.	Haul and access roads
W8	Works on the Cove Brook FSA would be scheduled taking advantage of long-term forecasts making use of dry weather conditions.	Cove Brook FSA
W9	The Cove Brook flood storage area (FSA) embankment dam would be reinstated to its former condition as soon as is practicable.	Cove Brook FSA
O7	Where required, water stops (or “stanks”) would be installed at intervals through the pipe bedding and side fill.	Areas of potential for groundwater flooding to occur at the surface (BGS Area ‘C’)



14. Residual Risks

- 14.1.1 While the project includes measures to ensure it does not exacerbate existing levels of flood risk during its construction phase, a residual risk of flooding remains. The project could experience a significant flood event that exceeds the capacity of the mitigation measures included in the project. There are no residual risks during the operational phase as the majority of works are below ground.
- 14.1.2 The impact of such an occurrence of an extreme event would be ameliorated by the application of the following measures (from Table 13.2):
- The contractor(s) would subscribe to the Environment Agency's Floodline service which provides advance warning of potential local flooding events. The contractor(s) would implement a suitable flood risk action plan which would include appropriate evacuation procedures should a flood occur or be forecast (G127).
- 14.1.3 In the event of an extreme rainfall event the construction works would have a negligible impact on existing flood risk in urban areas, given the predominantly impermeable nature of such areas. In rural areas, the set out in the REAC would consider the potential runoff from haul and access roads. Temporary measures such as straw bales could be placed across tracks with a gradient to attenuate runoff and direct it to vegetated areas at the side.
- 14.1.4 The project is not within an area that is protected by flood defences. Consequently there is no residual risk to the project should a defence fail.



15. Conclusions

- 15.1.1 This FRA has been undertaken to assess the project's potential to be impacted by flood risk and to increase flood risk elsewhere. In doing so, this FRA complies with NPS EN-1 and EN-4 with respect to flood risk. It includes an assessment of the risk of flooding to the project and the project's potential impact upon flood risk to other parties.
- 15.1.2 The construction phase to install and commission the pipeline are expected to last from grant of DCO until 2023, therefore the likelihood of flood events occurring during such a window is significantly reduced compared to the assumed 60-year operational phase – see Section 4.2.
- 15.1.3 The FRA provides an assessment of impact during construction and operation. It is assessed that unmitigated, the construction phase could increase flood risk elsewhere. Consequently good practice and additional mitigation measures have been incorporated and subsequently the FRA demonstrates that with their inclusion the project would not exacerbate flood risk. The project has been assessed as having a negligible impact upon flood risk during its operational phase, primarily because most of the project is below ground. The only significant works above ground would be the pigging station which would not significantly alter existing drainage patterns. Additionally it would be located within an area of low or very low risk (subject to source assessed) and is therefore not considered to have a significant impact upon flood risk.
- 15.1.4 The assessment of impact is based on the product of the likelihood of a flood event occurring and the consequence (severity of impact) producing a classification of risk for all sources of flooding to and from the project. The assessment comprises both pre- and post-mitigation, demonstrating how the embedded mitigation and working practices would ensure the project does not exacerbate flood risk during construction and operation.

15.2 Construction Phase

Coastal and Tidal Flood Risk

- 15.2.1 The project is not located within an area at risk of coastal or tidal flooding.

Fluvial Flood Risk

- 15.2.2 Where the route crosses areas of Flood Zones 1 and 2 the risk to the project is assessed as very low and low respectively, primarily due to the low likelihood of occurrence during the construction period. For example, there is a 0.002 probability of a 1 in 1,000 (0.1%) AEP event; the equivalent of Flood Zone 2, occurring during the construction period. In areas of Flood Zone 3 the risk to the project has been assessed as high. Good Practice and additional mitigation measures have therefore been included when the risk has been assessed as medium or high.



- 15.2.3 A further key consideration prior to that of embedded mitigation for the project, is the likely working approach. While the total construction period is assumed to be two years, this does not mean that the entire route would be active for this whole period of time. The intention is that the pipeline would be installed in multiple locations concurrently to provide construction flexibility. Therefore, when considering a watercourse or area of elevated flooding likelihood, the presence of the works is likely to be measured in days/weeks. Consequently the assessed risk referred to in Table 4.1 and 15.2.2 is an absolute worst-case and the actual probability of occurrence is significantly lower for any specific watercourse crossing.
- 15.2.4 The project route includes 98 watercourse crossings. Each crossing has been assessed for the potential for flooding to affect the project and for temporary watercourse crossings to exacerbate flood risk elsewhere.
- 15.2.5 Temporary watercourse crossings have the potential to reduce channel conveyance capacity and therefore exacerbate flood risk to local receptors. The sizing of culverts beneath watercourse crossings would be developed during the detailed design phase of the project, however this FRA provides criteria that would ensure no increase to flood risk (see Section 13.2).
- 15.2.6 When crossing floodplains, the arisings from the pipeline trench and haul roads would be temporarily stored in the floodplain. This has the potential to increase flood risk by reducing floodplain storage capacity, compartmentalising the floodplain, placing obstacles within the route of flood water and reducing conveyance capacity due to the entrainment and deposition of soil in the river and drainage network. The embedded mitigation measures developed for watercourse crossings to reduce this risk to workers and plant are included in Section 13. As a result of the incorporation of the good practice and additional mitigation measures, the risk is reduced to low or very low.
- 15.2.7 The route crosses a number of areas of Flood Zone 3 and the project would temporarily store soil within such areas. The intention would be to excavate and backfill the pipeline trench and working areas as the installation progresses. Topsoil and subsoil would be stockpiled for as short a duration as practicable within Flood Zones 3 areas, reducing the time period of storage of soil within Flood Zone 3 (see Section 15.2.3). An assessment has been made of such locations and the overall risk of impact is considered to be low based on the scale of impact and the proposed mitigation measures:
- storing excavated material outside Flood Zone 3 attributed to Ively Brook (W7);
 - installation of the pipeline through the Cove Brook FSA to maintain the integrity of the embankment dam and reinstate it to its former condition as soon as is practicable (W9); and
 - the proportion of soil stored within the Thames floodplain following reinstatement of the working areas and trench is very small compared to the overall volume of Flood Zone 3.



- 15.2.8 A series of measures is proposed to ensure that the project (workers and plant) are not placed at risk of fluvial flooding. The contractor(s) would subscribe to the Environment Agency's Floodline service which provides advance warning of potential local flooding events. The contractor(s) would implement a suitable flood risk action plan which would include appropriate evacuation procedures should a flood occur or be forecast (G127).

Surface Water Flood Risk

- 15.2.9 The risk to the project of surface water flooding has been assessed as low for all locations except where it traverses areas at risk from a 1 in 30 (3.3%) AEP event where the unmitigated risk to the project has been assessed as high.
- 15.2.10 Similarly to fluvial flood risk, the project has the potential to increase surface water flood risk by impeding flow routes through the temporary storage of materials in areas predicted to flood, thereby increasing flood risk to receptors upstream or redirecting flows to areas not predicted to be at risk. Good practice and additional mitigation measures are therefore included in the project as listed in Section 13.2 to ensure the works do not exacerbate flood risk which reduces the assessed risk to low.
- 15.2.11 The proposed good practice and additional mitigation measures would ensure existing predicted flow paths are maintained. Similarly to fluvial flood risk, the contractor would sign up for flood warning alerts and avoid working in risk areas at times of greatest risk of when an event is predicted, in order to protect workers and plant. With the consideration of these measures the risk of surface water flooding impacting the project or increasing the risk to third parties would be reduced to low or very low.

Groundwater Flood Risk

- 15.2.12 The risk to the project from groundwater flooding has been assessed as either low or very low due to slow onset and low velocities normally associated with groundwater flooding. In the event of prolonged groundwater flooding, work would cease in inundated areas, until either the groundwater is pumped out or levels recede naturally and operations can resume safely.
- 15.2.13 The project could exacerbate groundwater flood risk elsewhere through dewatering although this would only be in isolated locations and the duration of the excavations would be sufficiently short not to exacerbate flood risk to third parties. Stanks along the pipeline in groundwater-prone areas would prevent the creation of a preferential flowpath along the pipeline bedding during the operational phase (O1). The risk of groundwater flooding from the project is therefore assessed as low or very low.



Reservoir Failure

- 15.2.14 The project traverses six areas that are predicted to flood in the event of a reservoir breach (see Table 10.1). Five of these are relatively limited in extent and are similar to the predicted fluvial risk zones as the project is some distance from their sources and by the point they interact, local topography has restricted the flood extent to the river valley. However, there are a number of reservoirs in West London that collectively place an extensive area at risk of reservoir flooding should a breach occur.
- 15.2.15 The risk to the project from reservoir failure has been assessed as very low for the construction phase. While the severity of impact could be large should a reservoir failure occur, because such structures are subject to a rigorous inspection regime under the Reservoirs Act 1975, failure is considered to be extremely unlikely.
- 15.2.16 The project is not expected to have any impact upon reservoir flood risk. Any works in the vicinity of a reservoir would be undertaken a suitable distance away from the toe so as not to risk a failure. Should a breach event occur any works within the predicted flow path would be relatively minor and would therefore not exacerbate existing levels of risk to other parties.

Canal Flooding

- 15.2.17 The project is located in the vicinity of the Basingstoke Canal, the QMRI and the SRA. Canal embankment failure could place the project at risk of flooding during the construction phase. The Basingstoke Canal is crossed where it is in a cutting, restricting the extent of inundation should a breach occur; also similarly to reservoir failure, these structures are regularly inspected and maintained therefore the risk of such an occurrence during the construction phase is considered low.
- 15.2.18 The crossing of the one canal and two canal-like structures would be via a trenchless technique and consequently the risk of impact on flood risk from the project during construction has been assessed as very low as a result of the construction practices to avoid a clash between the pipeline and canals.

Water Infrastructure Failure

- 15.2.19 The overall risk to and from the project has been assessed in relation to water infrastructure (e.g. water mains, sewers, pumping stations). The proposed good practice and additional mitigation measures, including services searches and scanning prior to excavation, and the fact that the project is predominantly located in rural areas, would significantly reduce the risk of a clash with the pipeline. The risk of impact both to and from the project has therefore resulted in an assessment of very low.

Project Drainage

- 15.2.20 Compounds and storage hubs would not be positively drained and would consist of a pervious crushed stone surface underlain by a geotextile membrane.



15.2.21 Haul and access roads would not be positively drained. The intention would be that they would be permeable, however it is recognised that they could become compacted due to the movement of plant during the construction period, reducing their permeability. Haul roads would be retained for as long as required by the project for installation of the pipeline, however the intention would be to reinstate as soon as practicable. Traffic movement along the haul road is likely to reduce where the pipeline has been installed with an associated reduction in the risk of compaction. Where necessary these roads would be designed to ensure they shed rainfall to existing vegetated areas either side, where the runoff would infiltrate via the retained topsoil layer.

15.3 Operational Phase

15.3.1 Above-ground works in the operational phase are limited to the pigging station (for the insertion and retrieval of pipeline inspection gauges), small cabinets for CP, valves, pressure transducer and pipeline marker posts.

15.3.2 The pigging station is located near Boorley Green in an area at low risk of flooding – it is within Flood Zone 1 and is at less than 1 in 1,000 (0.1%) AEP of surface water flooding and is not at risk from other sources. The pigging station would be a fenced compound with an impermeable surface with a small bunded area around the pipeline inlet and outlet points, to contain any liquids on the pipeline inspection gauges. Given the relatively small area of impermeable area involved, the station would not be positively drained, with rainfall running off as it would at present.

15.3.3 Where required, stanks would be installed in the pipeline trench bedding material to prevent the conveyance of groundwater flows (O1).

15.3.4 The risk to and from the project in the operational phase is therefore considered to be very low and no specific mitigation measures are proposed.

15.3.5 A summary of the risk of impact to and from the project, pre- and post-mitigation is included in Table 15.1. It should be noted that this summary table represents the worst-case assessment based on the areas identified to have the highest risk associated with each flood source.

Table 15.1: Summary of Flood Risk Impact

Source	Construction Phase Risk		Operational Phase Risk	
	Unmitigated	Post-mitigation	Unmitigated	Post-mitigation
Tidal/coastal	Very low	Not required	Very low	Not required
Fluvial	High	Low	Low	Very low
Surface water	High	Low	Very low	Very low
Groundwater	Low	Low	Low	Very low
Reservoirs	Medium	Low	Very low	Very low
Canals	Medium	Low	Very low	Very low



Source	Construction Phase Risk		Operational Phase Risk	
	Unmitigated	Post-mitigation	Unmitigated	Post-mitigation
Water infrastructure	Medium	Low	Very low	Very low

15.4 Sequential and Exception Tests

- 15.4.1 Under NPS EN-1 the project is subject to the Sequential Test. The project crosses Flood Zone 3 and therefore is also subject to the Exception Test.
- 15.4.2 Many factors and design principles have influenced the development of the pipeline route. Additionally, flood risk is one of a number of environmental constraints on the project which further restrict where it could be located to avoid detrimental impact upon the environment. Consequently the pipeline cannot be located wholly within the Flood Zone of lowest risk.
- 15.4.3 The Exception Test requires that:
- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk;
 - the project should be on developable, previously developed land or, if it is not on previously developed land, that there are no reasonable alternative sites on developable previously developed land subject to any exceptions set out in the technology-specific NPSs; and,
 - a FRA must demonstrate that the project will be safe, without increasing flood risk elsewhere subject to the exception below and, where possible, will reduce flood risk overall.
- 15.4.4 This FRA demonstrates compliance with the three parts of the Exception Test. The provision of a new pipeline between Southampton and West London reduces vehicle movements as the alternative would be to tanker the fuel, increasing congestion and pollution. The need for the pipeline is described in detail in Section 1.1 of the Sequential and Exception Test report included as Appendix A. This FRA demonstrates that the project would not have a significant impact on flood risk for its assumed 60-year operational lifetime.



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Appendix A. Sequential and Exception Tests Report



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Southampton to London Pipeline

Esso Petroleum Company, Limited

Appendix A - Sequential and Exception Tests Report

B2325300-JAC-ENV-APP-000059

May 2019



Southampton to London Pipeline Project

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Document Title: Appendix A Sequential and Exception Tests Report
Document No.: B2325300-JAC-ENV-APP-000059
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Client Name: Esso Petroleum Company, Limited

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1 Introduction

- 1.1.1 This appendix to the project Flood Risk Assessment (FRA) demonstrates how the flood risk Sequential Test and Exception Test for the selection of the Southampton to London Pipeline Project ('the project') route has been applied.

1.2 The Need

- 1.2.1 Esso Petroleum Company, Limited (Esso) is making an application for development consent to replace 90km (56 miles) of its existing 105km (65 miles) aviation fuel pipeline that runs from the Fawley Refinery near Southampton, to the Esso West London Terminal storage facility in Hounslow. The replacement pipeline is 97km (60 miles) long. The replacement is referred to as the project within this report.
- 1.2.2 The existing pipeline was built between 1969 and 1972. It was originally installed to transport a type of oil used by large industrial facilities and oil-fired power stations. During the 1980s when natural gas became more widely available in the UK, the need for this type of heating fuel dwindled. With the subsequent growth of air travel, the pipeline was then used to transport aviation fuel.
- 1.2.3 The existing pipeline is working adequately, but the need for inspections and maintenance is increasing. Esso is undertaking the project now to allow sufficient time to gain approval and install the replacement, while maintaining the safe and secure movement of fuel along the existing pipeline.
- 1.2.4 This Sequential and Exception Tests Report relates to the project route at application for Development Consent Order.

1.3 Project Description

- 1.3.1 A description of the project is included in Section 1 of the FRA. A location plan is included as Figure A1.

1.4 National Policy Statements for Energy

- 1.4.1 National Policy Statement (NPS) EN-1 sets out the Government's overarching policy with regard to the development of NSIPs in the energy sector. It outlines the high-level objectives, policy and regulatory framework. It states that where an energy project is greater than 1ha in area, located within Flood Zone 2 or Flood Zone 3 (see Section 7 of the FRA for a definition of these areas) or subject to sources of flooding other than from rivers or the sea, a FRA will be required.
- 1.4.2 Section 5.7.9 of EN-1 further sets out that applications will be expected to show that the development is supported by an FRA, that the Sequential Test has been applied in site selection, that a sequential approach has been taken to minimise risk within the site and that in areas of flood risk the site is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed for the lifetime of the development.



1.5 National Planning Policy Framework

- 1.5.1 The Revised National Planning Policy Framework (NPPF, 2018) sets out the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so.
- 1.5.2 The NPPF does not contain specific policies for NSIPs. These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant NPS for major infrastructure, as well as any other matters that are relevant (which may include the NPPF).

1.6 Planning Policy Regarding the Sequential Test

- 1.6.1 The NPS EN-1 refers to the Sequential Test (Section 5.7.13) which aims to steer new development away from areas of highest flood risk (Flood Zone 3) progressing towards the lowest designation (Flood Zone 1). Preference should be given to locating projects in Flood Zone 1 in England and if there is no reasonably available site in Flood Zone 1 then projects can be located in Flood Zone 2. If there is no reasonably available site in Flood Zones 1 or 2, then nationally significant energy infrastructure projects can be located in Flood Zone 3 subject to the Exception Test. Consideration of alternative sites should take account of the policy on alternatives set out in Section 4.4 of NPS EN-1.

1.7 Planning Policy Regarding the Exception Test

- 1.7.1 Section 5.7.14 of EN-1 states that if, following application of the sequential test, it is not possible, consistent with wider sustainability objectives, for the project to be located in zones of lower probability of flooding than Flood Zone 3, the Exception Test can be applied. The test provides a method of managing flood risk while still allowing necessary development to occur.
- 1.7.2 The Exception Test has to pass three elements for the development to be consented:
- it must be demonstrated that the project provides wider sustainability benefits to the community that outweigh flood risk;
 - the project should be on developable, previously developed land or, if it is not on previously developed land, that there are no reasonable alternative sites on developable previously developed land subject to any exceptions set out in the technology-specific NPSs; and
 - an FRA must demonstrate that the project will be safe, without increasing flood risk elsewhere subject to the exception below and, where possible, will reduce flood risk overall.
- 1.7.3 NPS EN-4 specifically relates to gas supply infrastructure and gas and oil pipelines. In addition to the guidance in EN-1, EN-4 states generally that applicants should show how the proposal would be resilient to an increased risk of flooding due to climate change.



- 1.7.4 With specific reference to gas and oil pipelines, EN-4 notes that constructing pipelines creates corridors of surface clearance and excavation that can potentially affect watercourses, aquifers, water abstraction and discharge points, areas prone to flooding and ecological receptors. Pipeline impacts could include inadequate or excessive drainage, interference with groundwater flow pathways, mobilisation of contaminants already in the ground, the introduction of new pollutants, flooding, disturbance to water ecology, pollution due to silt from construction and disturbance to species and their habitats. Impacts during construction should be avoided as far as possible through route selection or mitigated if unavoidable and ground should be reinstated after construction.



2 Compliance with the Sequential Test

- 2.1.1 This section demonstrates that a sequential approach has been undertaken in planning the route with respect to flood risk in accordance with NPS EN-1.
- 2.1.2 As set out in the NPS EN-1, the aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. The fluvial flood zones are the starting point for this sequential approach. Flood Zones 2 and 3 are indicated on the Environment Agency Flood Map for Planning (Environment Agency, 2019) with Flood Zone 1 being all the land falling outside Zones 2 and 3. These flood zones refer to the probability of sea and river flooding only, ignoring the presence of existing defences.
- 2.1.3 Where the proposed development has not been included in a Strategic Flood Risk Assessment (SFRA) developed by the Local Planning Authority, the Sequential Test should be based on the Environment Agency flood zones. The project covers such a wide area and a number of diverse SFRA's the assessment is based on Environment Agency Flood Zones.
- 2.1.4 The format has been developed to demonstrate compliance of the project with the Sequential and Exception Tests as set out by NPS EN-1.

Stage 1 - Strategic application

- Has the Sequential Test already been carried out for this development at Local Plan level? If yes, reference should be provided for the site allocation and Local Plan document in question.

2.1.5 No.

- Does the proposed development pass the Sequential Test as defined by Section 5.7.13 of NPS EN-1?

- 2.1.6 In accordance with NPS EN-1 Section 5.7.13, the route passes the Sequential test in Flood Zones 1 and 2 but that the Exception Test needs to be passed for areas of the route within Flood Zone 3.
- 2.1.7 Figure A2 indicates the extent of the proposed route that falls within Flood Zones 2 and 3.

Stage 2 - Defining the Evidence Base

2.1 State the geographical area over which the test is to be applied

2.2 If greater or less than the district boundary justify why the geographical area for applying the test has been chosen

- 2.1.8 The following three key geographical constraints informed the creation of the longlist of potential corridor options for the replacement pipeline:



- the existing aviation fuel pipeline had already been renewed between Hamble and Boorley Green in Hampshire. Therefore, the pipeline must begin at Boorley Green;
- the replacement pipeline must be routed via the existing pumping station facility at Alton to connect to existing infrastructure; and
- the replacement pipeline must terminate at the West London Terminal storage facility.

2.1.9 These constraints split the replacement pipeline into two geographic areas, south of Alton and north of Alton, and on this basis it was decided that creation of a longlist of corridor options would be progressed separately for the north and south areas.

2.3 Identify the source or reasonable available sites

2.1.10 A longlist of seven corridors to the south of Alton Pumping Station (corridor references A-G), and ten to the north of Alton Pumping Station (corridor references H and J-R) was developed. Constraints taken into account included existing settlements and infrastructure, and environmental designations and features. Further details can be found in ES Chapter 4 Design Evolution (**application document 6.2**).

2.1.11 Before sifting the longlist, the 17 corridors were reviewed again and updated where there were opportunities to take account of any additional environmental, planning and engineering information. This included early consultee feedback.

2.1.12 The longlist corridors were then sifted in accordance with the adopted methodology in a multi-disciplinary workshop. As a result of the longlist sifting process, the following six corridors were taken forward to the shortlist presented to consultees in the corridor consultation (non-statutory) in March/April 2018:

- South of Alton: Options D, F and G; and,
- North of Alton: Options J, M and Q.

2.1.13 The primary reasons for taking these options forward to the shortlist are outlined in Table 2.1. These six-shortlisted corridors are considered to be the relevant strategic options for Sequential Testing as shown in Figure A3.

Table 2.1: Corridors Taken Forward to Shortlist

Corridor	Primary Reasons for Progression to the Shortlist
South	
D	Shares the same alignment as Option G until West Tisted. At this point this corridor travels northeast, skirting to the south of Lasham. This is to avoid Chawton Wood and Bushy Leaze Wood. It then approaches Alton Pumping Station from the west. In common with Option F, this is one of the shortest corridors within the SDNP.
F	This corridor avoids development areas to the north of Alton. This corridor shares the same alignment as Option G until West Tisted. At this point, this corridor travels

2.2 If greater or lesser than the district boundary justify why the geographical area for applying the test has been chosen



Corridor	Primary Reasons for Progression to the Shortlist
	northeast, skirting to the northern edge of Four Marks. In common with Option D, this is one of the shortest corridors within the SDNP.
G	Developed to follow the existing aviation fuel pipeline where feasible, to make best use of existing infrastructure and landowner and stakeholder relationships. The corridor avoids Ancient Woodland, and its alignment through Hampshire and Surrey has taken account of features that were not built or protected in the 1960s, when the existing pipeline was built.
North	
J	Developed to follow the existing aviation fuel pipeline where feasible, to make best use of existing infrastructure and landowner and stakeholder relationships. Its alignment through Hampshire and Surrey has taken account of features that were not built in the 1960s, when the existing pipeline was built.
M	Developed to avoid national and European designated sites that Option J passes through. It also avoids the SDNP, that Option Q passes through.
Q	Developed to avoid national and European designated sites that Option J passes through, as well as to avoid the community of Farnham that Option M passes through. This corridor follows the route of another Esso pipeline, along a route through Alice Holt Forest and within the SDNP.

2.4 State the method used for comparing flood risk between sites

- 2.1.14 The linear nature of the development makes it appropriate to consider the possible route corridors between Boorley Green and at Esso's West London Terminal storage facility without being constrained to district boundaries.
- 2.1.15 The Sequential Test has been applied to the six corridors using the Environment Agency Flood Map for Planning (Environment Agency, 2019). This flood map includes flooding from fluvial and coastal sources. However, the project routes are not at risk from coastal/tidal sources of flooding. Consideration is also given to flooding from:
- Surface water;
 - Reservoir flooding;
 - Canal flooding;
 - Groundwater; and
 - Water mains / sewer pipes.

Stage 3 - Applying the Sequential Test

Compare the reasonably available sites identified under stage 2 with the application site. Sites should be compared in relation to flood risk; Local Plan status; capacity; and constraints to delivery including availability, policy restrictions, physical problems or limitations, potential impacts of the development, and future environmental conditions that would be experienced by the inhabitants of the development.

3.1 State the name and location of the reasonably available site options being compared to the application site.



2.1.16 The six sites being compared in the Sequential Test are the six corridors D, F, G, J, M and Q as shown in Figure A3 which shows the six route corridors on the Environment Agency Flood Zone mapping. Figure A4 shows the preferred route overlaid on the route corridors and Flood Zone mapping.

3.2 Indicate whether flood risk on the reasonable available options is higher or lower than the application site. State the Flood Zone or SFRA classification for each site.

2.1.17 An assessment has been made of the area of each corridor within each of the three flood zones, based on published Flood Zones 2 and 3 (Flood Map for Planning, Environment Agency 2019). However, it should be noted that, once installed, the pipeline would be buried, and therefore the project would be at low or very low risk of flooding.

2.1.18 To the south of Alton, the preferred corridor G has the highest area of encroachment into Flood Zones 2 and 3 of the routes considered (see Table 2.2.2). However, compared to the area of the route encroaching into the Flood Zones to the north of Alton these areas are relatively small. The preferred route corridor J to the north of Alton has significantly less area within Flood Zone 2 and Flood Zone 3 (Table 2.2.3) than other options.

Table 2.2.2: Corridor Areas Within Respective Flood Zones – South of Alton

	Corridor D	Corridor F	Corridor G
Corridor area (ha)	1,295	1,081	1,094
Area within Flood Zone 2 (ha)	6	17	22
Area within Flood Zone 3 (ha)	2	10	14

Table 2.2.3: Corridor Areas Within Respective Flood Zones – North of Alton

	Corridor J	Corridor M	Corridor Q
Corridor area (ha)	1,814	1,808	1,758
Area within Flood Zone 2 (ha)	310	459	487
Area within Flood Zone 3 (ha)	147	287	303

3.3 State whether the reasonably available options being considered are allocated within the Local Plan. Confirm the status of the Plan.

2.1.19 The possible corridors extend across the boundaries of nine Local Authorities:

- Eastleigh Borough Council;
- Winchester City Council;
- South Downs National Park Authority;
- East Hampshire District Council;
- Hart District Council;
- Rushmoor Borough Council;



- Surrey Heath Borough Council;
- Guildford Borough Council;
- Waverley District Council;
- Woking Borough Council;
- Runnymede Borough Council; and
- Spelthorne Borough Council.

2.1.20 Due to its nature, the project is not allocated within any of the Local Plans.

3.4 State the approximate capacity of each reasonably available site being considered. This should be based on:

- the density policy within the Local Plan, and past performance in this respect.

2.1.21 Not Applicable – density primarily refers to housing.

3.5 Detail any constraints to the delivery of identified reasonably available options; for example, availability within a given time period or lack of appropriate infrastructure. This part of the test should include recommendations on how these constraints could be overcome and when.

2.1.22 The selection of the preferred corridor and subsequently the preferred route and then the final route has been influenced by many environmental, technical and economic factors of which flood risk is just one.

2.1.23 The choice of corridors was restricted by the start and end points being fixed at Boorley Green and the Esso West London Terminal in Hounslow, with the added requirement to pass through the existing Esso pumping station at Alton. Of the six-feasible main corridors, the preferred corridor is the most practicable combining the best of the possible corridors between these fixed points taking into account the technical, environmental constraints, public consultation responses and flood risk.

2.1.24 No reasonably available route was technically or economically feasible that entirely avoids encroaching into Flood Zone 3. The preferred route follows the most acceptable route taking into account the relevant constraints identified during the appraisal.

Sequential Test Conclusion

Are there any reasonably available sites in areas with a lower probability of flooding that would be appropriate?



3 The Exception Test

Exception Test - Where necessary, the Exception Test should now be applied in accordance with NPS EN-1.

Applying the sequential approach at site level In addition to the formal Sequential Test, the NPS EN-1 sets out the requirement for the sequential approach (see Section 5.7.9, third bullet point and Section 5.7.23) to locating development within the site. In determining an application for development consent, the IPC should be satisfied that where relevant a sequential approach has been applied at the site level to minimise risk by directing the most vulnerable uses to areas of lowest flood risk.

The sequential approach should be applied to the layout and design of the project. More vulnerable uses should be located on parts of the site at lower probability and residual risk of flooding.

- Can density be varied to reduce the number or vulnerability of units located in higher risk parts of the site?

3.1.1 Paragraphs 5.7.15 and 5.7.16 of the NPS EN-1 define the exception test and state:

'The Exception Test is only appropriate for use where the sequential test alone cannot deliver an acceptable site, taking into account the need for energy infrastructure to remain operational during floods.'

All three elements of the test will have to be passed for development to be consented. For the Exception Test to be passed:

- *it must be demonstrated that the project provides wider sustainability benefits to the community that outweigh flood risk;*
- *the project should be on developable, previously developed land or, if it is not on previously developed land, that there are no reasonable alternative sites on developable previously developed land subject to any exceptions set out in the technology-specific NPSs; and*
- *a FRA must demonstrate that the project will be safe, without increasing flood risk elsewhere subject to the exception below and, where possible, will reduce flood risk overall.*



- 3.1.2 The project would provide wider sustainability benefits to the community. The Esso Fawley site directly employs over 1,000 people, with many more employed within the supply chain. Although the pipeline itself does not give rise to significant local employment, the pipeline transports aviation fuel whose refining and import does supports considerable local employment.
- 3.1.3 During the installation of the pipeline, there would be a number of local economic benefits, although these may be limited in extent. The pipeline installation would give rise to local employment and supply opportunities, which would benefit the local and wider economy. The sustainable transport of fuels by underground pipeline avoids the use of road tankers for aviation fuel transport. Based on an estimate of the volume of aviation fuel transferred from the Fawley Refinery to the West London Terminal via pipeline in 2015, the replacement pipeline would keep around 100 road tankers off the road every day.
- 3.1.4 The pipeline is to be installed as close as practicable to the existing pipeline which is to be replaced. The pipeline would be located on; developable; previously developed land; and (particularly in the more rural southern areas) on land that has not been previously developed, where there are no alternative sites. The installation of the pipeline would have no impact on the existing land use in the previously undeveloped land and would not preclude future development.
- 3.1.5 Even though the development would include areas within Flood Zone 3, it would be appropriately flood resilient. For normal operation, it would not require access for maintenance works to the pipeline within Flood Zone 3 and consequently would not place users (maintenance workers) at risk from flooding. An FRA has been developed for the project that assesses the risk of flooding to and from the project during its construction and operational phases in accordance with the NPS EN-1. The FRA demonstrates that the project would be safe and would not have a significant impact upon flood risk. The project therefore complies with the requirements of the Exception Test.
- 3.1.6 The paragraphs above demonstrate how the project passes the three requirements of the Exception Test because it would support local employment and avoid impacts to the environment from additional road traffic, it would be on developable land and would not preclude future development and it would be safe and not increase flood risk.



4 Conclusion

- 4.1.1 The replacement pipeline would provide essential aviation fuel transport infrastructure to the West London Terminal storage facility. This comprises a key element of the need for the project.
- 4.1.2 An FRA covering all of the different aspects of the route has been completed. This sets out the flood risks posed to and caused by the proposed development and how these will be mitigated during construction and operation. The FRA has concluded that during construction, flood risks to the works and caused by the works vary by flood source, but after mitigation are all assessed to be low risk. It has also concluded that there are very low risks to the proposed development from all sources during its operation and when operational, the proposed development will not increase flood risk elsewhere.
- 4.1.3 The Sequential Test and the Exception Test have been carried out in accordance with the NPS on Energy, specifically NPS EN-1, the NPPF and supporting PPG on Flood Risk and Coastal Change. Both the Sequential Test and the Exception Test are considered to have been passed for the project.



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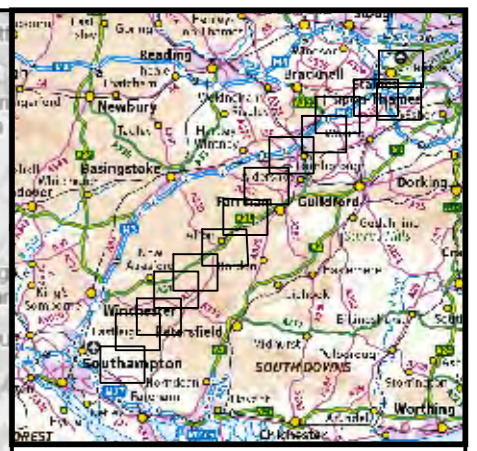
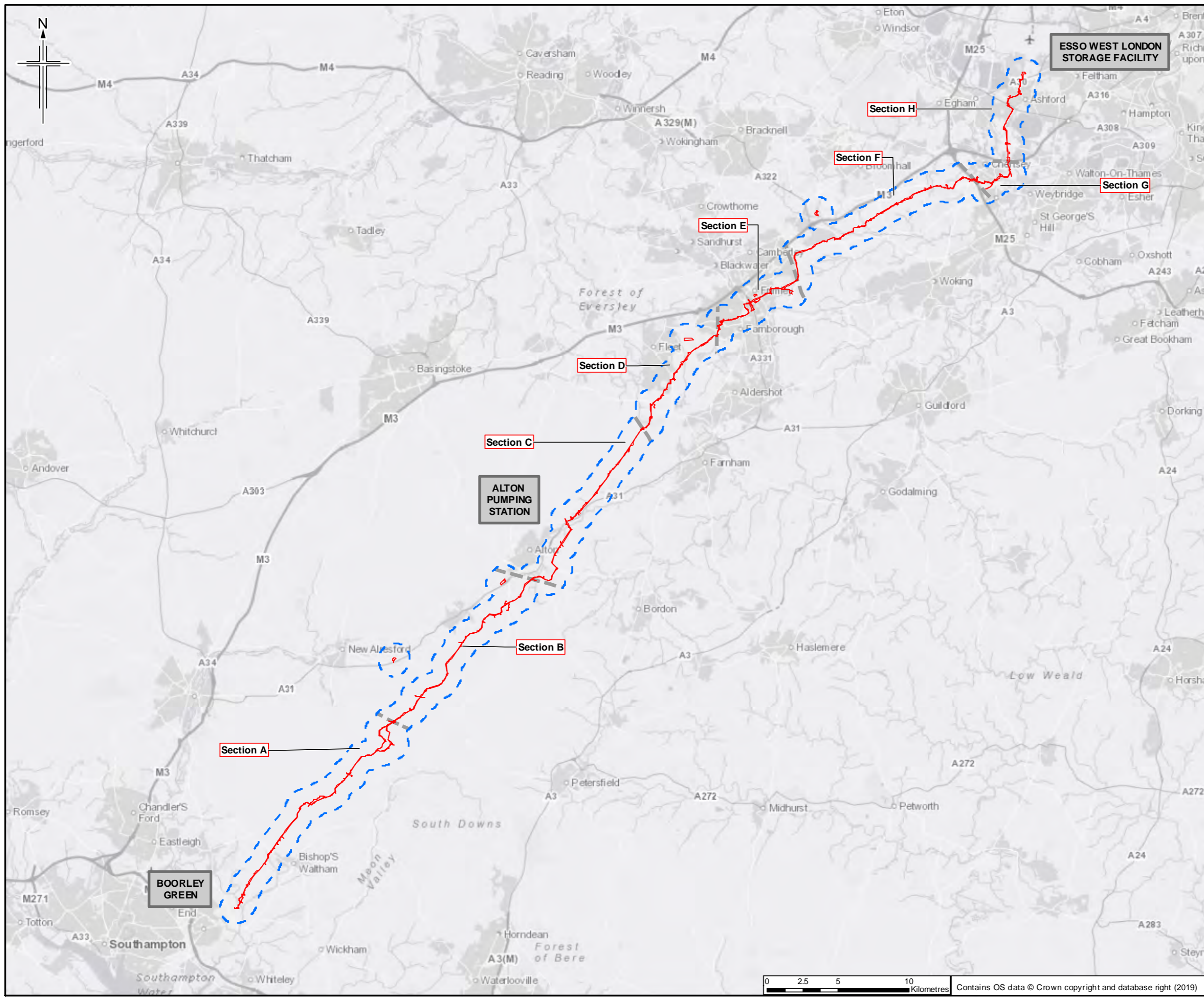
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Figures



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 - Order Limits 1km buffer
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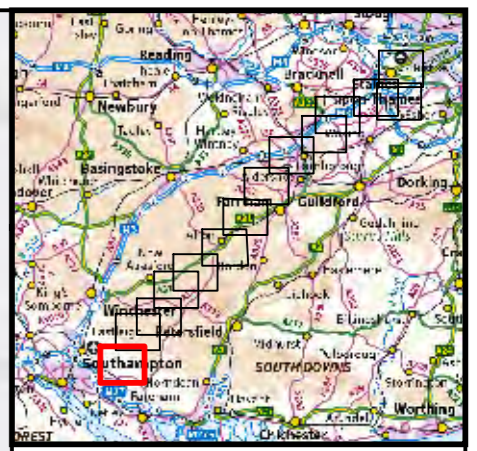
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Southampton to London Pipeline Project

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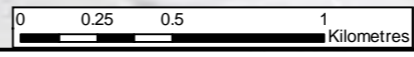


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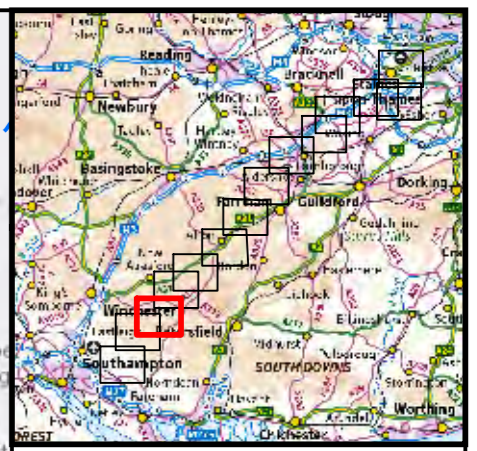
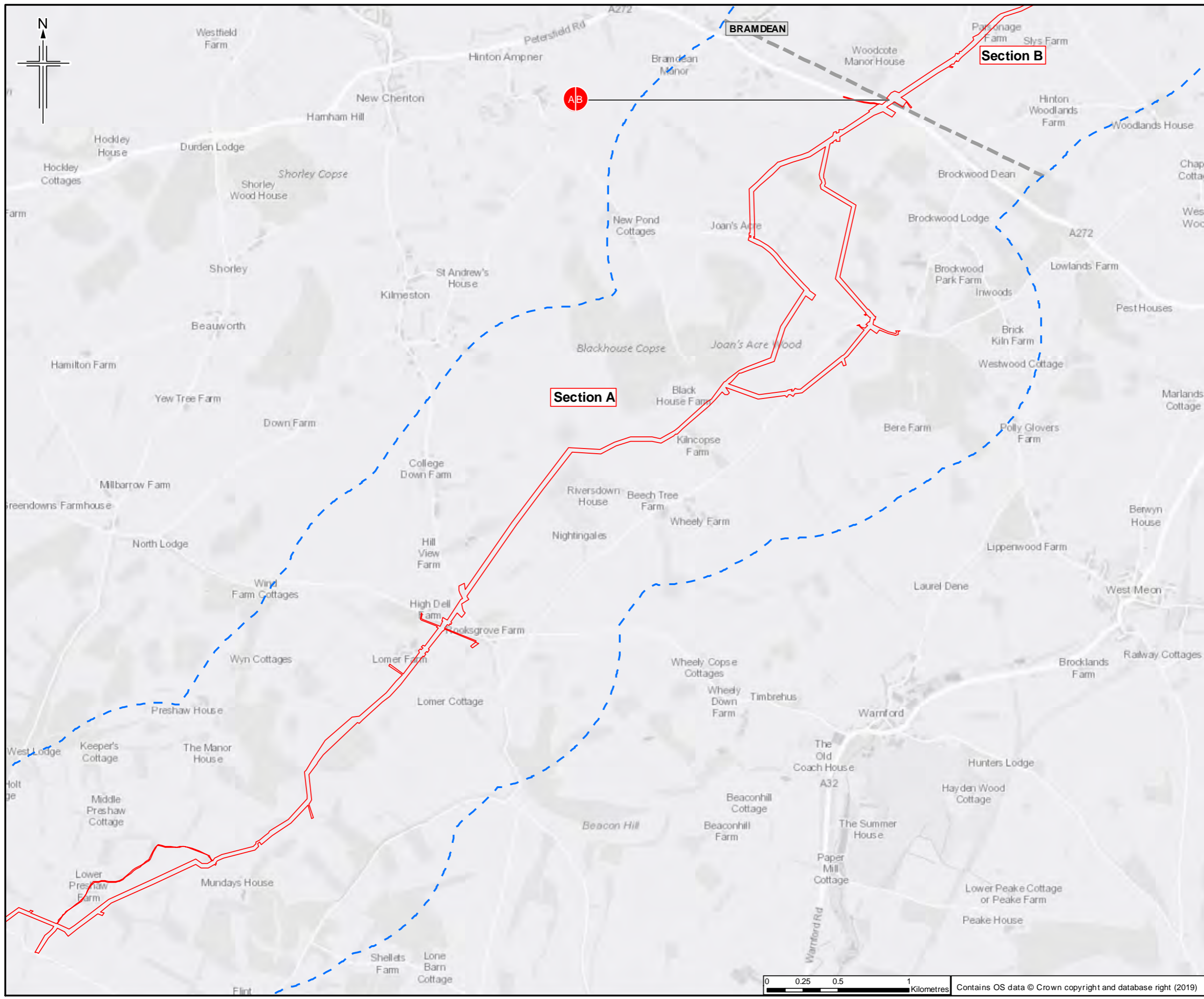


Drawing title
FLOOD RISK ASSESSMENT
THE PREFERRED ROUTE OF THE
SOUTHAMPTON TO LONDON
PIPELINE PROJECT
APFP Reg. (2009) 5(2)(o)

Drawing Status	For Issue
Scale	1:25,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001015
Drawing number	Figure A1 Sheet 1 of 14
Rev	0



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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break

Sheet displays parts of Section A and Section B

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

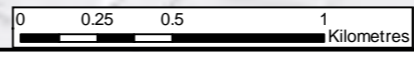


Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
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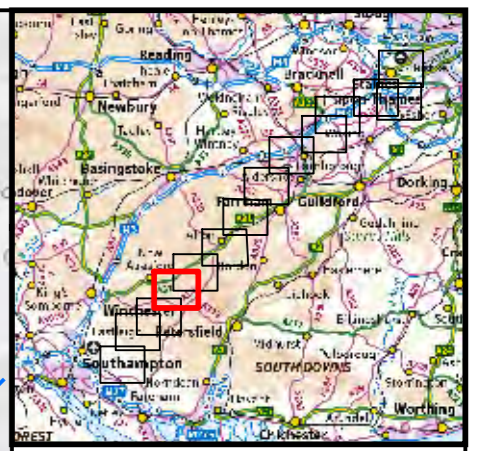
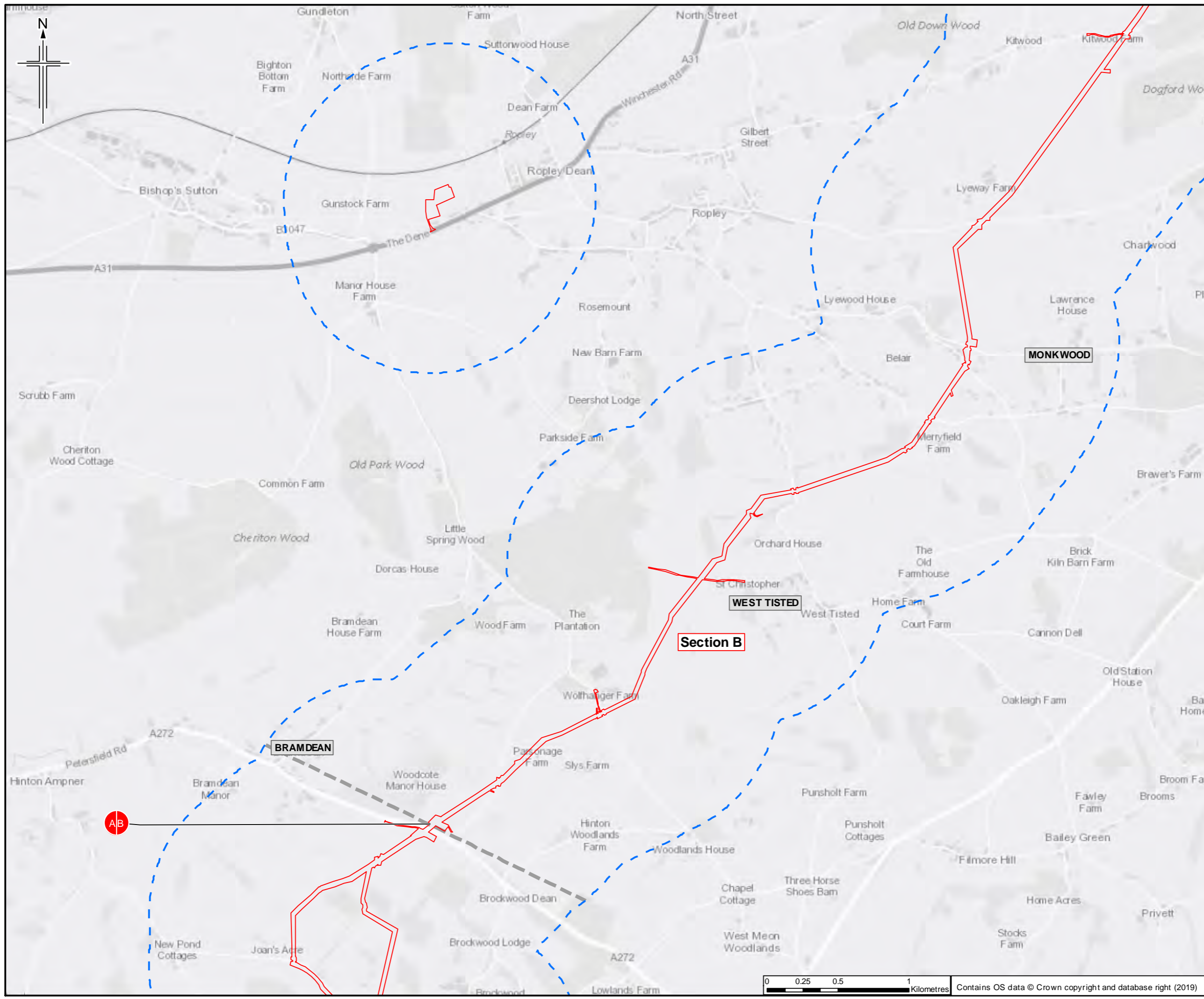


Drawing title
FLOOD RISK ASSESSMENT
THE PREFERRED ROUTE OF THE
SOUTHAMPTON TO LONDON
PIPELINE PROJECT
APFP Reg. (2009) 5(2)(o)

Drawing Status	For Issue
Scale	1:25,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project/Draw No.	B2325300-JAC-000-ENV-DRG-001015
Drawing number	Figure A1 Sheet 3 of 14
Rev	0



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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break

Sheet displays parts of Section A and Section B

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

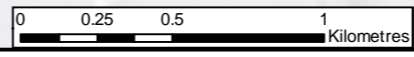


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Leatherhead,
Surrey,
KT22 8UX

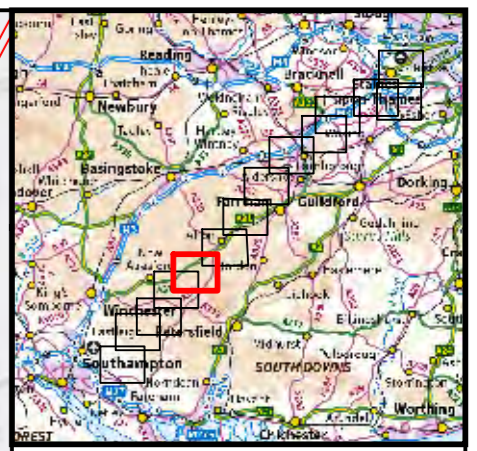
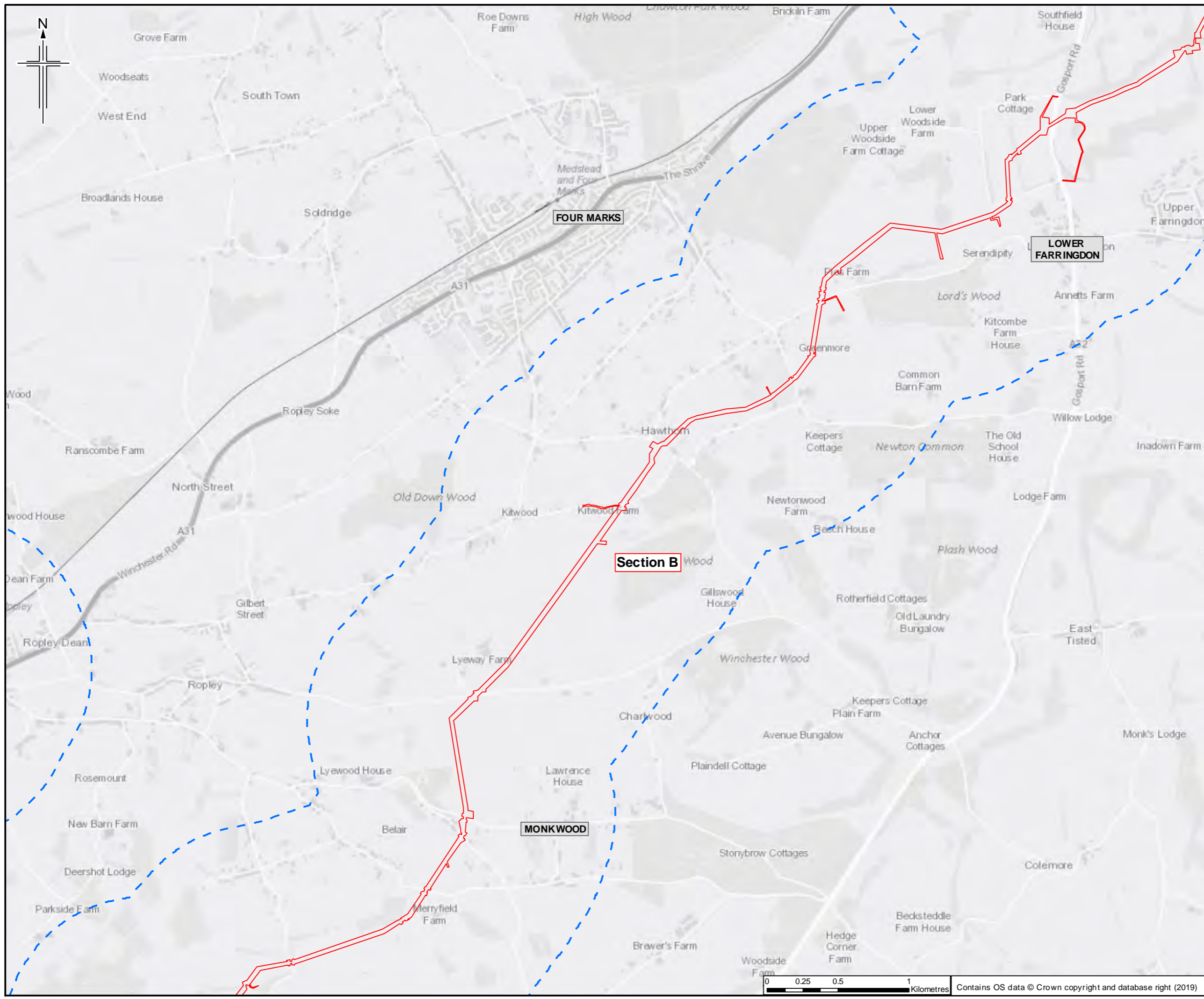


Drawing title
**FLOOD RISK ASSESSMENT
THE PREFERRED ROUTE OF THE
SOUTHAMPTON TO LONDON
PIPELINE PROJECT
APFP Reg. (2009) 5(2)(o)**

Drawing Status	For Issue
Scale	1:25,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project Wise No.	B2325300-JAC-000-ENV-DRG-001015
Drawing number	Figure A1 Sheet 4 of 14
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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break

Sheet displays part of Section B

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

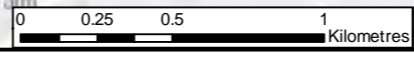


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Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

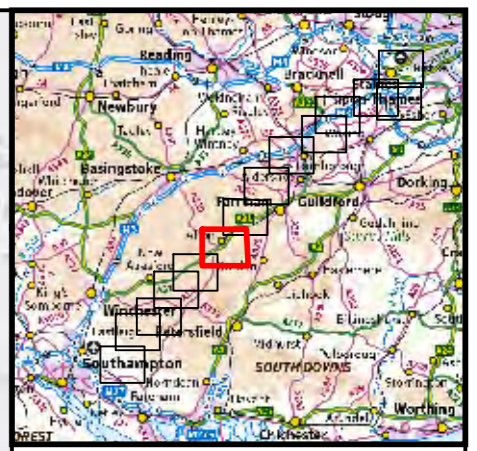
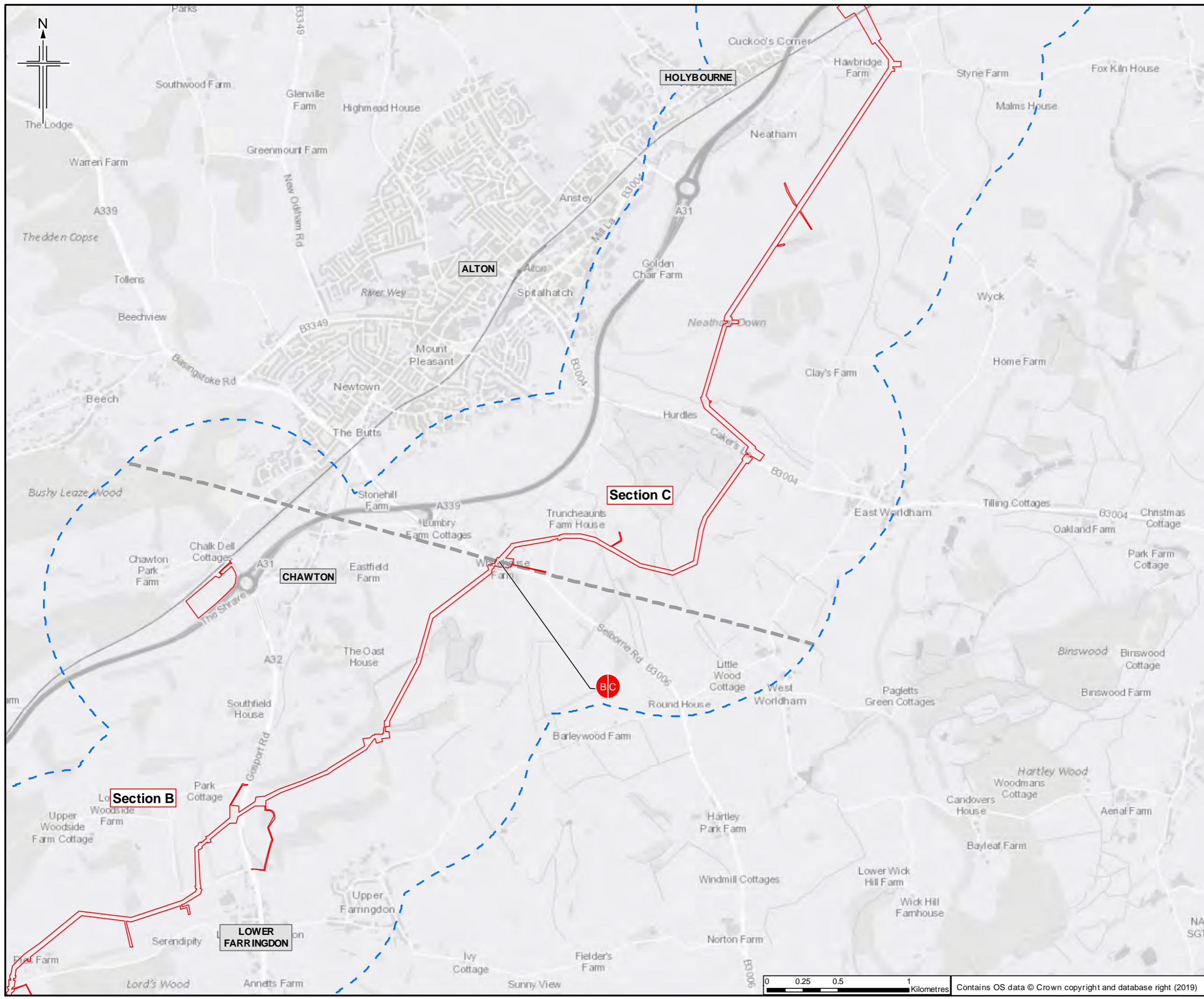


Drawing title
FLOOD RISK ASSESSMENT
THE PREFERRED ROUTE OF THE
SOUTHAMPTON TO LONDON
PIPELINE PROJECT
APFP Reg. (2009) 5(2)(o)

Drawing Status	For Issue
Scale	1:25,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001015
Drawing number	Figure A1 Sheet 5 of 14
Rev	0



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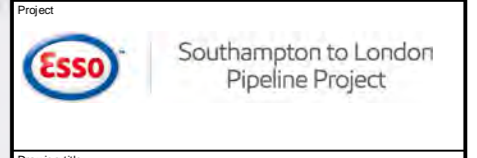
- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break

Sheet displays parts of Section B and Section C

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
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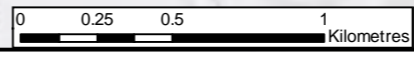
Client
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Ermyn House,
Ermyn Way,
Leatherhead,
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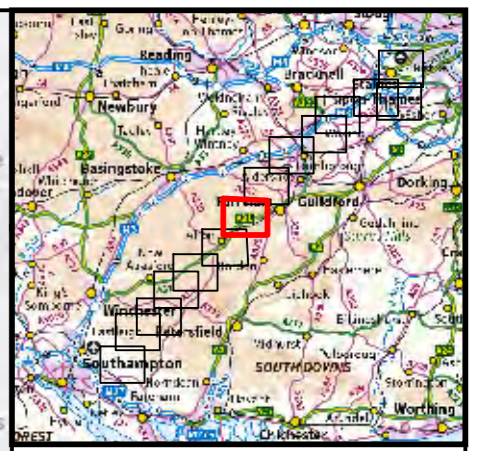
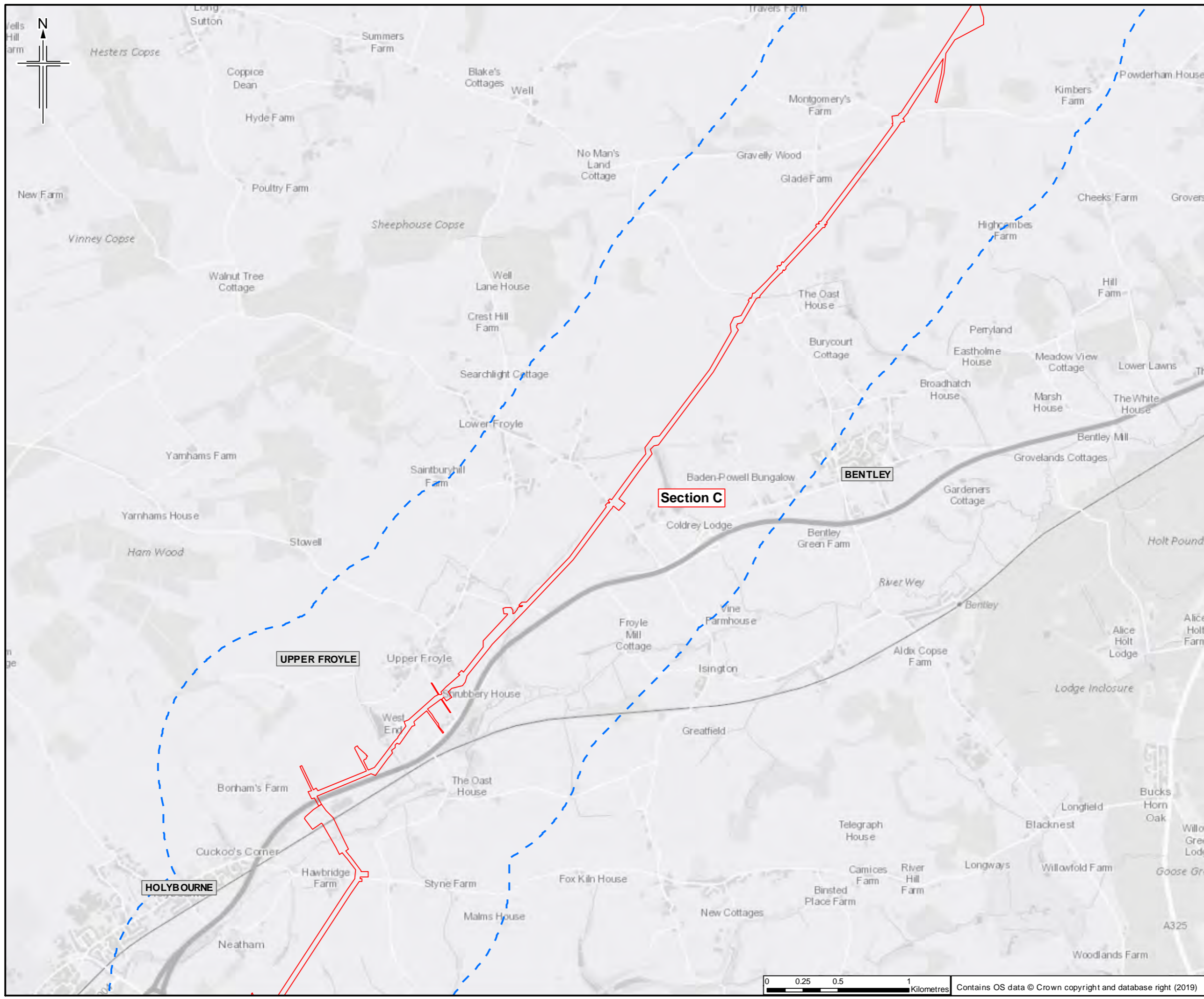
Drawing title
FLOOD RISK ASSESSMENT
THE PREFERRED ROUTE OF THE
SOUTHAMPTON TO LONDON
PIPELINE PROJECT
APFP Reg. (2009) 5(2)(o)

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
Project/Work No.	B2325300-JAC-000-ENV-DRG-001015	
Drawing number	Figure A1 Sheet 6 of 14	Rev 0

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- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break

Sheet displays part of Section C

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

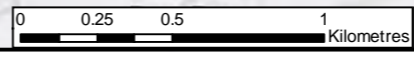
JACOBS
 1160 Eastlake Road, Wokingham, Wokingham RG40 3DU, UK
 Tel: +44 (0) 135 945 7000 Fax: +44(0) 135 945 7001
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Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

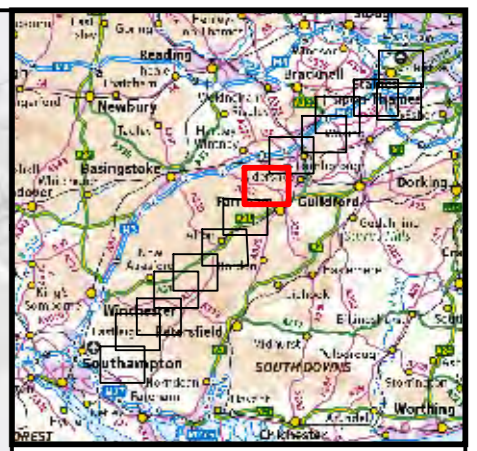
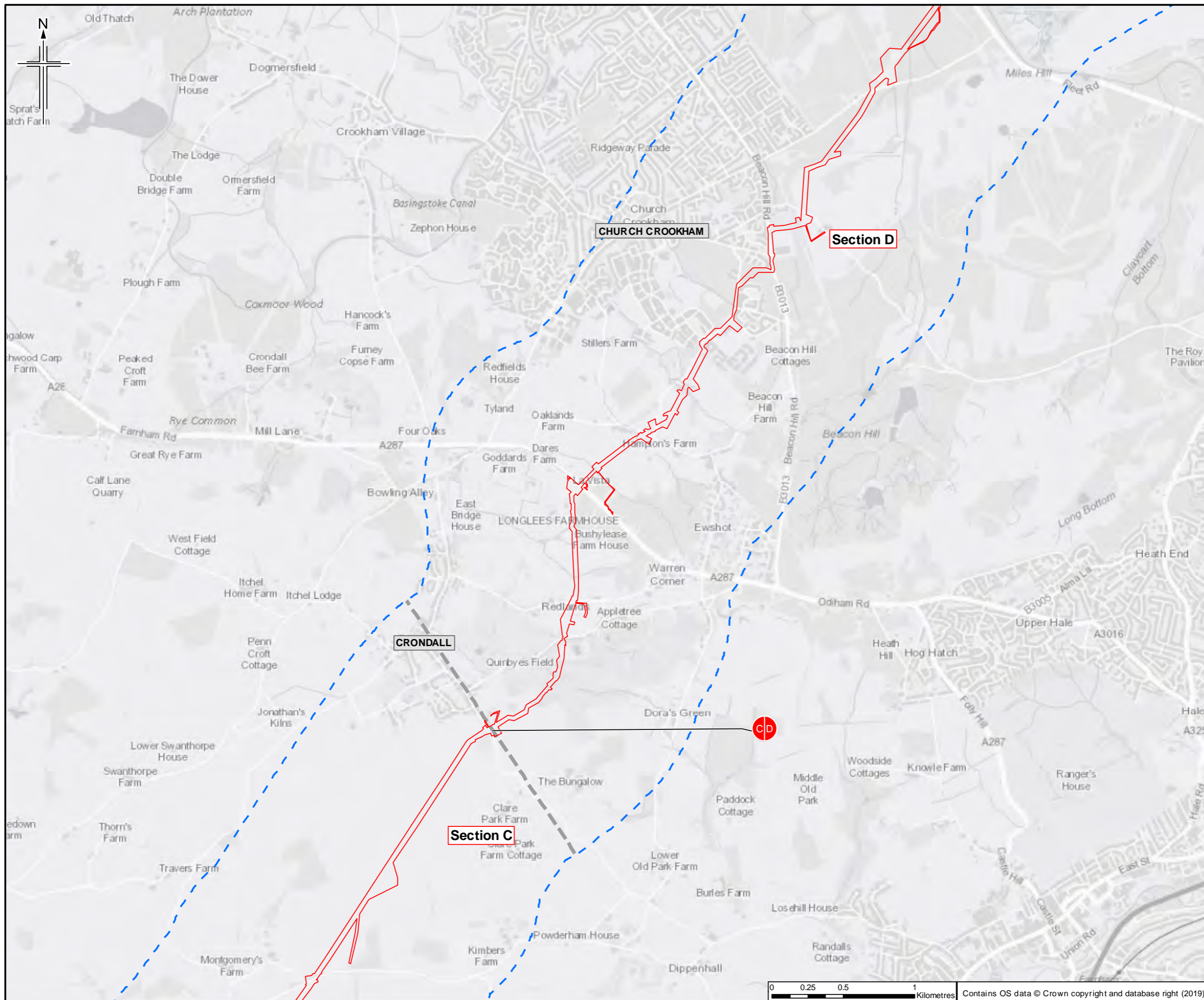
Project
Southampton to London Pipeline Project

Drawing title
 FLOOD RISK ASSESSMENT
 THE PREFERRED ROUTE OF THE
 SOUTHAMPTON TO LONDON
 PIPELINE PROJECT
 APFP Reg. (2009) 5(2)(o)

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001015	
Drawing number	Figure A1 Sheet 7 of 14	Rev 0



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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break

Sheet displays parts of Section C and Section D

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

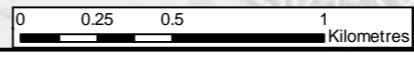


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Esso Petroleum Company, Limited
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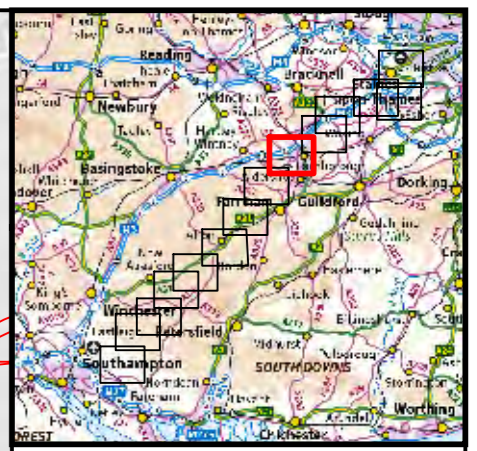
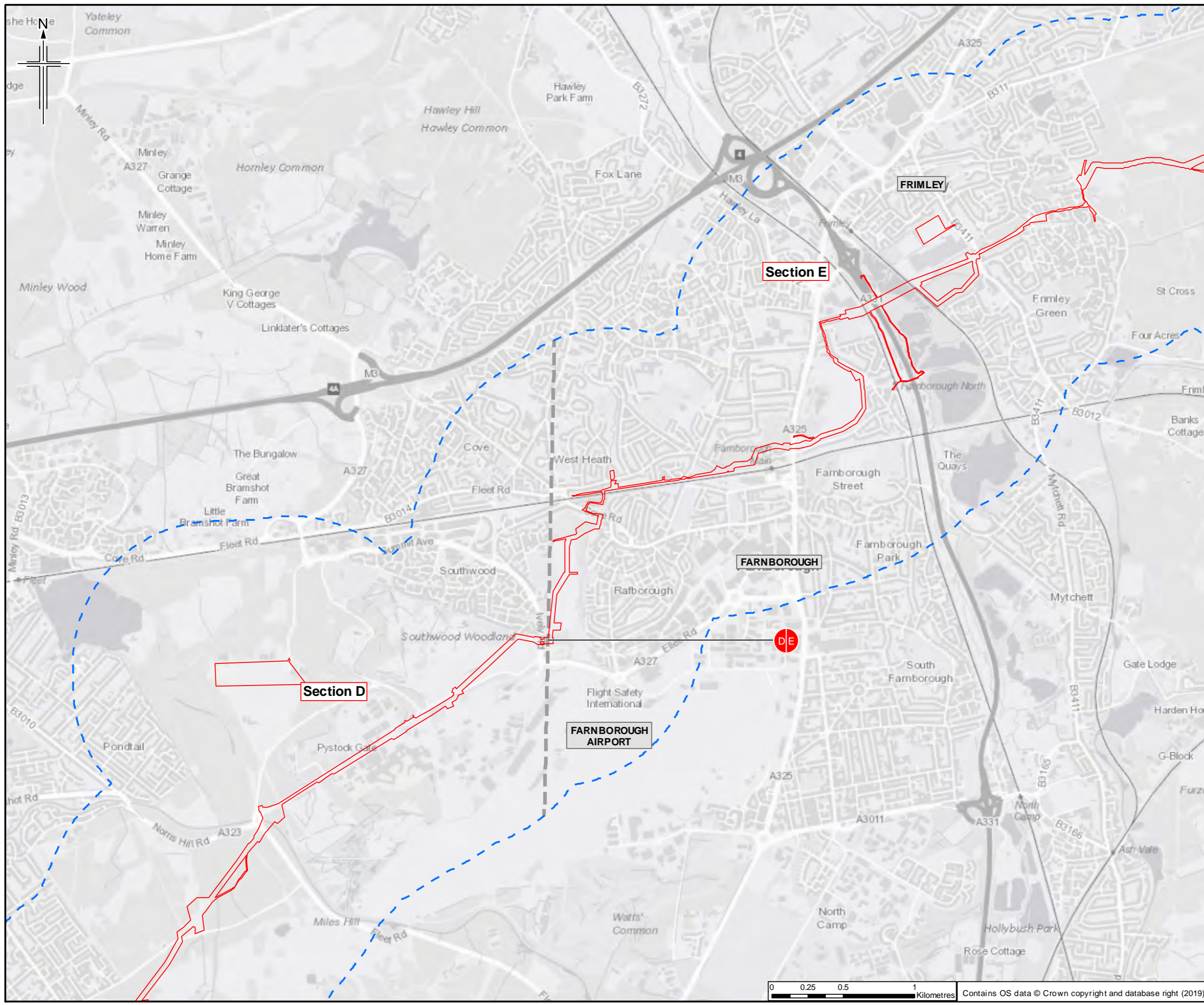


Drawing title
**FLOOD RISK ASSESSMENT
THE PREFERRED ROUTE OF THE
SOUTHAMPTON TO LONDON
PIPELINE PROJECT
APFP Reg. (2009) 5(2)(o)**

Drawing Status	For Issue
Scale	1:25,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project/Work No.	B2325300-JAC-000-ENV-DRG-001015
Drawing number	Figure A1 Sheet 8 of 14
Rev	0



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 - Order Limits 1km buffer
 - Section break
 - Section break

Sheet displays parts of Section D and Section E

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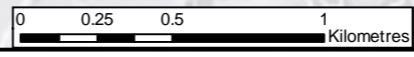
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

Project
Southampton to London Pipeline Project

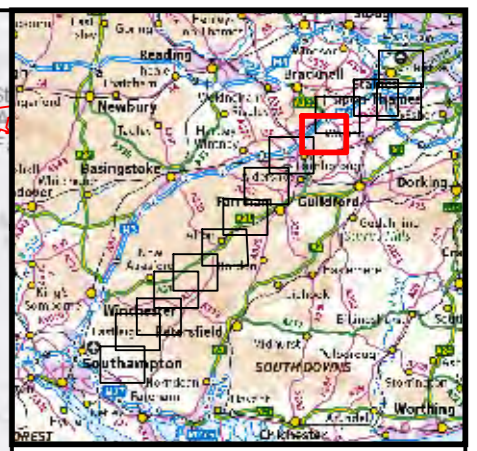
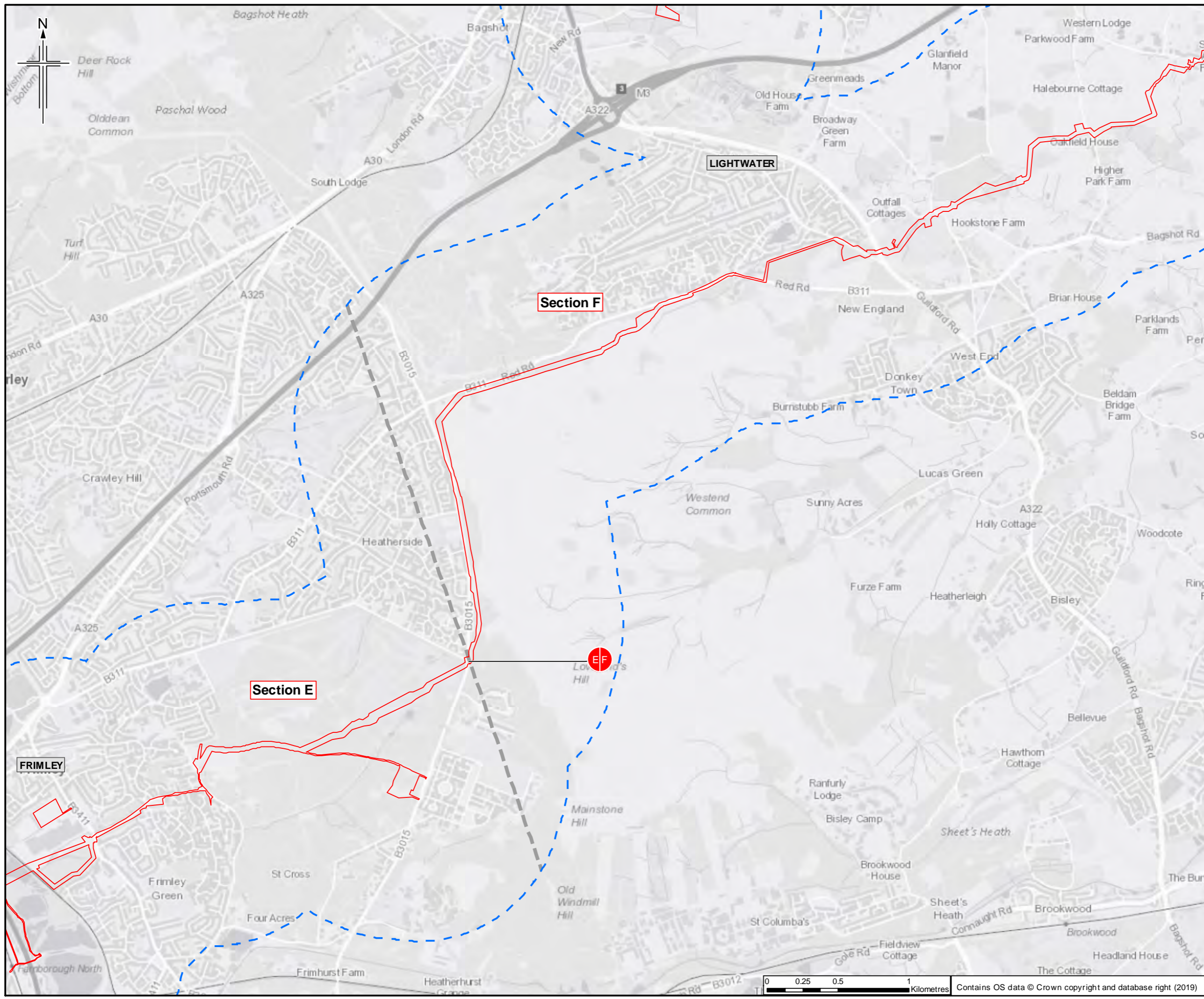
Drawing title
**FLOOD RISK ASSESSMENT
 THE PREFERRED ROUTE OF THE
 SOUTHAMPTON TO LONDON
 PIPELINE PROJECT
 APFP Reg. (2009) 5(2)(o)**

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001015	
Drawing number	Figure A1 Sheet 9 of 14	Rev 0

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- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break

Sheet displays parts of Section E and Section F

Rev.	Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

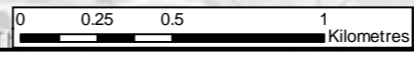


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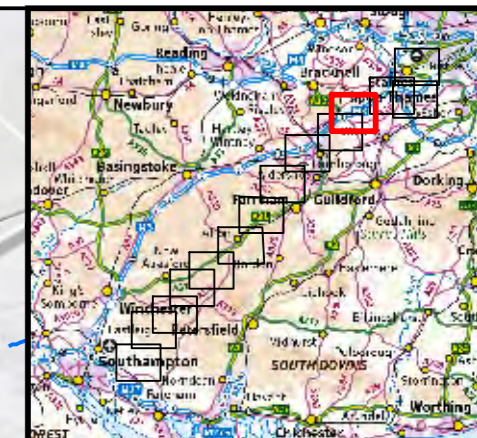
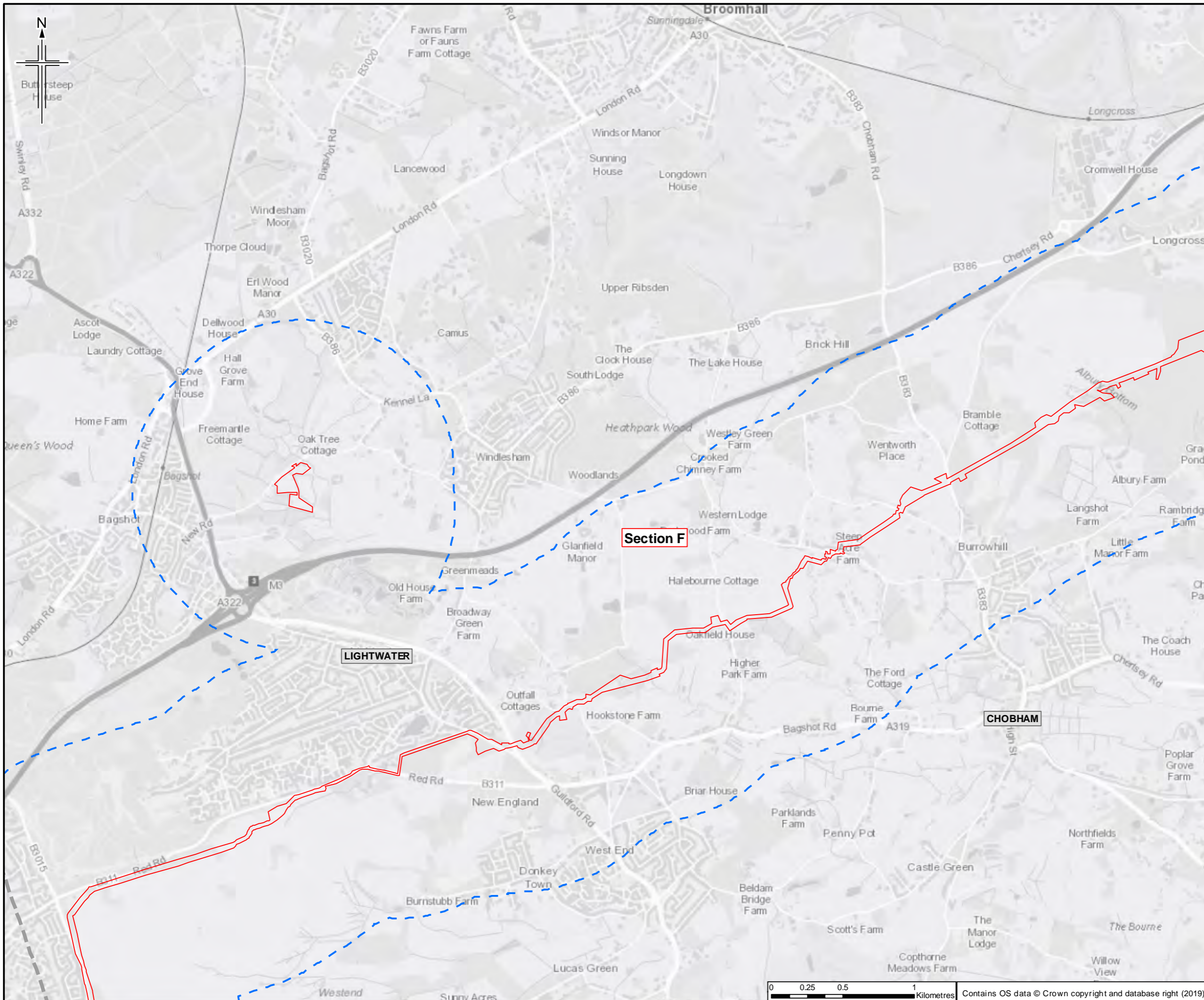


Drawing title
**FLOOD RISK ASSESSMENT
 THE PREFERRED ROUTE OF THE
 SOUTHAMPTON TO LONDON
 PIPELINE PROJECT
 APFP Reg. (2009) 5(2)(o)**

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
JACOBS No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001015	
Drawing number	Figure A1 Sheet 10 of 14	Rev 0



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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break

Sheet displays part of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

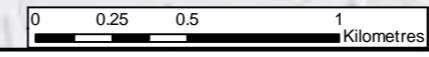


Client
 Esso Petroleum Company, Limited
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 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

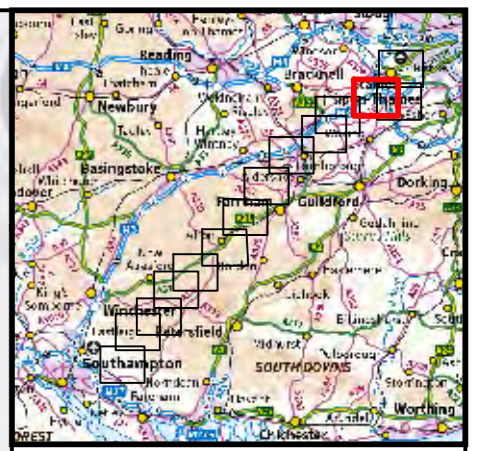
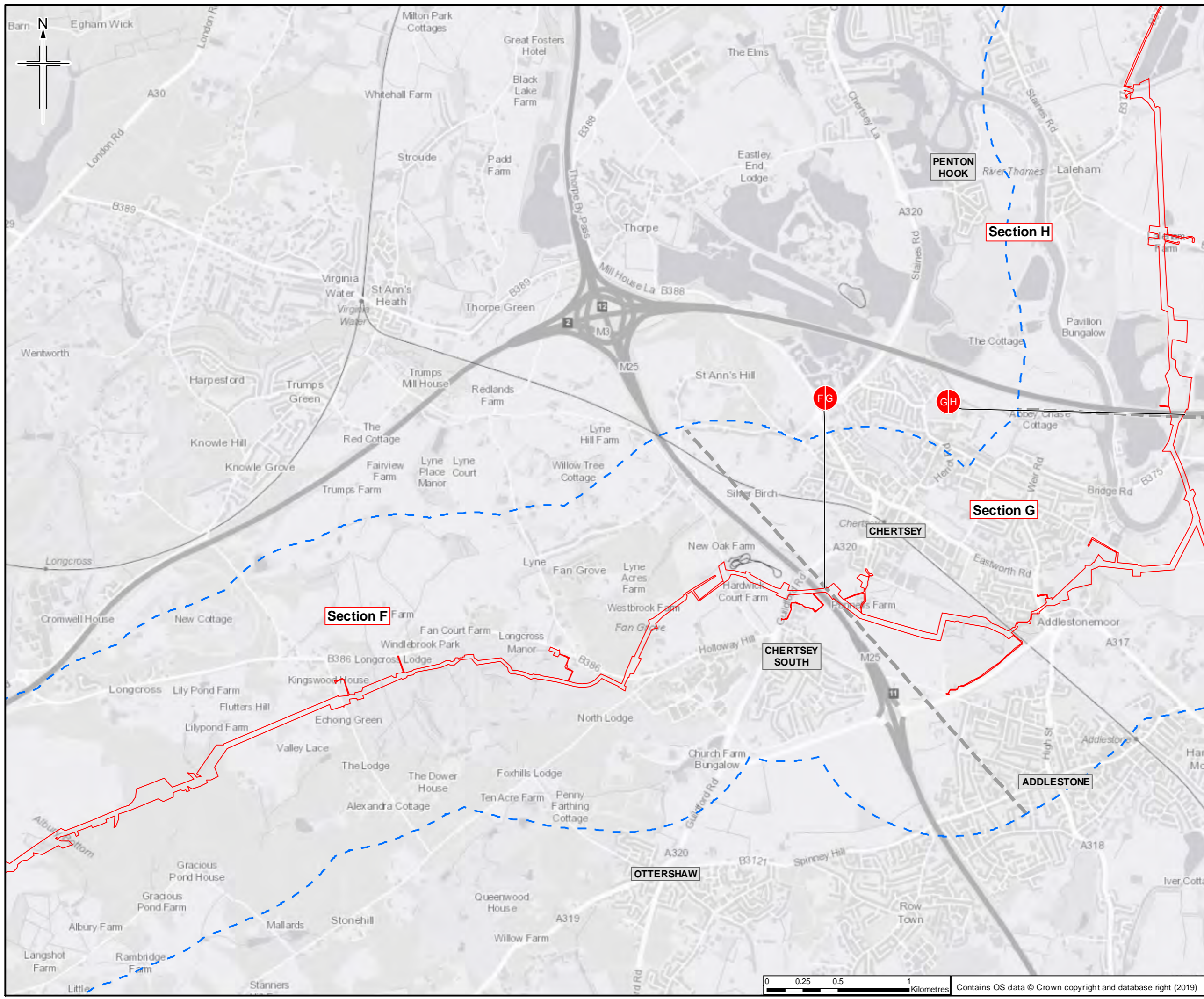


Drawing title
**FLOOD RISK ASSESSMENT
 THE PREFERRED ROUTE OF THE
 SOUTHAMPTON TO LONDON
 PIPELINE PROJECT
 APFP Reg. (2009) 5(2)(o)**

Drawing Status	For Issue	DO NOT SCALE
Scale	1:25,000 @ A3	
Jacobs No.	B2325300	
Project/Draw No.	B2325300-JAC-000-ENV-DRG-001015	
Drawing number	Figure A1 Sheet 11 of 14	Rev 0



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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break

Sheet displays parts of Section F, Section G and Section H

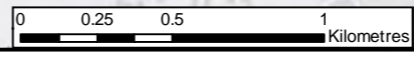
0	09/04/2019	For Issue	LM	FW	SM	SH
Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd

Client
 Esso Petroleum Company, Limited
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 Leatherhead,
 Surrey,
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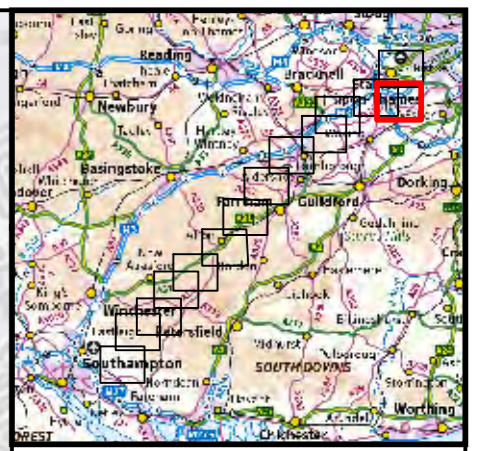
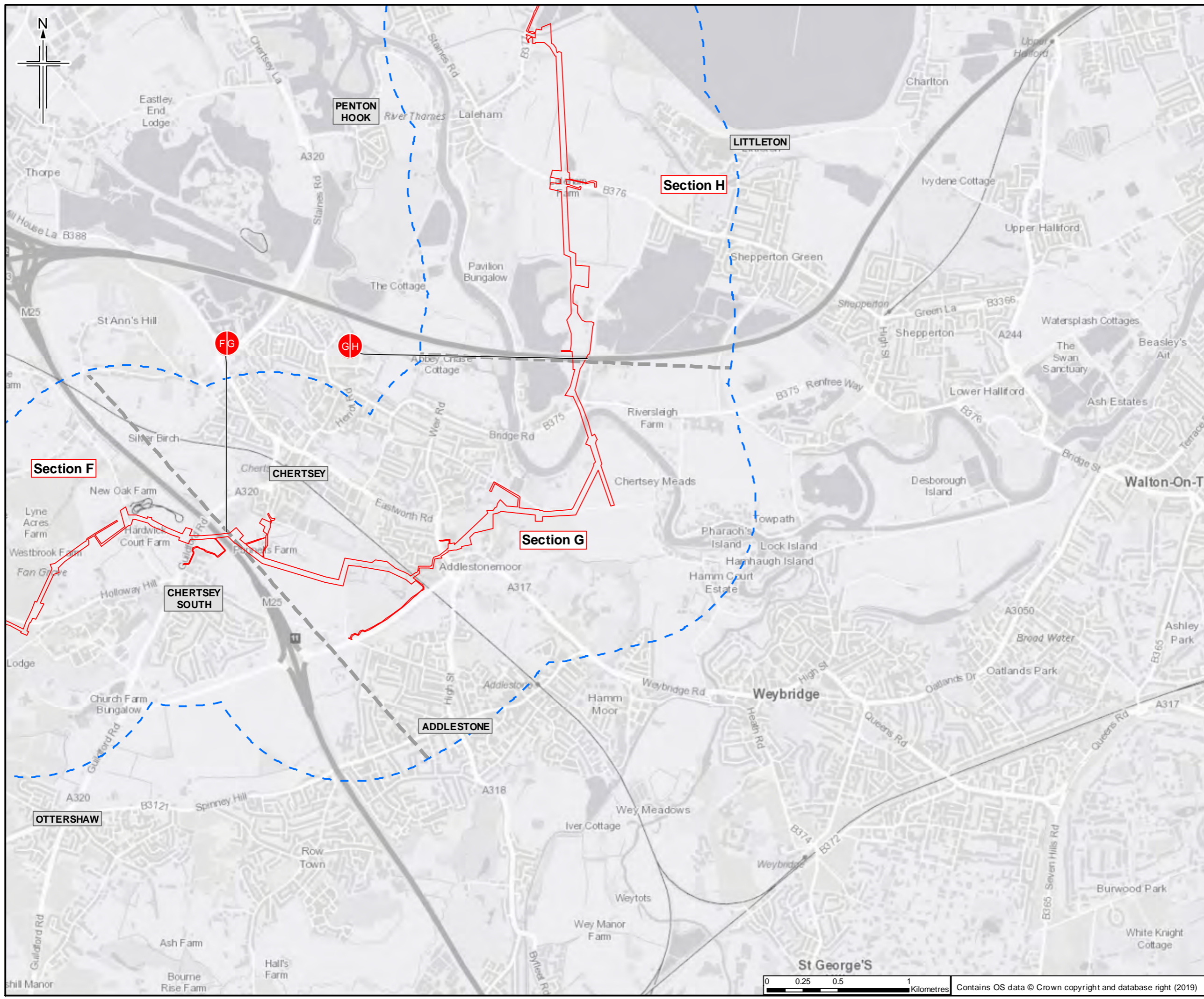
Project
 Southampton to London Pipeline Project

Drawing title
**FLOOD RISK ASSESSMENT
 THE PREFERRED ROUTE OF THE
 SOUTHAMPTON TO LONDON
 PIPELINE PROJECT
 APFP Reg. (2009) 5(2)(o)**

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
JACOBS No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001015	
Drawing number	Figure A1 Sheet 12 of 14	Rev 0



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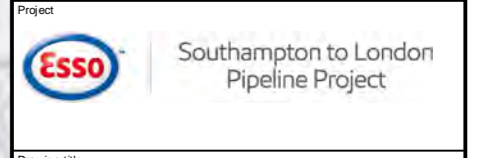
- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break

Sheet displays parts of Section F, Section G and Section H

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Rev.	Rev. Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd



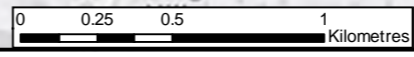
Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX



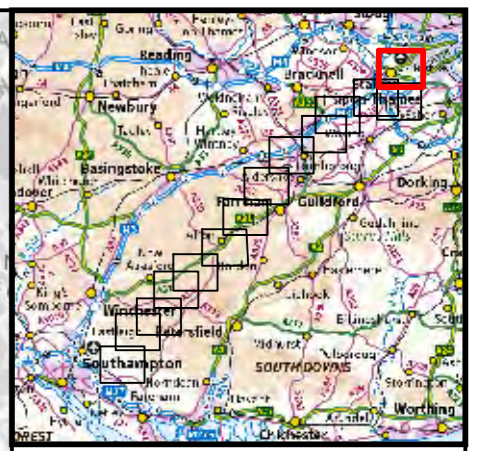
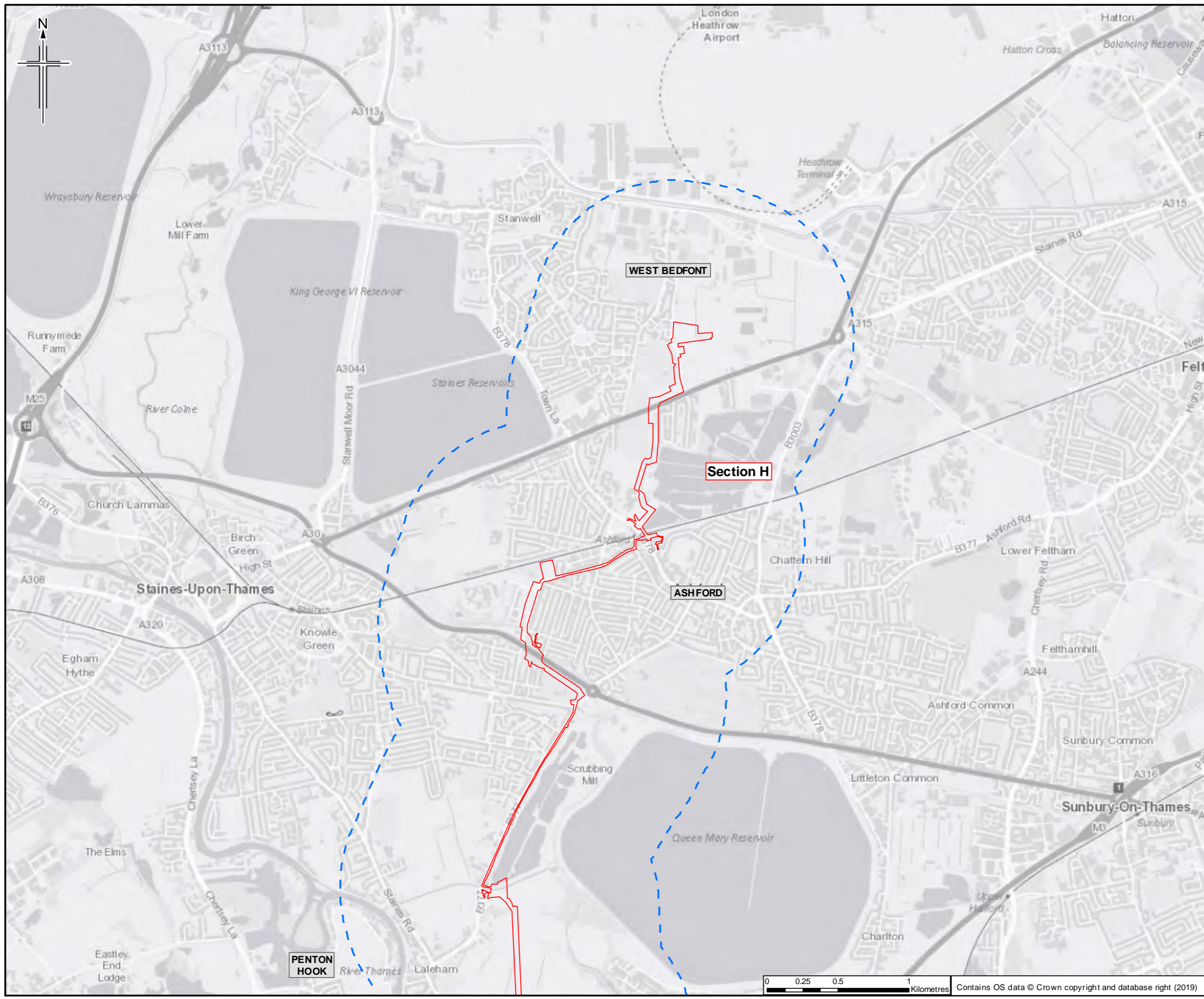
Drawing title
**FLOOD RISK ASSESSMENT
THE PREFERRED ROUTE OF THE
SOUTHAMPTON TO LONDON
PIPELINE PROJECT
APFP Reg. (2009) 5(2)(o)**

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
Project/Work No.	B2325300-JAC-000-ENV-DRG-001015	
Drawing number	Figure A1 Sheet 13 of 14	Rev 0

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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break

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 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
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Project

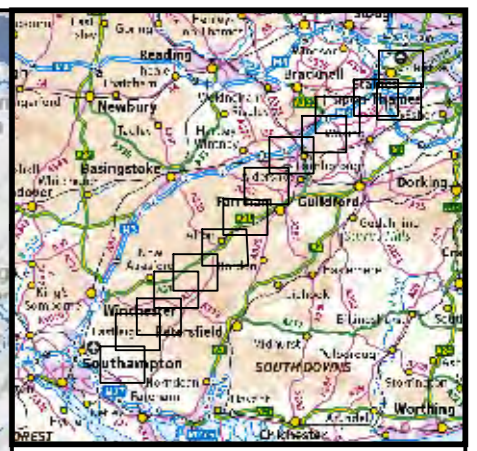
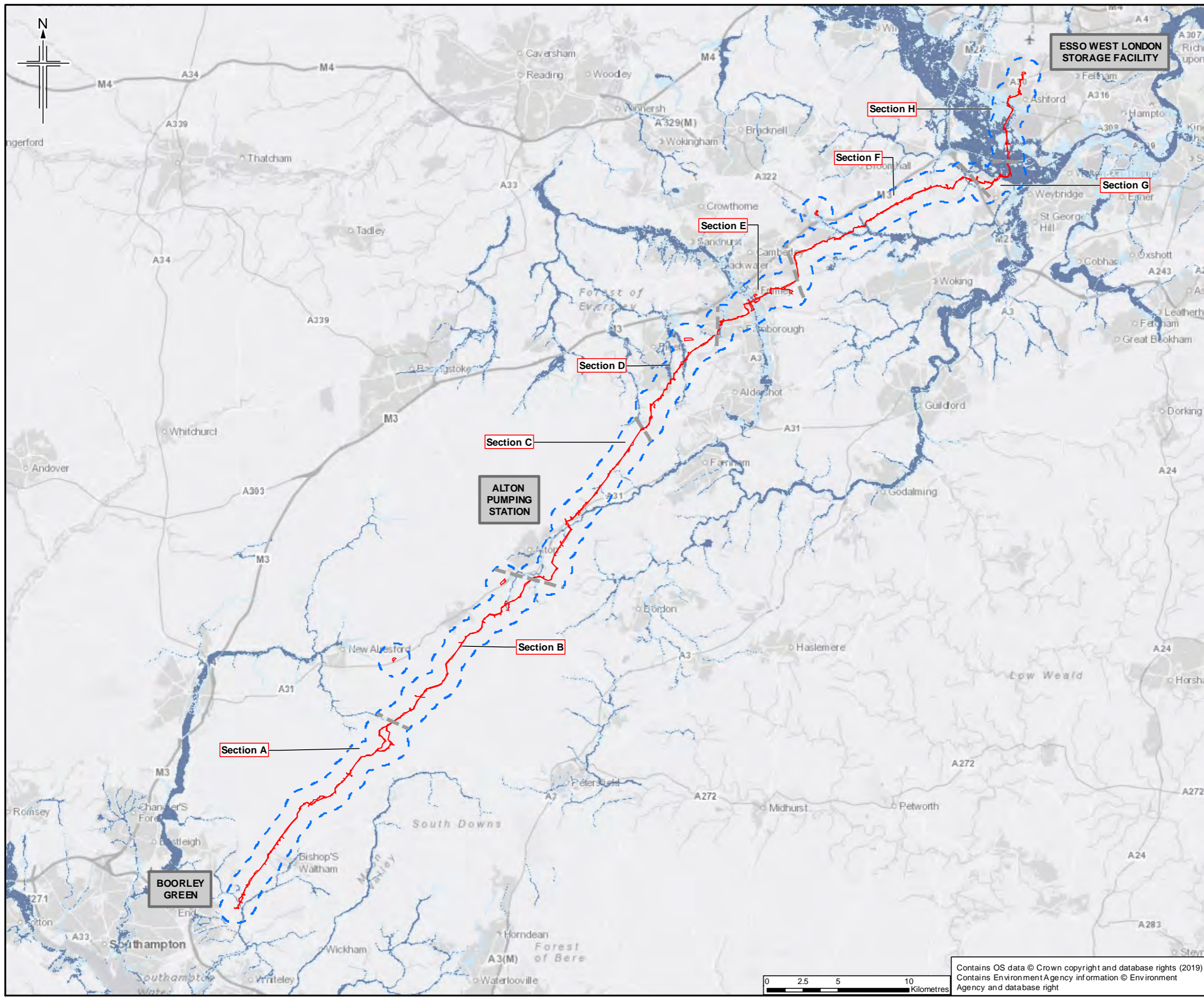
Southampton to London Pipeline Project

Drawing title

**FLOOD RISK ASSESSMENT
 THE PREFERRED ROUTE OF THE
 SOUTHAMPTON TO LONDON
 PIPELINE PROJECT
 APFP Reg. (2009) 5(2)(o)**

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001015	
Drawing number	Figure A1 Sheet 14 of 14	Rev 0

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Legend

- Order Limits
- Order Limits 1km buffer
- Section break
- Section break
- Flood Zone 2
- Flood Zone 3

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

Author: **JACOBS**
 1180 Epsom Road, Wokingham, Wokingham RG40 3DU, UK
 Tel: +44 (0) 1344 770074 Fax: +44(0)1344 740701
 www.jacobs.com

Client:
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
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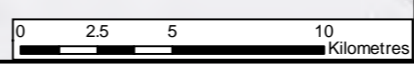
Project:
Southampton to London Pipeline Project

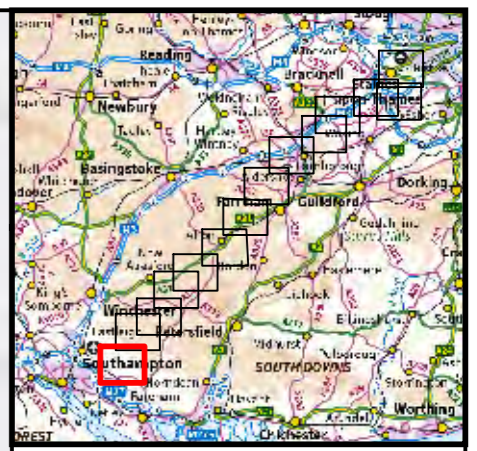
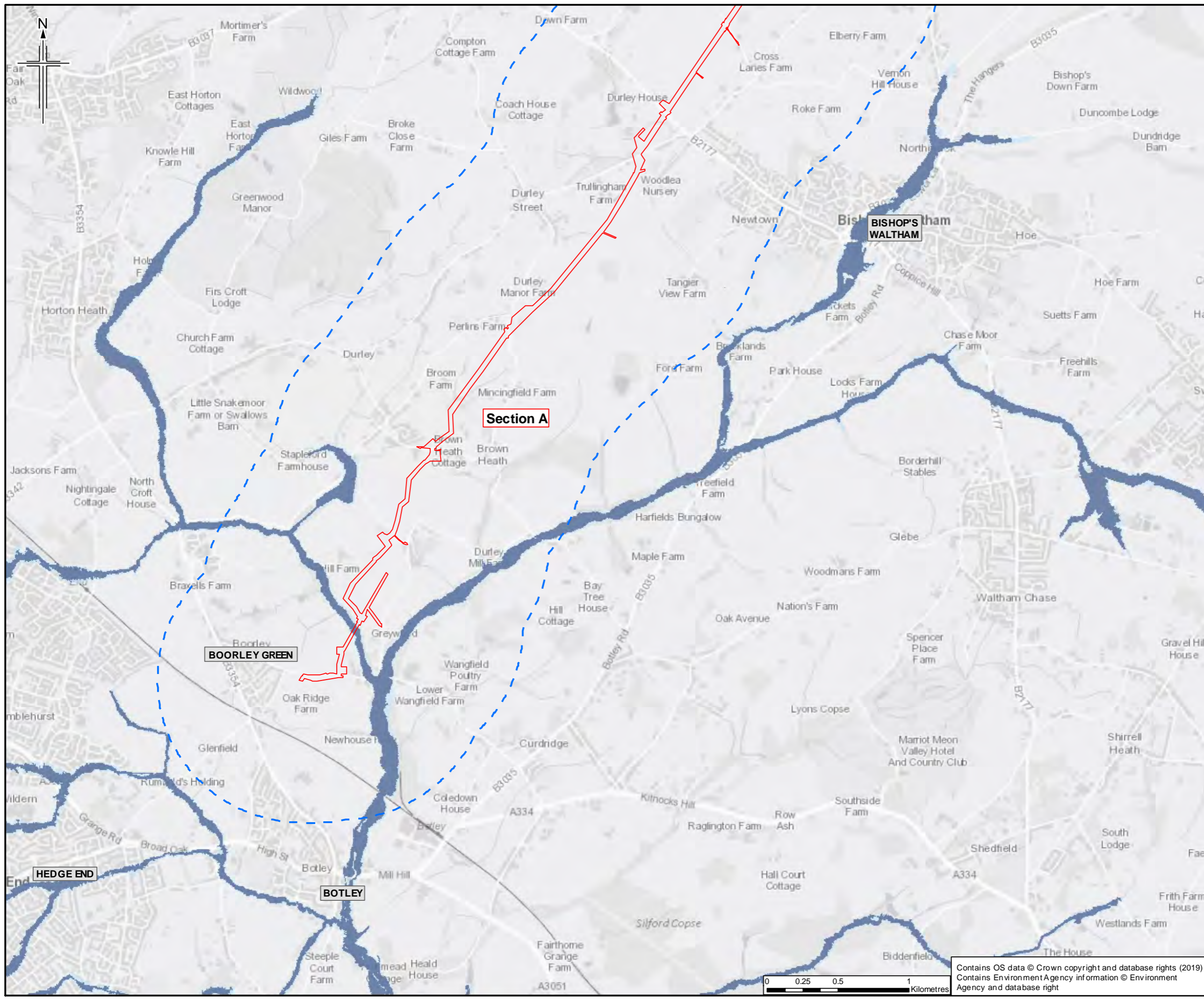
Drawing title:
**FLOOD RISK ASSESSMENT
 PREFERRED ROUTE AND FLOOD ZONES
 APFP Reg. (2009) 5(2)(I)**

Drawing Status	For Issue	
Scale	1:250,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001014	
Drawing number	Figure A2 Key Plan	Rev 0

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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break
 - Flood Zone 2
 - Flood Zone 3

Sheet displays part of Section A

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue				



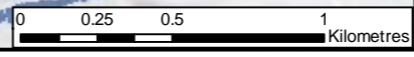
Client
 Esso Petroleum Company, Limited
 Ermyn House,
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 Surrey,
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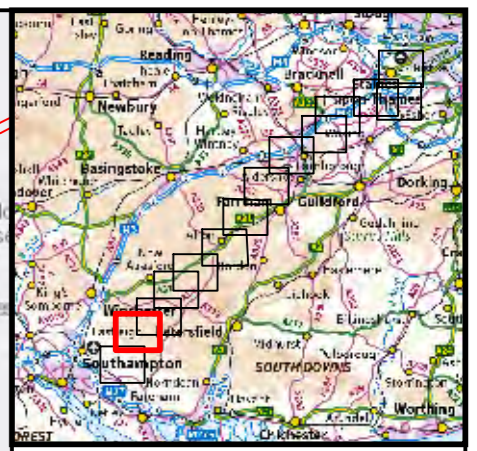
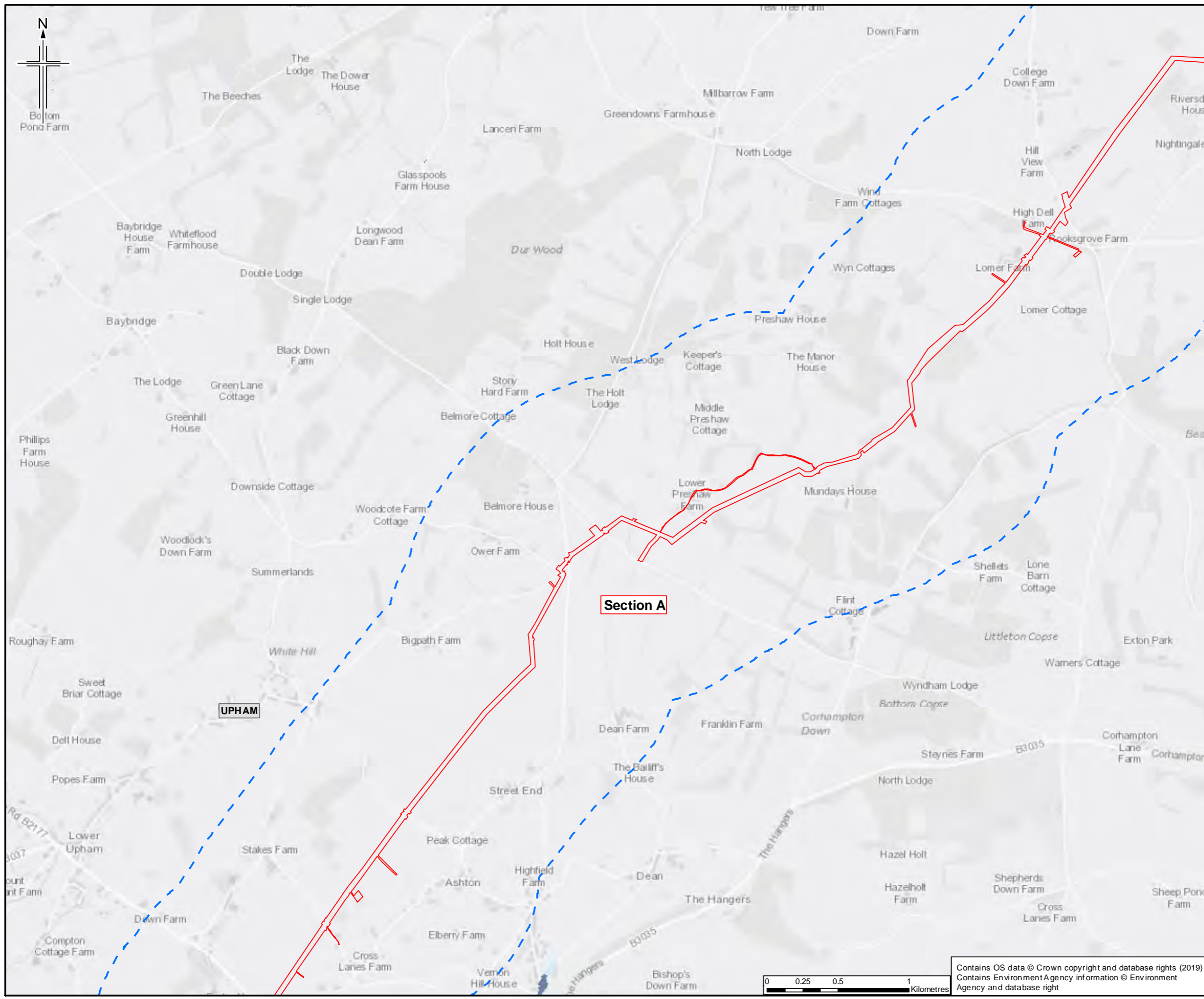


Drawing title
**FLOOD RISK ASSESSMENT
 PREFERRED ROUTE AND FLOOD ZONES
 APFP Reg. (2009) 5(2)(I)**

Drawing Status	For Issue
Scale	1:25,000 @ A3 DO NOT SCALE
JACOBS No.	B2325300
Project/Draw No.	B2325300-JAC-000-ENV-DRG-001014
Drawing number	Figure A2 Sheet 1 of 14
Rev	0

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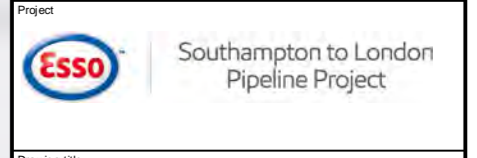
- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break
 - Flood Zone 2
 - Flood Zone 3

Sheet displays part of Section A

0	09/04/2019	For Issue	LM	FW	SM	SH
Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Checked	Rev'd	Apprv'd

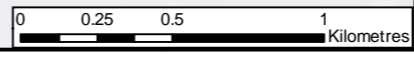


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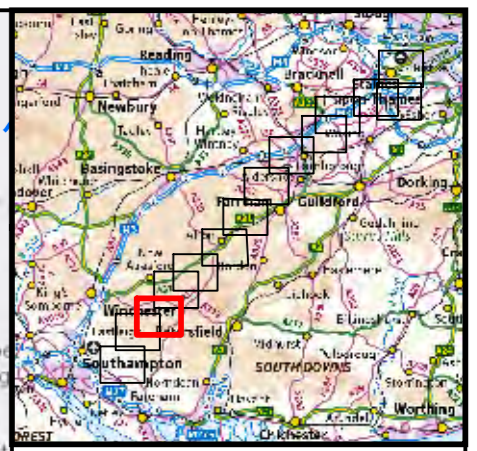
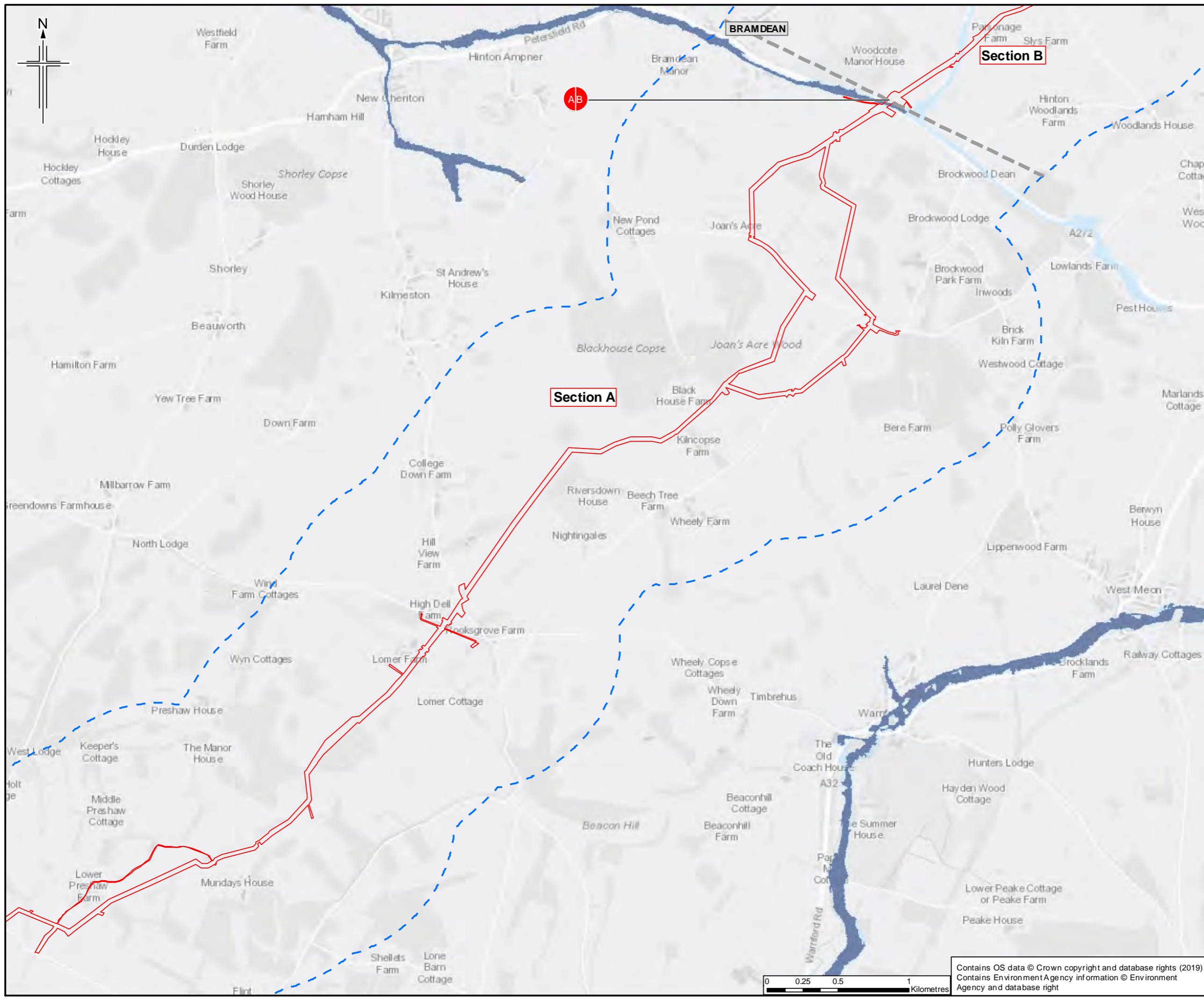
Drawing title
**FLOOD RISK ASSESSMENT
PREFERRED ROUTE AND FLOOD ZONES
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
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Drawing number	Figure A2 Sheet 2 of 14	Rev 0



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- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break
 - Flood Zone 2
 - Flood Zone 3

Sheet displays parts of Section A and Section B

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Rev.	Rev. Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd

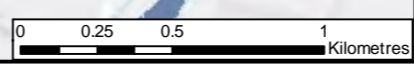


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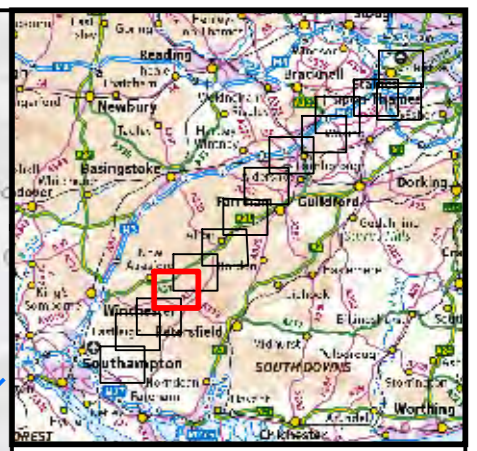
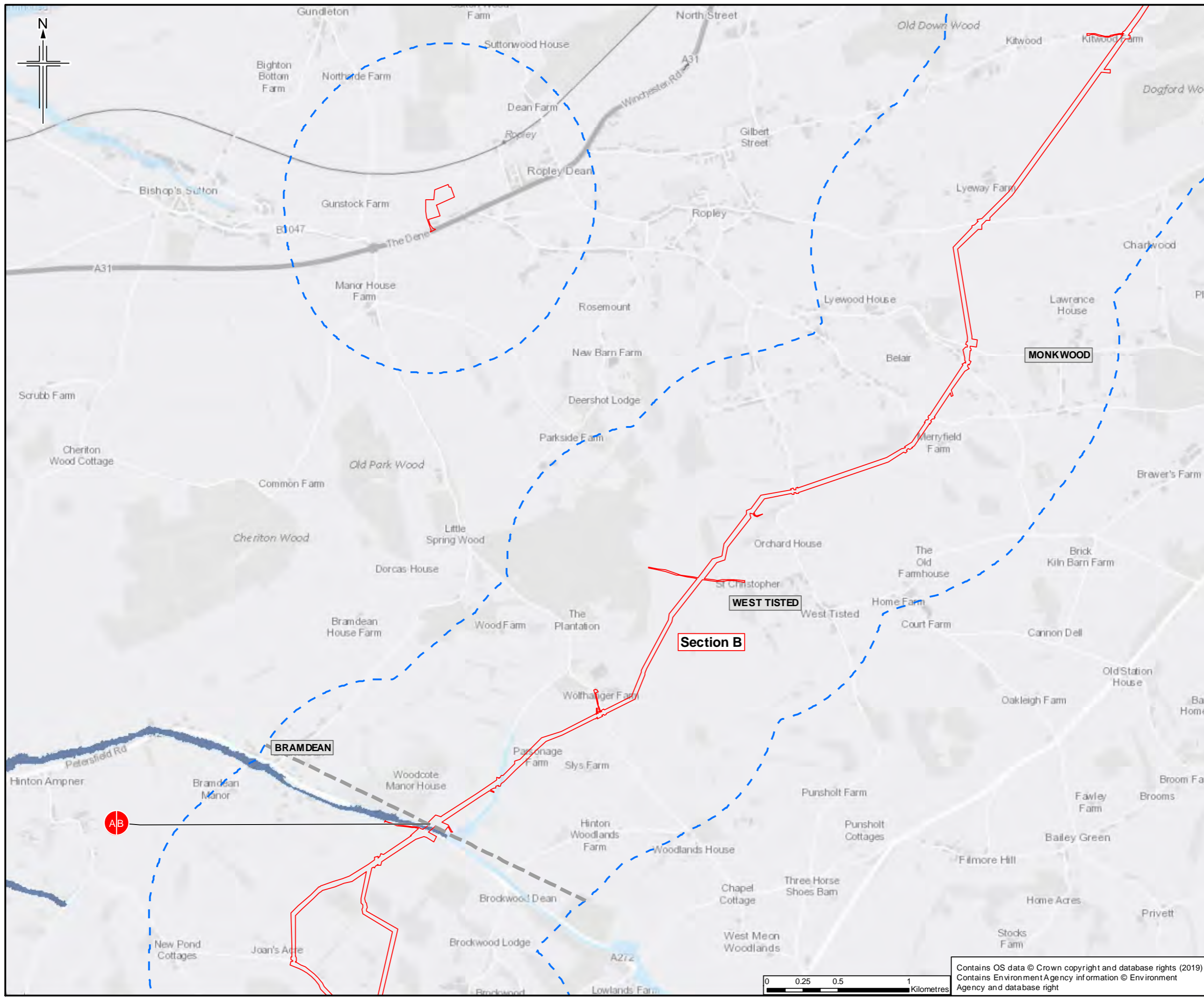
Drawing title
**FLOOD RISK ASSESSMENT
PREFERRED ROUTE AND FLOOD ZONES
APFP Reg. (2009) 5(2)(I)**

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break
 - Flood Zone 2
 - Flood Zone 3

Sheet displays parts of Section A and Section B

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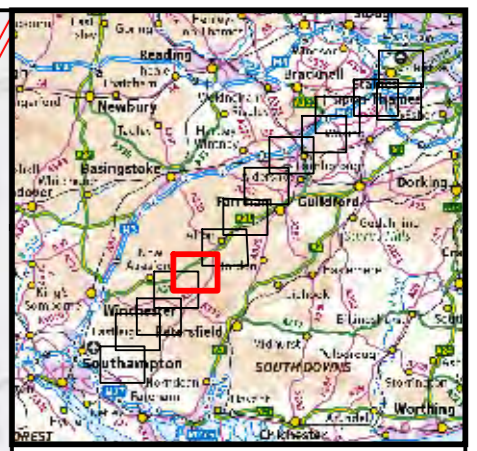
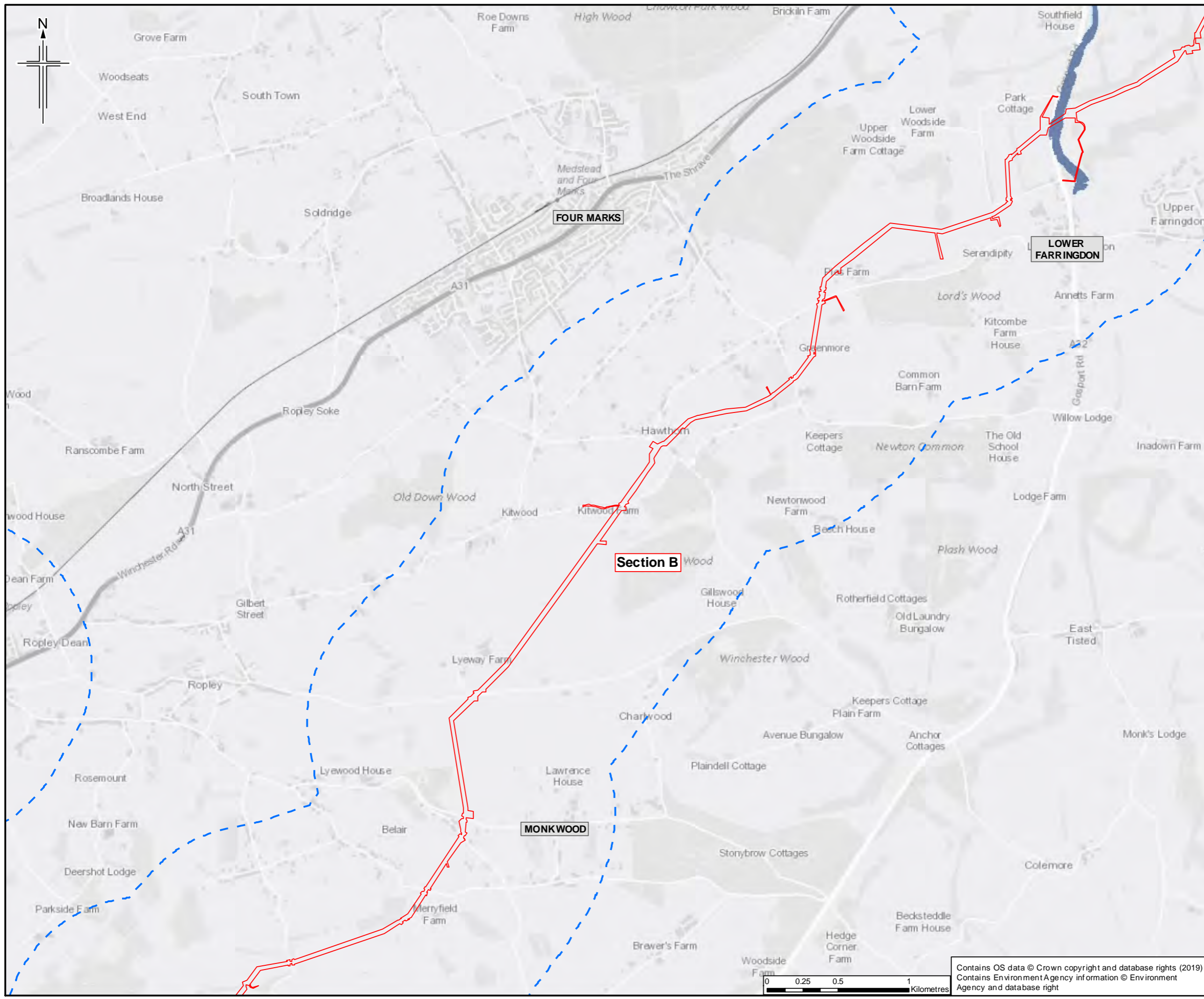
Project
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Drawing title
**FLOOD RISK ASSESSMENT
 PREFERRED ROUTE AND FLOOD ZONES
 APFP Reg. (2009) 5(2)(I)**

Drawing Status	For Issue
Scale	1:25,000 @ A3 DO NOT SCALE
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- Order Limits 1km buffer
- Section break
- Section break
- Flood Zone 2
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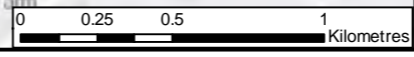
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Project

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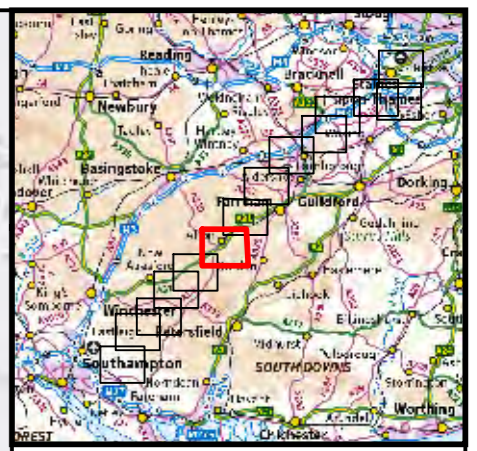
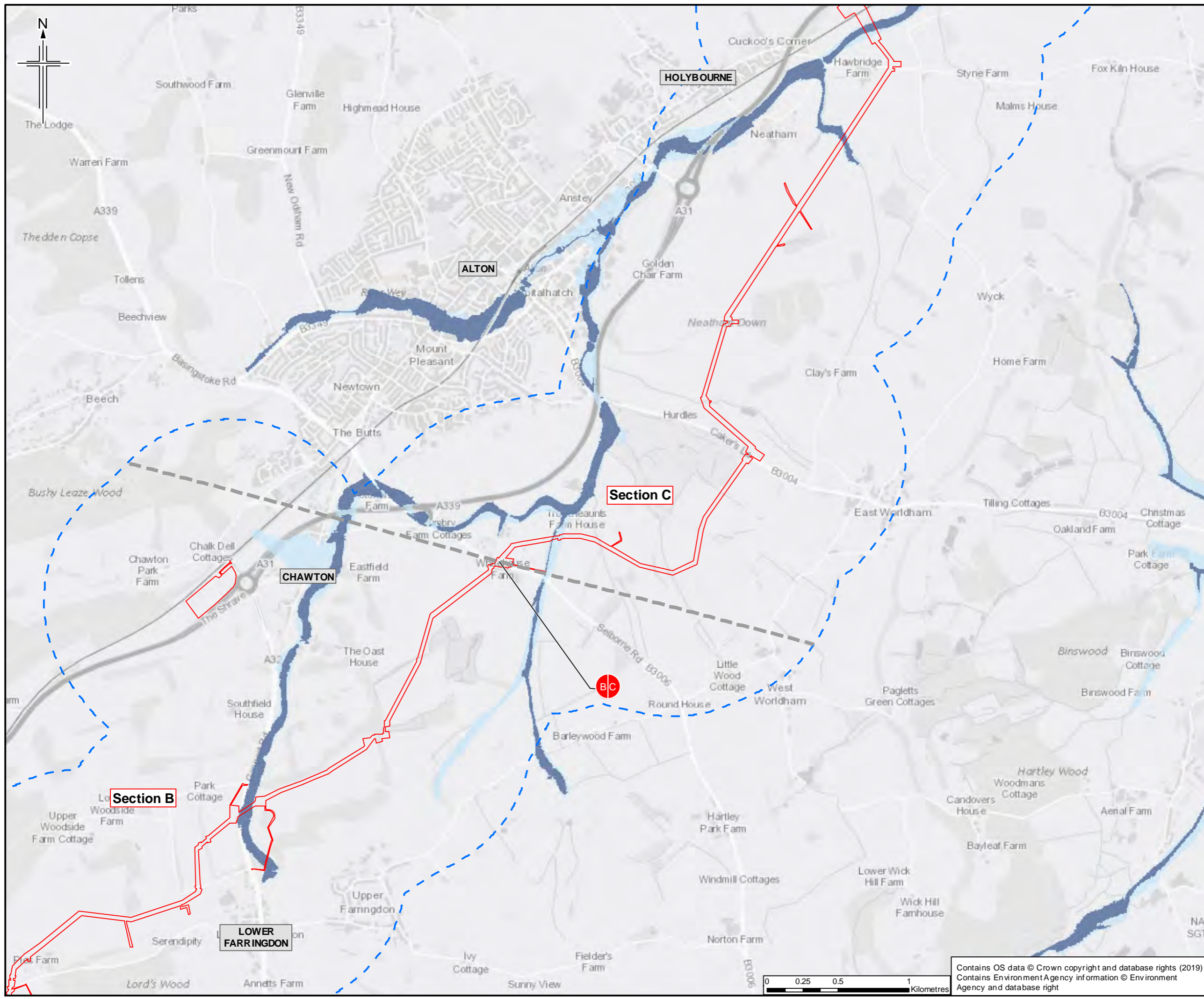
Drawing title
 FLOOD RISK ASSESSMENT
 PREFERRED ROUTE AND FLOOD ZONES
 APFP Reg. (2009) 5(2)(I)

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
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Drawing number	Figure A2 Sheet 5 of 14	Rev 0



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- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break
 - Flood Zone 2
 - Flood Zone 3

Sheet displays parts of Section B and Section C

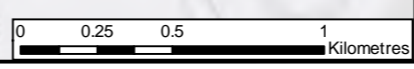
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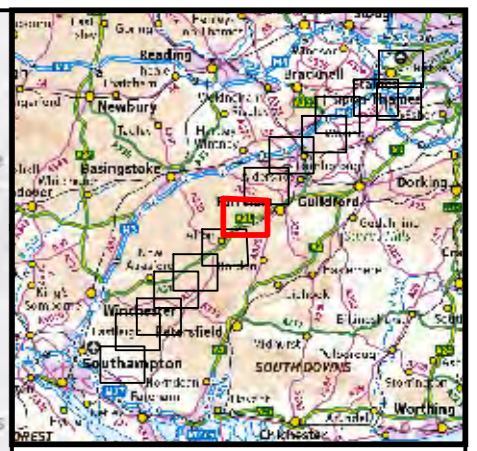
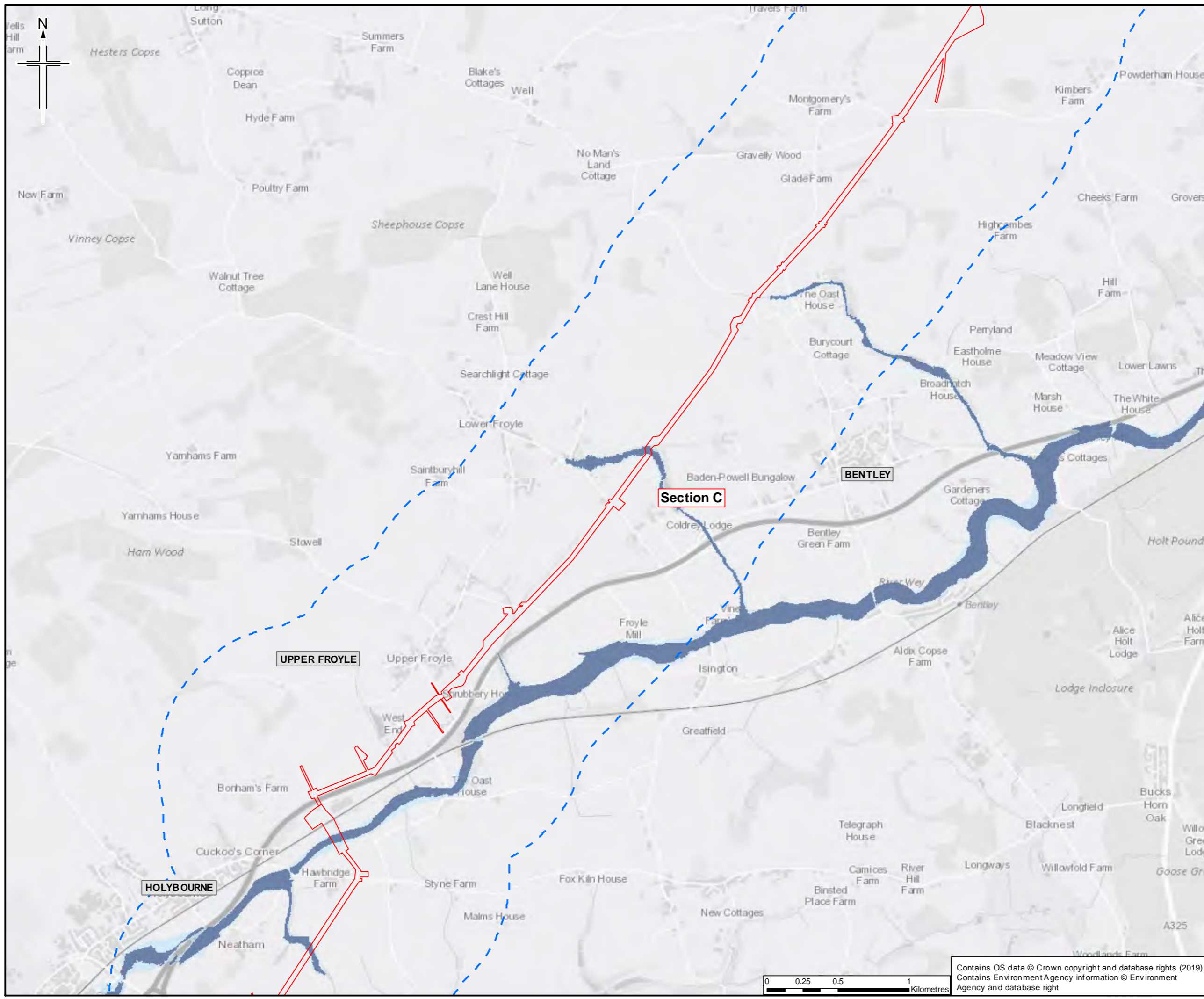
Project
 Southampton to London Pipeline Project

Drawing title
 FLOOD RISK ASSESSMENT
 PREFERRED ROUTE AND FLOOD ZONES
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break
 - Flood Zone 2
 - Flood Zone 3

Sheet displays part of Section C

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0	09/04/2019	For Issue	LM	FW	SM	SH

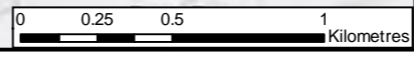


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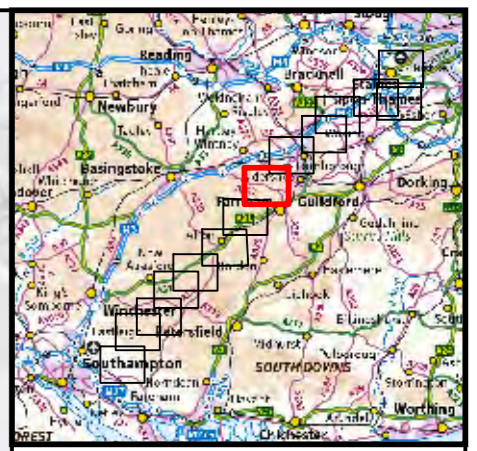
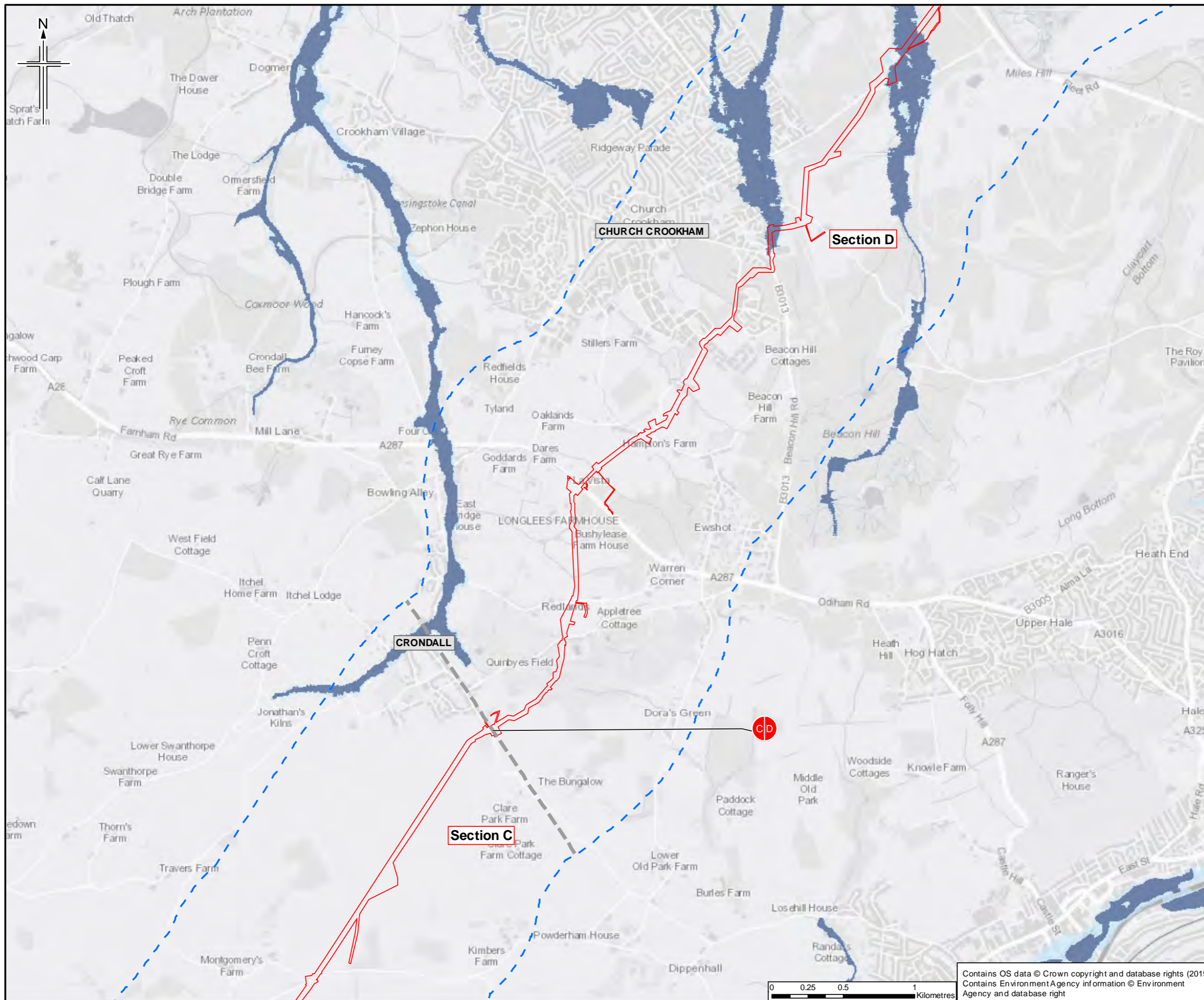


Drawing title
FLOOD RISK ASSESSMENT
PREFERRED ROUTE AND FLOOD ZONES
APFP Reg. (2009) 5(2)(I)

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break
 - Flood Zone 2
 - Flood Zone 3

Sheet displays parts of Section C and Section D

Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

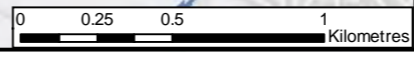


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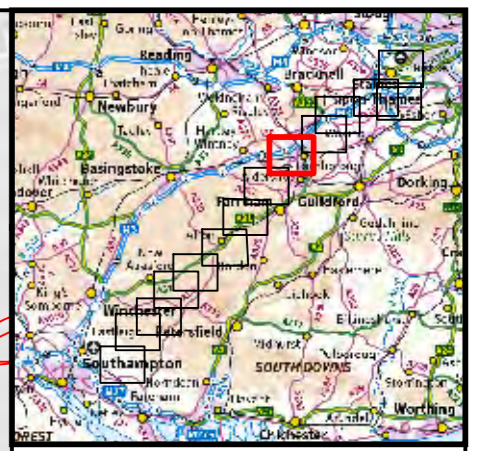
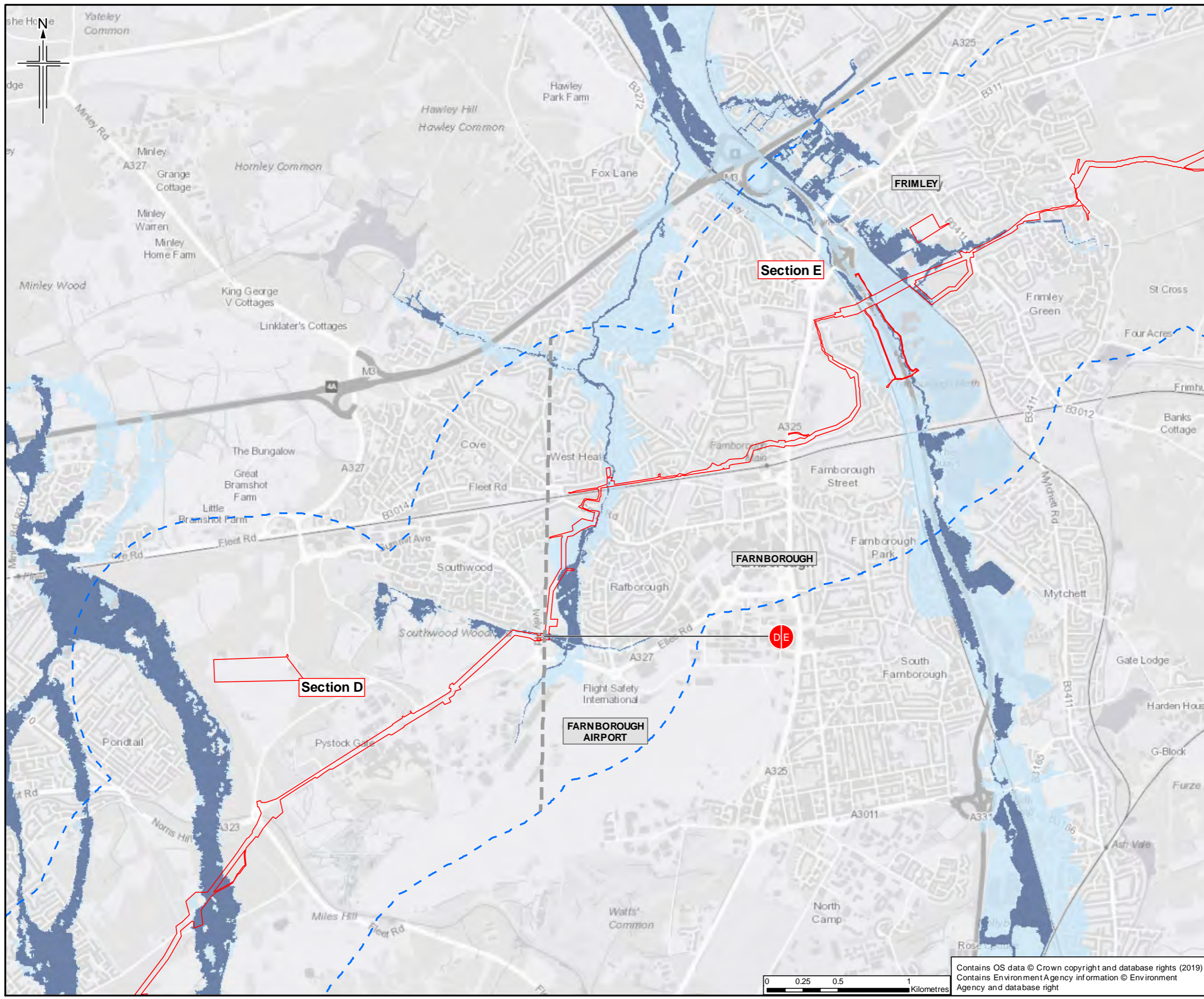
Drawing title
**FLOOD RISK ASSESSMENT
PREFERRED ROUTE AND FLOOD ZONES
APFP Reg. (2009) 5(2)(I)**

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break
 - Flood Zone 2
 - Flood Zone 3

Sheet displays parts of Section D and Section E

Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

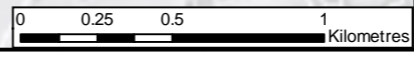
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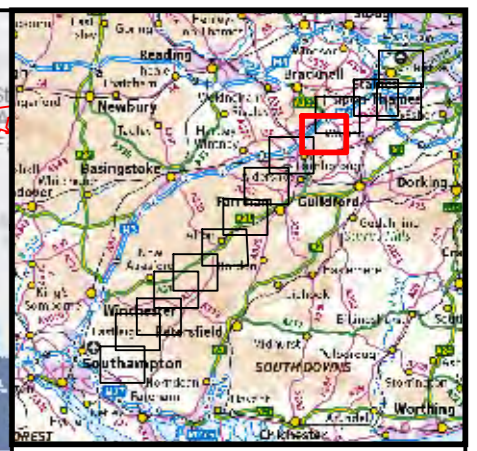
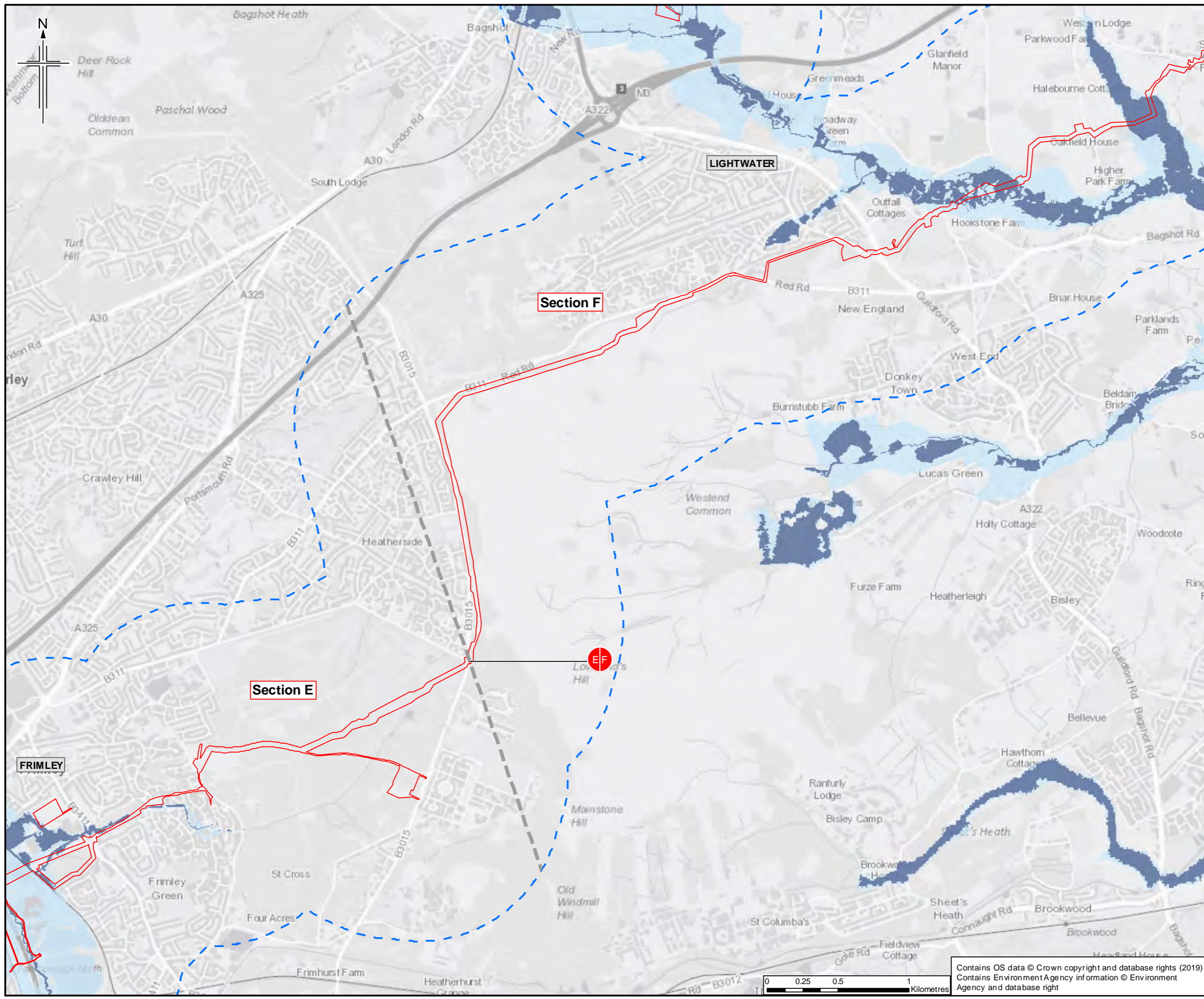
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**FLOOD RISK ASSESSMENT
 PREFERRED ROUTE AND FLOOD ZONES
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break
 - Flood Zone 2
 - Flood Zone 3

Sheet displays parts of Section E and Section F

Rev.	Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

Author

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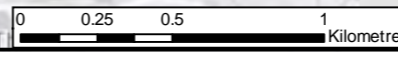
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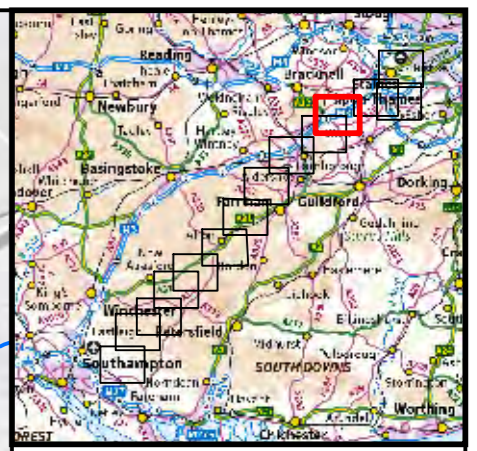
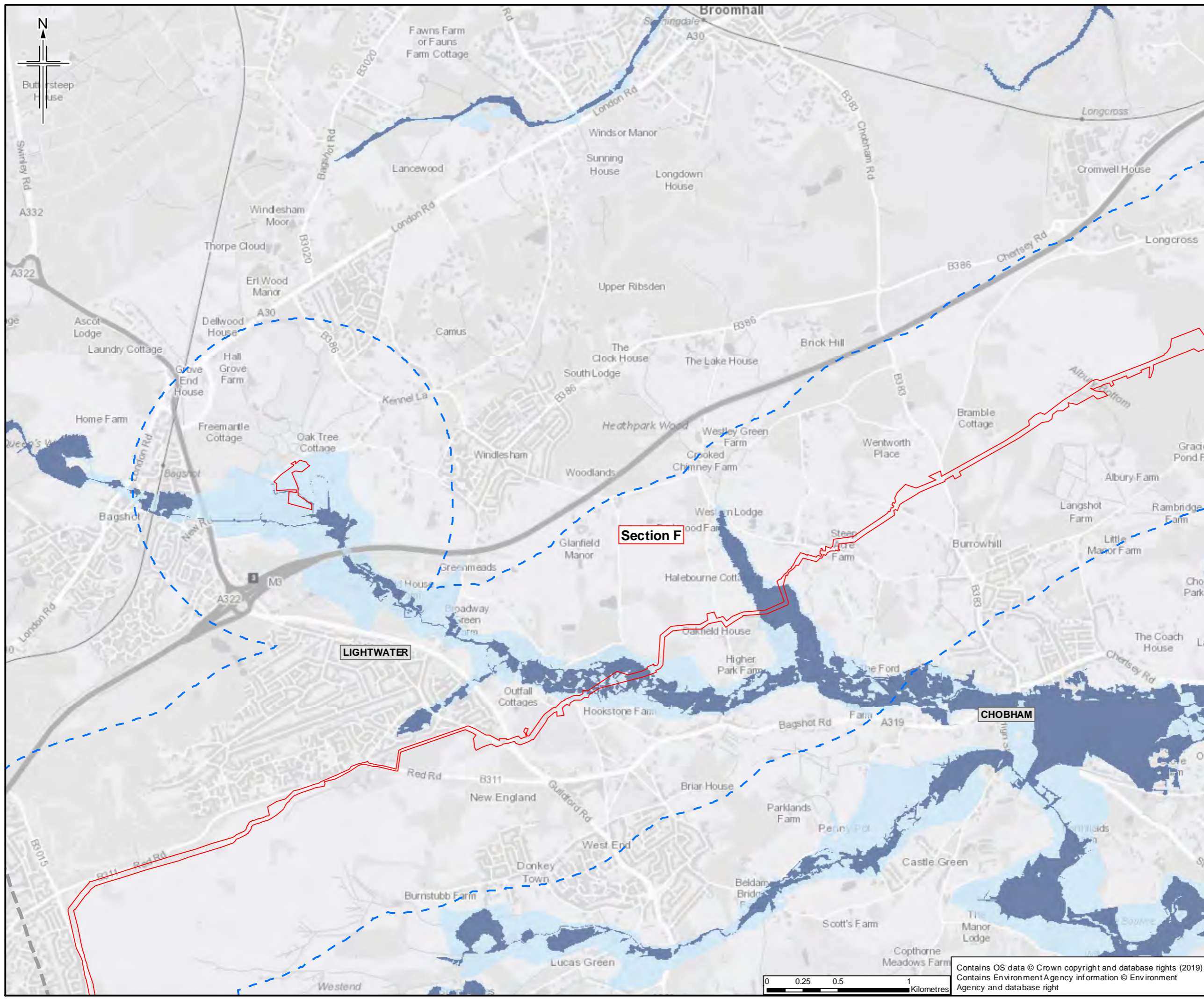
Drawing title

FLOOD RISK ASSESSMENT
PREFERRED ROUTE AND FLOOD ZONES
APFP Reg. (2009) 5(2)(I)

Drawing Status	For Issue	
Scale	1:25,000	@ A3 DO NOT SCALE
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- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break
 - Flood Zone 2
 - Flood Zone 3

Sheet displays part of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

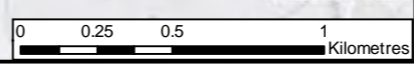
Author: **JACOBS**
 1180 Eastlake Road, Wokingham, Wokingham RG40 3DU, UK
 Tel: +44 (0) 1344 770000 Fax: +44(0)1344 770001
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Client: Esso Petroleum Company, Limited
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Project: Southampton to London Pipeline Project

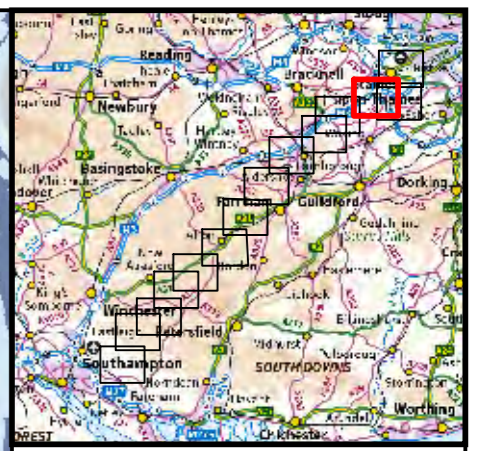
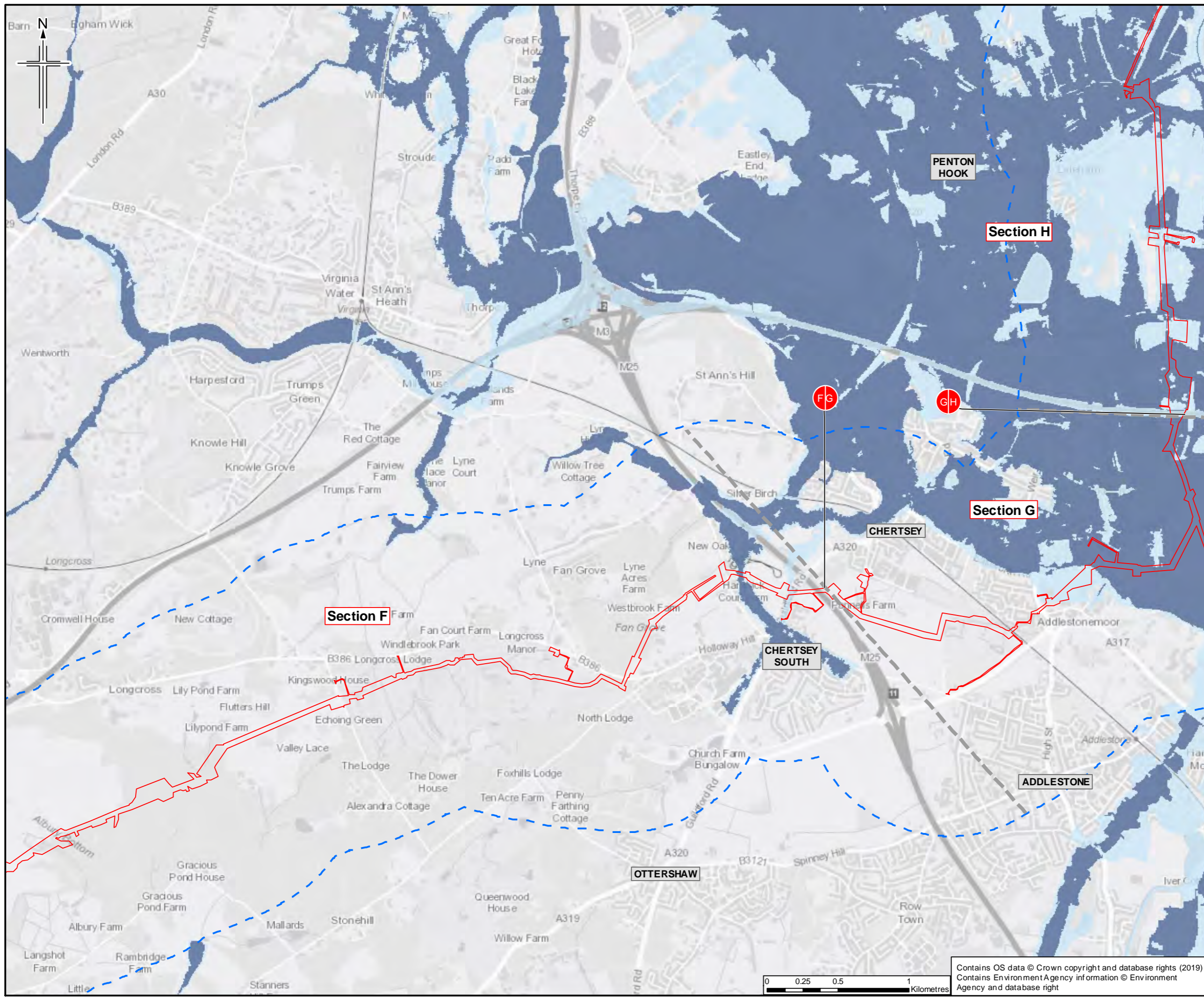
Drawing title: **FLOOD RISK ASSESSMENT
 PREFERRED ROUTE AND FLOOD ZONES
 APFP Reg. (2009) 5(2)(I)**

Drawing Status	For Issue
Scale	1:25,000 @ A3 DO NOT SCALE
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Legend

- Order Limits
- Order Limits 1km buffer
- Section break
- Section break
- Flood Zone 2
- Flood Zone 3

Sheet displays parts of Section F, Section G and Section H

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0	09/04/2019	For Issue	LM	FW	SM	SH

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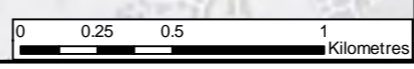
Client: Esso Petroleum Company, Limited
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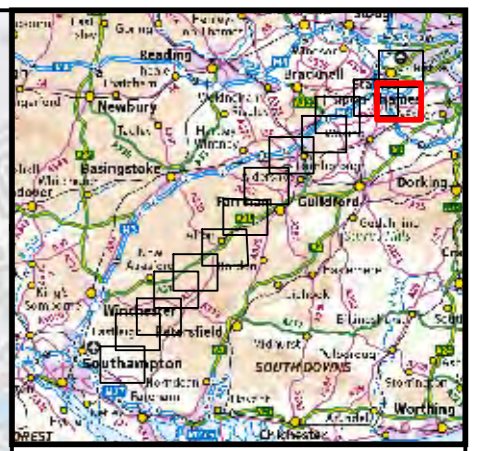
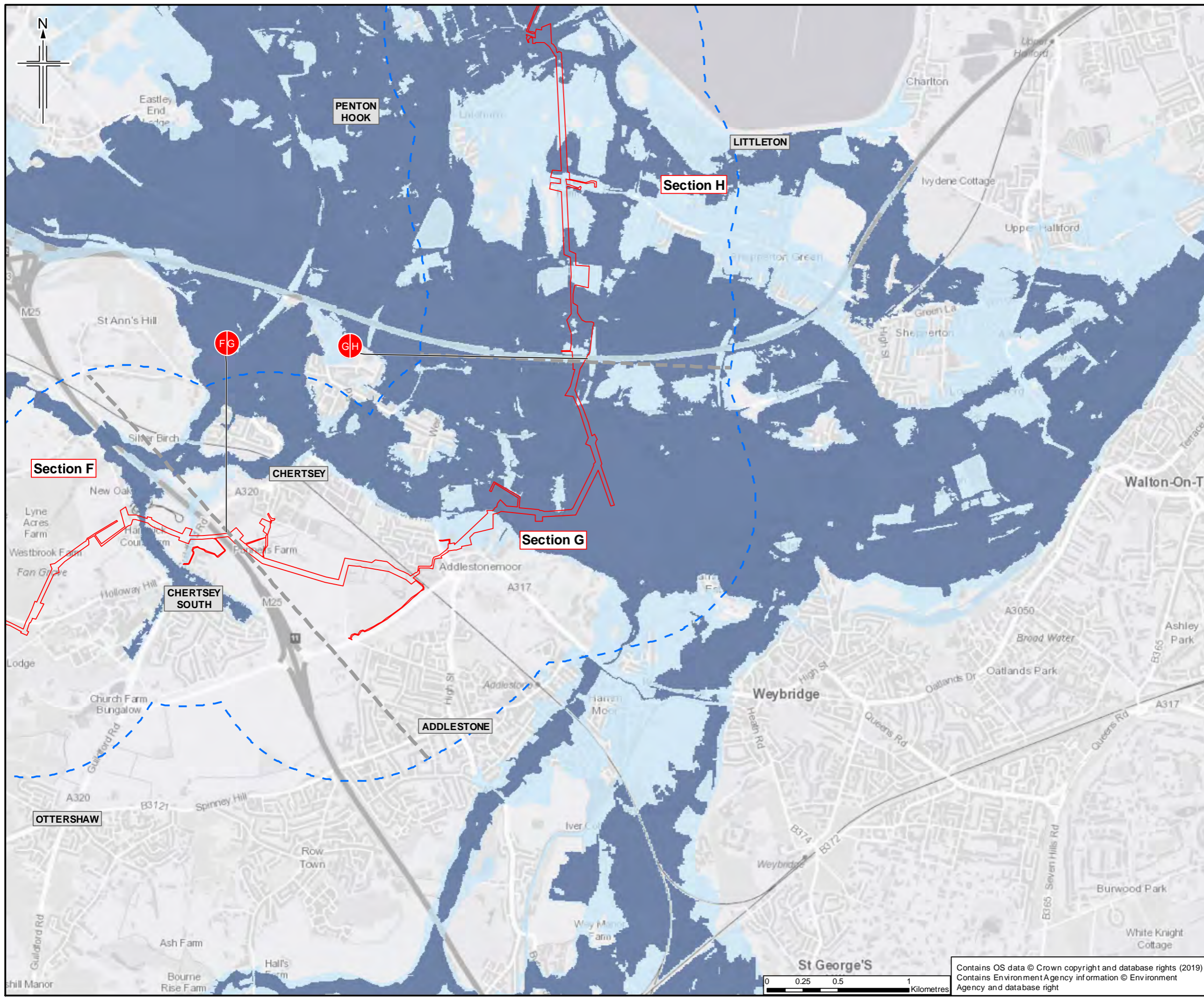
Project: Southampton to London Pipeline Project

Drawing title: **FLOOD RISK ASSESSMENT
 PREFERRED ROUTE AND FLOOD ZONES
 APFP Reg. (2009) 5(2)(I)**

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
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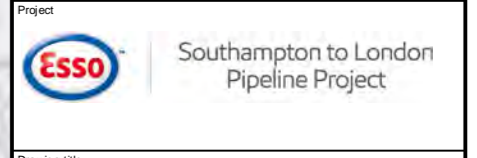
- Legend**
- Order Limits
 - Order Limits 1km buffer
 - Section break
 - Section break
 - Flood Zone 2
 - Flood Zone 3

Sheet displays parts of Section F, Section G and Section H

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
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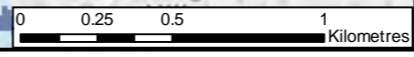
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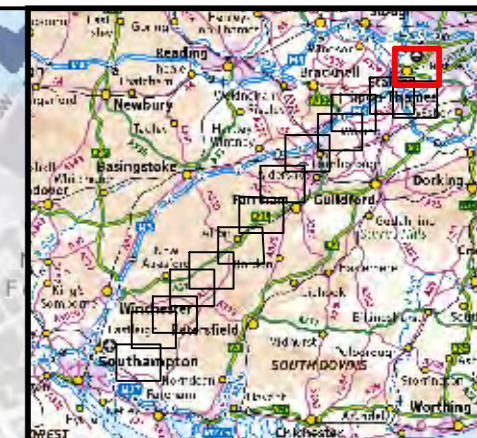
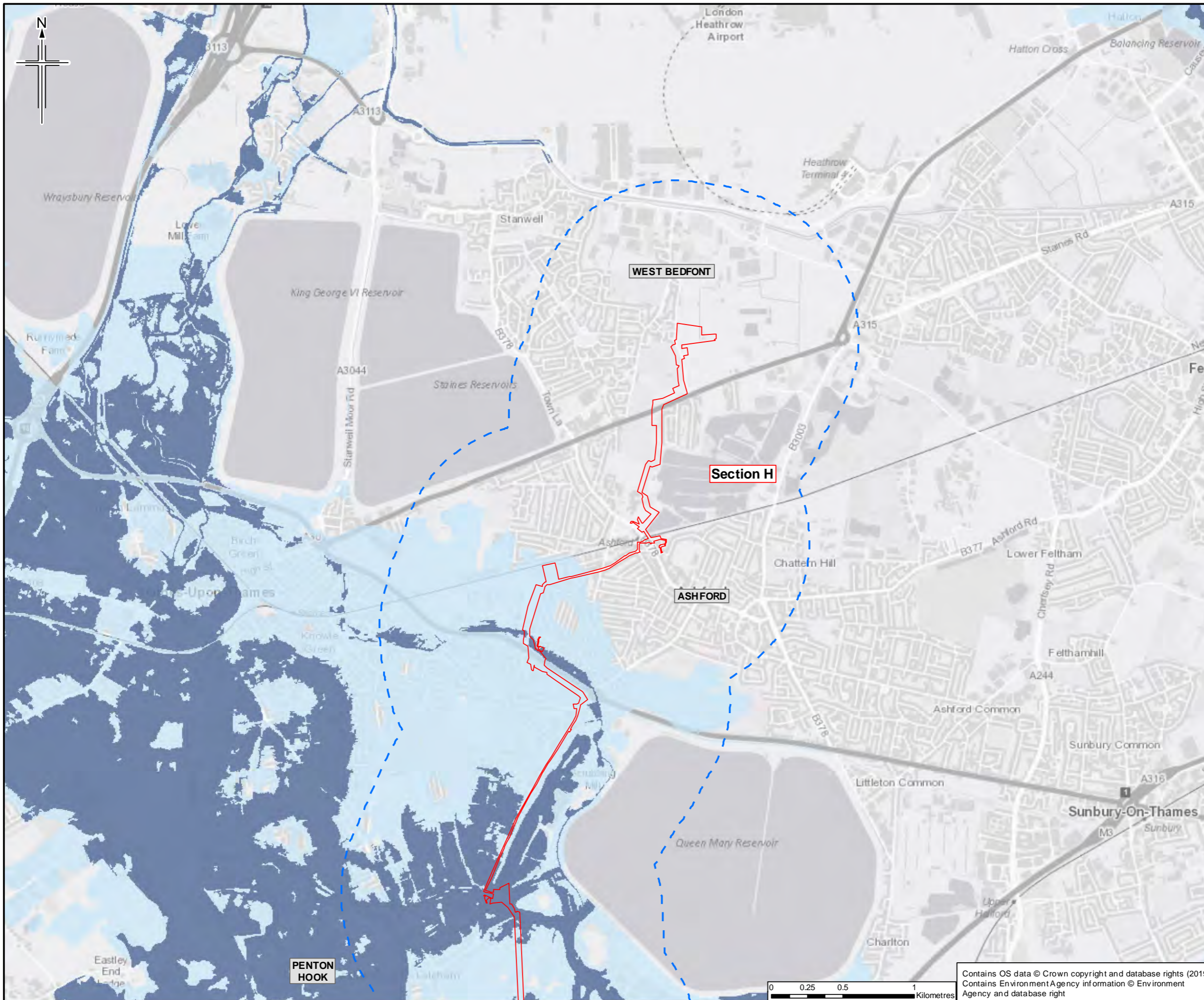


Drawing title
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APFP Reg. (2009) 5(2)(I)**

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
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- Legend**
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 - Order Limits 1km buffer
 - Section break
 - Section break
 - Flood Zone 2
 - Flood Zone 3

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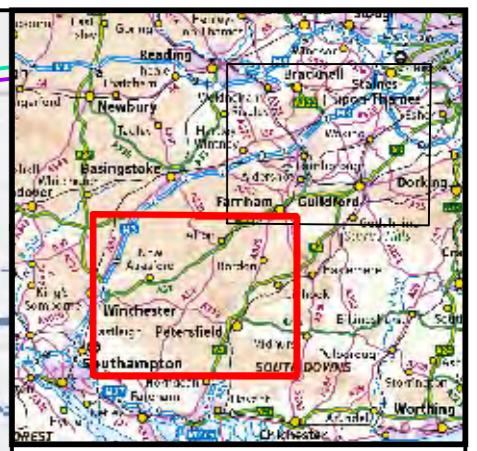
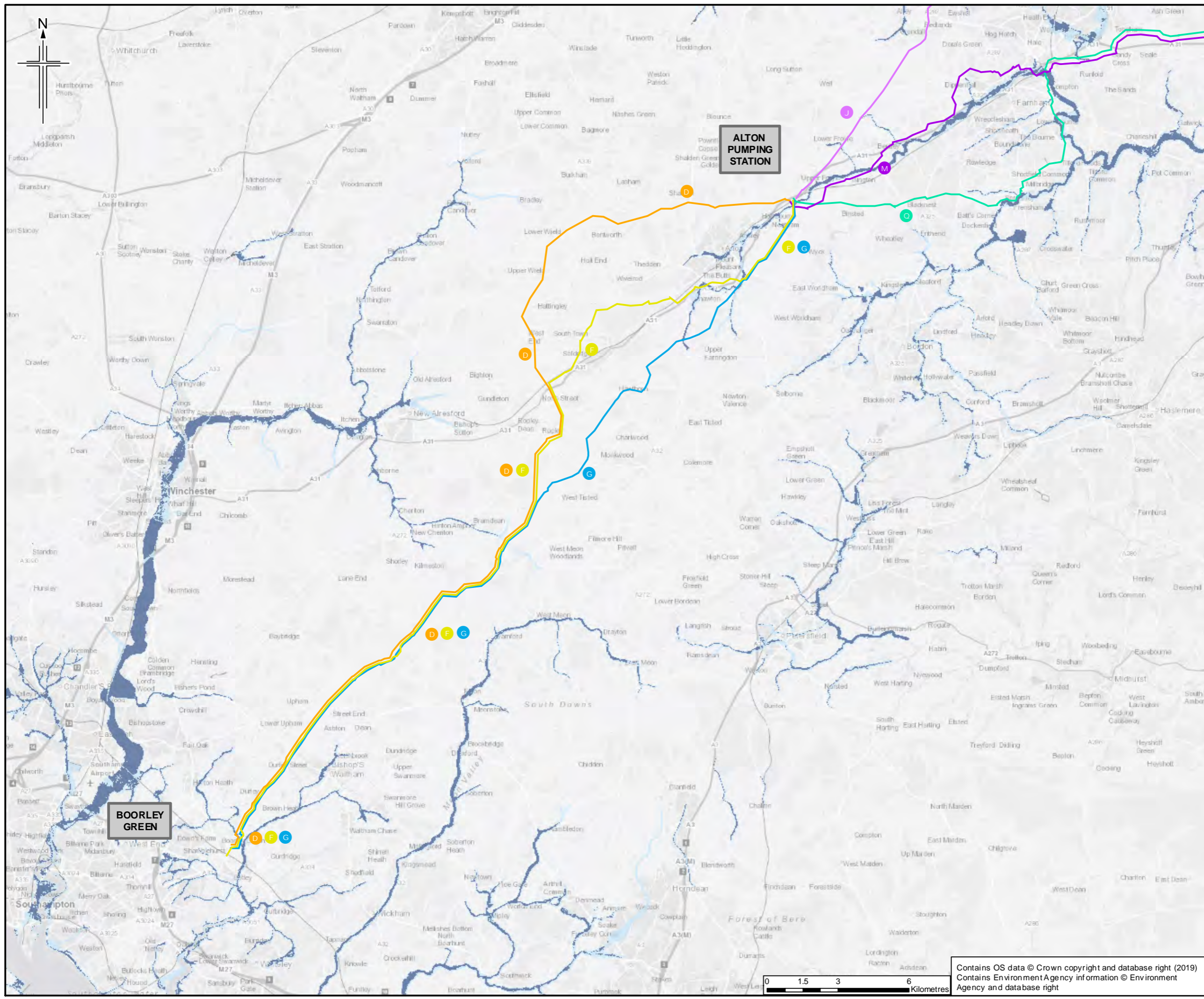
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 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue	
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Legend

Short List Corridor Options

- D
- F
- G (Favoured)
- J (Favoured)
- M
- Q

Flood Zone 2

Flood Zone 3

Colour coded centre lines have been used to illustrate each of the Short List pipeline corridor options, some of which are slightly offset to aid visualisation. Local widening of pipeline corridors and sub-options developed to allow routing flexibility due to potential constraints are not shown on the figure.

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Project
 Southampton to London Pipeline Project

Drawing title
**FLOOD RISK ASSESSMENT
 ALTERNATIVE ROUTE CORRIDORS
 (SOUTH)**
 APFP Reg. (2009) 5(2)(o)

Drawing Status: For Issue

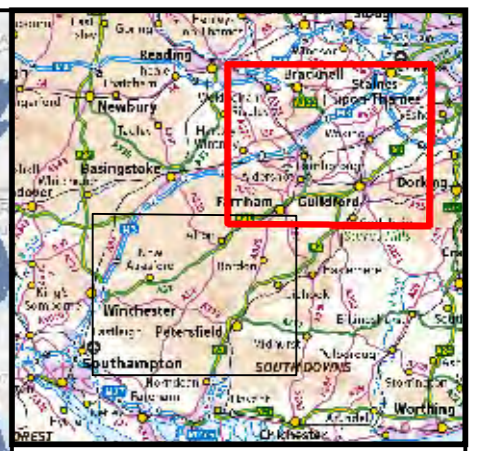
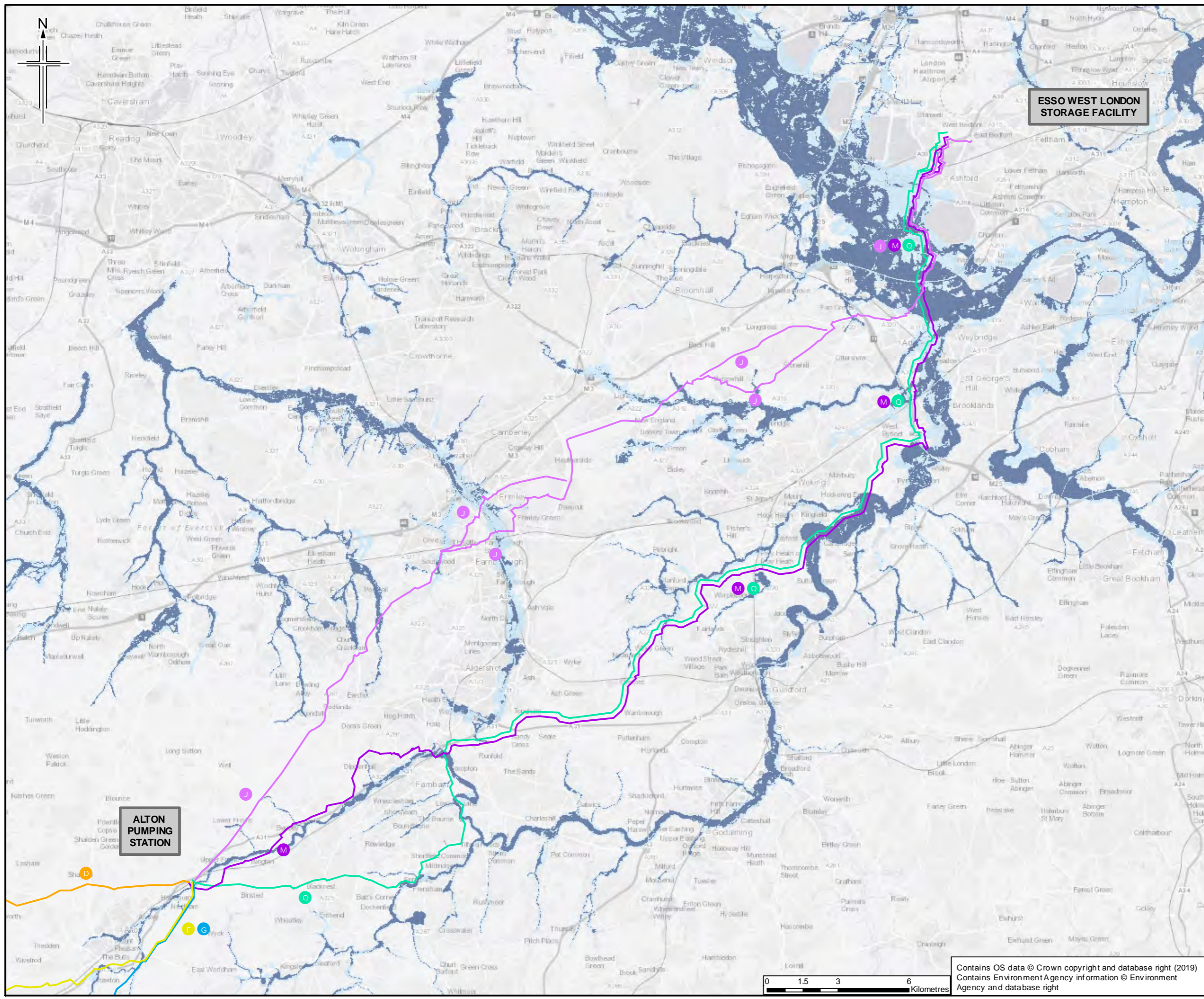
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ESSO WEST LONDON STORAGE FACILITY

ALTON PUMPING STATION

Legend
Short List Corridor Options

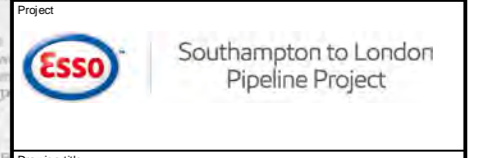
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- F
- G (Favoured)
- J (Favoured)
- M
- Q
- Flood Zone 2
- Flood Zone 3

Colour coded centre lines have been used to illustrate each of the Short List pipeline corridor options, some of which are slightly offset to aid visualisation. Local widening of pipeline corridors and sub-routes developed to allow routing flexibility due to potential constraints are not shown on the figure.

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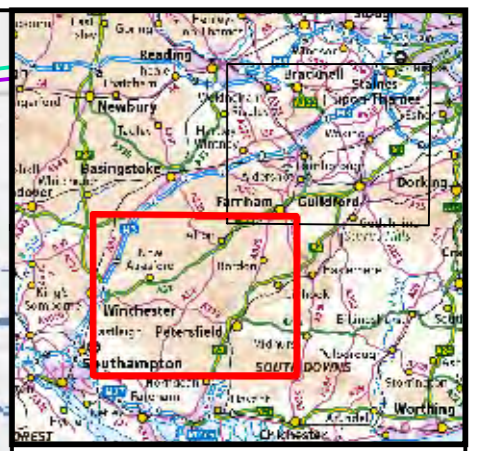
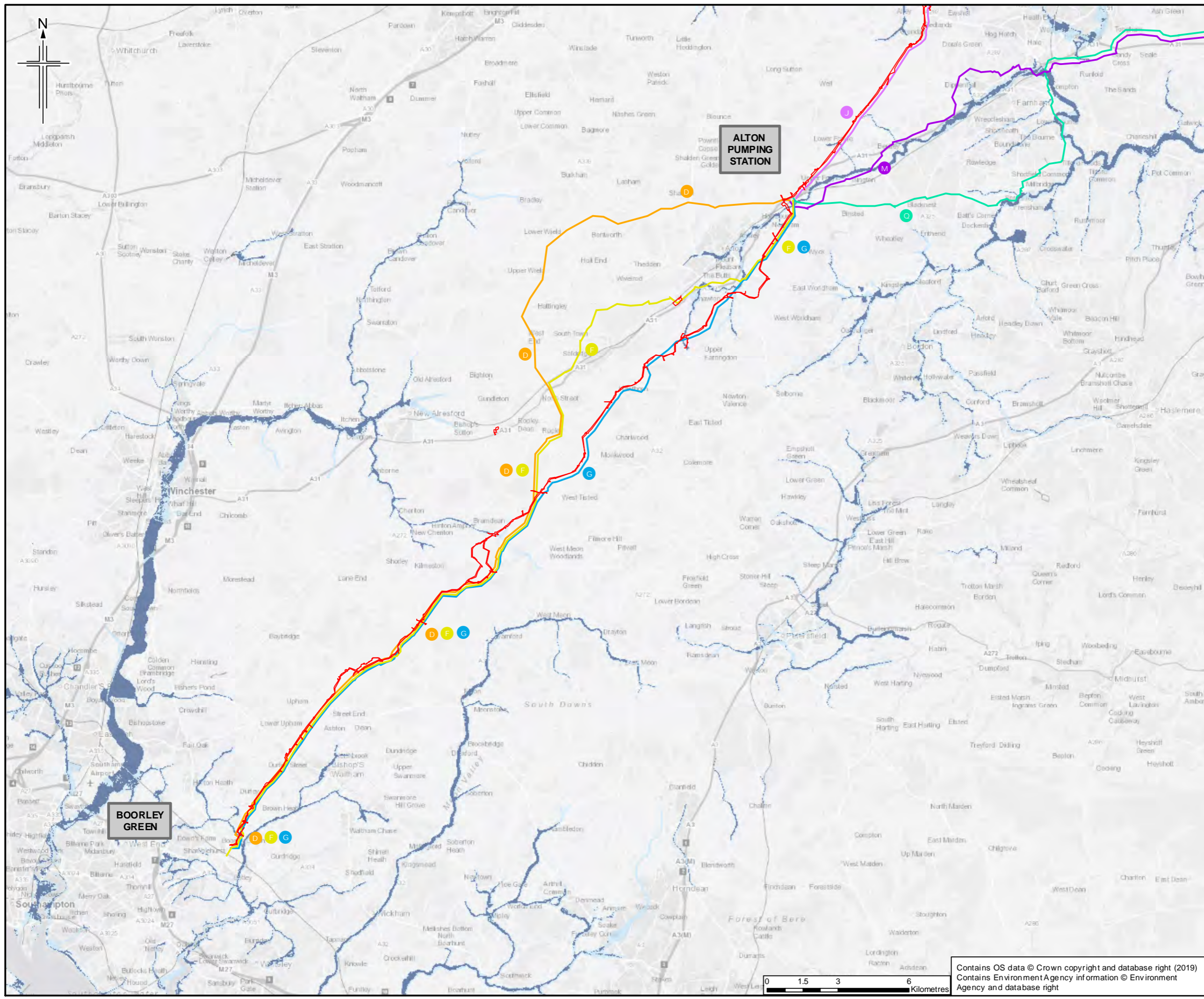


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**FLOOD RISK ASSESSMENT
ALTERNATIVE ROUTE CORRIDORS
(NORTH)**
APFP Reg. (2009) 5(2)(o)

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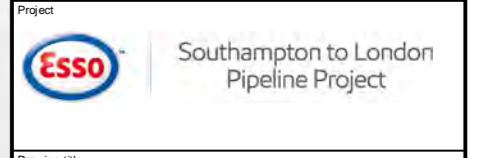
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- Short List Corridor Options**
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- F
- G (Favoured)
- J (Favoured)
- M
- Q
- Flood Zone 2
- Flood Zone 3

Colour coded centre lines have been used to illustrate each of the Short List pipeline corridor options, some of which are slightly offset to aid visualisation. Local widening of pipeline corridors and sub-options developed to allow routing flexibility due to potential constraints are not shown on the figure.

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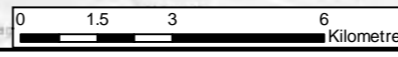
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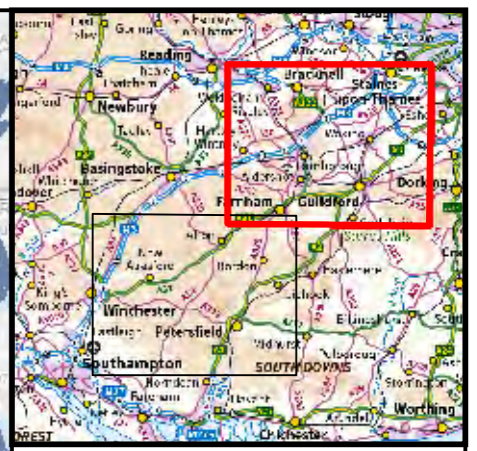
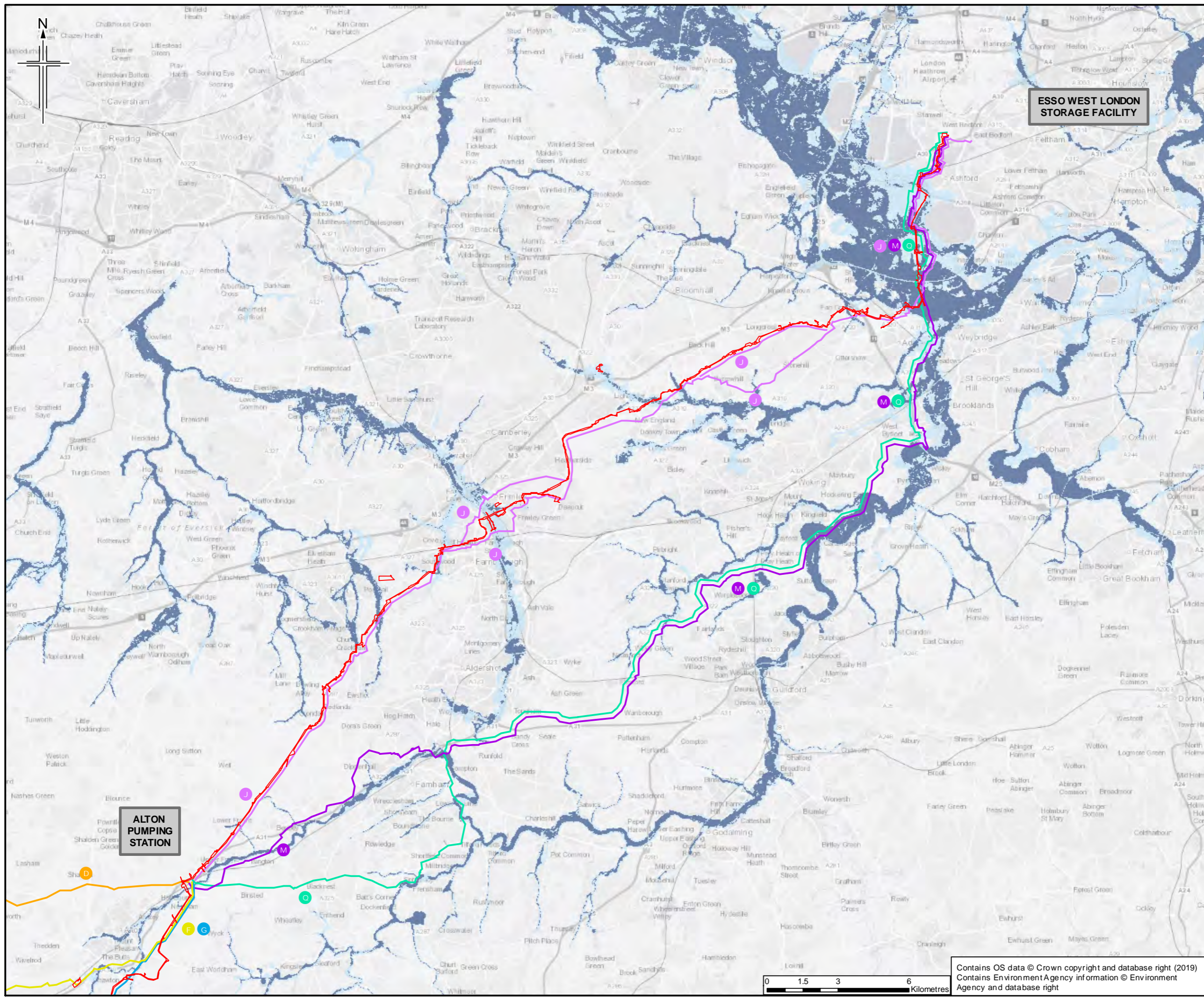


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**FLOOD RISK ASSESSMENT
PREFERRED ROUTE OVERLAIN
ON ROUTE CORRIDORS (SOUTH)
APFP Reg. (2009) 5(2)(o)**

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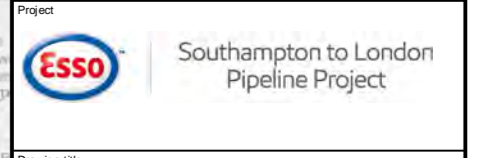
- Legend**
- Order Limits
 - Short List Corridor Options**
 - D
 - F
 - G (Favoured)
 - J (Favoured)
 - M
 - Q
 - Flood Zone 2
 - Flood Zone 3

Colour coded centre lines have been used to illustrate each of the Short List pipeline corridor options, some of which are slightly offset to aid visualisation. Local widening of pipeline corridors and sub-options developed to allow routing flexibility due to potential constraints are not shown on the figure.

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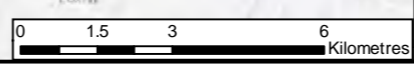


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**FLOOD RISK ASSESSMENT
PREFERRED ROUTE OVERLAIN
ON ROUTE CORRIDORS (NORTH)**
APFP Reg. (2009) 5(2)(o)

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Appendix B. Watercourse Crossing Summary



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SLP Flood Risk Assessment - Watercourse Crossing Schedule - Likelihood, Severity and Risk of Flooding

The watercourse crossings assessed in this schedule represent any location where the Order Limits are crossed by a watercourse. These include all locations where the pipeline crosses a watercourse, locations where a watercourse is within the Order Limits but may not be crossed by the pipeline itself and locations where access roads cross a watercourse to reach the main pipeline corridor. As such, the watercourse crossings included here differ from those presented in the Project Crossings Schedule as this only included crossings by the pipeline.

Note: W4 refers to mitigation measure W4. Refer to Table 13.2 in the FRA.

WCX/Watercourse Number	Easting	Northing	Section	Watercourse Name	Watercourse Type	Crossing Type	Flood Source	Likelihood	Justification	Risk from Construction		Mitigation	Severity	Risk	
										Unmitigated	Severity				
WCX 002a	451574	114737	A	Ford Lake	Main River	Trenchless without access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 003	452299	116363	A	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
W004	452760	116928	A	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	0.1%	Low	Some local disruption (minor road)	Low	Refer to mitigation reference W4	Very low	Very low
WCX 005	453272	117521	A	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Low	0.1%	Very low	Some local disruption (minor road)	Low	Refer to mitigation reference W4	Very low	Low
WCX 006	453569	118010	A	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Low	Some local disruption (minor road)	Medium	Refer to mitigation reference W4	Very low	Low
WCX 007	453735	118311	A	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Large	Disruption to residential property and road	High	Refer to mitigation reference W4	Very low	Low
W008	470548	135486	B	Unnamed watercourse	Ordinary Watercourse	Access Road only	Fluvial	Medium	Flood Zone 3	Low	Some local disruption (minor road)	Medium	Refer to mitigation reference W4	Very low	Low
W009	471430	136478	B	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
W009a	471431	136440	B	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 010	471637	136966	B	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 011	472138	137591	C	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	0.1%	Moderate	Local disruption to immediate properties and local road	Low	Refer to mitigation reference W4	Very low	Very low
WCX 012	472575	137804	C	Caker Stream	Main River	Open	Fluvial	Medium	Flood Zone 3	Low	Some local disruption (minor road)	Medium	Refer to mitigation reference W4	Very low	Low
WCX 013	472903	137776	C	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 014a	473398	137563	C	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 015	473622	137857	C	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
WCX 016	473779	138129	C	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 017	473647	138770	C	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Low	1%	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
WCX 018	474645	140620	C	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	Flood Zone 3	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
WCX 019	474811	141418	C	River Wey	Main River	Trenchless with launch/receptor sites outside floodplain - No access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 020	475191	142042	C	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 021	476058	142975	C	Ryebriidge Stream	Ordinary Watercourse	Open	Fluvial	Low	1%	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
WCX 023	477745	145220	C	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Low	1%	Low	Some local disruption (minor road)	Low	Refer to mitigation reference W4	Very low	Low
WCX 025a	480503	148626	D	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
WCX 026	480544	148879	D	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Low	1%	Low	Some local disruption (minor road)	Low	Refer to mitigation reference W4	Very low	Low
WCX 027	480636	149312	D	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 029	480624	149556	D	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 030	480617	149674	D	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very Low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 031	480770	150071	D	Unnamed watercourse	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - No access road	Fluvial	Very Low	0.1%	Very low	Trenchless Crossing	Very low	No mitigation required	Very low	Very low
W031 west	480900	149931	D	Unnamed Watercourse	Ordinary Watercourse	Access Road only	Fluvial	Very Low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 032	481072	150301	D	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Large	Disruption to residential property and road	High	Refer to mitigation reference W4	Very low	Low
WCX 033	481391	150648	D	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Low	1%	Low	Some local disruption (minor road)	Low	Refer to mitigation reference W4	Very low	Low
WCX 034	481401	150668	D	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Low	1%	Low	Some local disruption (minor road)	Low	Refer to mitigation reference W4	Very low	Low
WCX 035	481747	151222	D	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very low	No Flooding	Large	Disruption to residential property and road	Medium	Refer to mitigation reference W4	Very low	Low
WCX 036	482012	151475	D	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Low	1%	Moderate	Disruption to communities, possible local evacuation may be necessary	Medium	Refer to mitigation reference W4	Very low	Low
WCX 038	482849	152914	D	Unnamed watercourse	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - access road	Fluvial	Very low	Flood Zone 2	Very low	Trenchless Crossing	Very low	No mitigation required	Very low	Very low
WCX 039	482970	153083	D	Unnamed watercourse	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 040	483005	153129	D	Gelvert Stream	Main River	Trenchless with launch/receptor sites outside floodplain - access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 041	483311	153562	D	Basingstoke Canal	Canal	Trenchless without access road	Fluvial	Very low	No Flooding	Very low	Trenchless Crossing	Very low	No mitigation required	Very low	Very low
WCX 043	484072	154070	D	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very low	No Flooding	Moderate	Disruption to communities, possible local evacuation may be necessary	Low	Refer to mitigation reference W4	Very low	Very low
WCX 044	484287	154225	D	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very low	0.1%	Moderate	Disruption to communities, possible local evacuation may be necessary	Low	Refer to mitigation reference W4	Very low	Very low
WCX 045	484948	154734	D	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 047	485309	154843	E	Iveley Brook (formerley named)	Main River	Open	Fluvial	Medium	Flood Zone 3	Large	Disruption to residential property and road	High	Refer to mitigation reference W4	Very low	Low
WCX 048c	485744	155897	E	Cove Brook	Main River	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
W048	485761	155935	E	Cove Brook	Main River	Access Road only	Fluvial	Medium	Flood Zone 3	Large	Disruption to residential property and road	High	Refer to mitigation reference W4	Very low	Low
WCX 049	486557	156036	E	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Large	Disruption to residential property and road	High	Refer to mitigation reference W4	Very low	Low
WCX 051	487617	157208	E	River Blackwater	Main River	Trenchless with launch/receptor sites outside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 055	487785	157296	E	The Hatches (formerly Water f	Lake	Trenchless with launch/receptor sites outside floodplain - no access road	Fluvial	Very low	Flood Zone 2	Very low	Trenchless Crossing	Very low	No mitigation required	Very low	Very low
WCX 058a	487856	157334	E	Unnamed watercourse	Main River	Trenchless with launch/receptor sites outside floodplain - access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 058b	488013	157408	E	Unnamed watercourse	Main River	Open	Fluvial	Medium	3.3%	Moderate	Disruption to communities, possible local evacuation may be necessary	Medium	Refer to mitigation reference W4	Very low	Low
WCX 058c	488639	157744	E	Unnamed watercourse	Main River	Open	Fluvial	Medium	Flood Zone 3	Large	Disruption to residential property and road	High	Refer to mitigation reference W4	Very low	Low
WCX 058d	487916	157302	E	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
W060	490311	158119	E	Unnamed watercourse	Ordinary Watercourse	Access Road only	Fluvial	Very low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
W062	491196	160955	F	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very low	No Flooding	Low	Some local disruption (minor road)	Low	Refer to mitigation reference W4	Very low	Very low
WCX 063	492951	161502	F	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Large	Disruption to residential property and road	High	Refer to mitigation reference W4	Very low	Low
WCX 064	493997	161721	F	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 065	494149	161808	F	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Low	Some local disruption (minor road)	Medium	Refer to mitigation reference W4	Very low	Low

Note: W4 refers to mitigation measure W4. Refer to Table 13.2 in the FRA.

										Risk from Construction					
										Unmitigated					
WCX/Watercourse Number	Eastings	Northing	Section	Watercourse Name	Watercourse Type	Crossing Type	Flood Source	Likelihood	Justification	Severity	Justification	Risk	Mitigation	Severity	Risk
WCX 066	494429	162042	F	Hale Bourne	Main River	Trenchless with launch/receptor site inside floodplain - access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 067	494611	162102	F	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
WCX 068	494822	162164	F	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	Flood Zone 3	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
WCX 068a	494797	162154	F	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Medium	Flood Zone 3	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
WCX 070	495634	162585	F	Clappers Brook	Main River	Open	Fluvial	Medium	Flood Zone 3	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
W072	496989	163352	F	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Low	Some local disruption (minor road)	Medium	Refer to mitigation reference W4	Very low	Low
WCX 073	497876	164148	F	Unnamed watercourse	Main River	Trenchless with launch/receptor sites outside floodplain - access road	Fluvial	Medium	3.3%	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 076	498966	164596	F	Unnamed watercourse	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - access road	Fluvial	Very low	1%	Very low	Trenchless Crossing	Very low	No mitigation required	Very low	Very low
WCX 077	499995	165165	F	Unnamed watercourse	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - no access road	Fluvial	Very low	No Flooding	Very low	Trenchless Crossing	Very low	No mitigation required	Very low	Very low
WCX 079	500215	165261	F	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 079a	500125	165220	F	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 079b	500097	165181	F	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 079c	500028	165181	F	Unnamed Watercourse	Ordinary Watercourse	Access Road only	Fluvial	Very low	No Flooding	Low	Some local disruption (minor road)	Low	Refer to mitigation reference W4	Very low	Very low
WCX 080	500554	165365	F	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Low	1%	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
WCX 081	501127	165399	F	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 081a	501203	165341	F	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 082	501331	165309	F	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 083	501846	165305	F	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 085a	487617	157208	F	Unnamed watercourse	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 086	503134	165906	F	Unnamed watercourse	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - no access road	Fluvial	Very low	0.1%	Very low	Trenchless Crossing	Very low	No mitigation required	Very low	Very low
W087	503616	165892	G	Unnamed watercourse	Ordinary Watercourse	Access Road only	Fluvial	Very low	0.1%	Moderate	Disruption to non-residential property	Low	Refer to mitigation reference W4	Very low	Low
WCX 092	504262	165747	G	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
WCX 092a	504196	165608	G	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 093	504406	165726	G	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Very low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 093a	504730	165656	G	Unnamed watercourse	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - no access road	Fluvial	Very low	1%	Very low	Trenchless Crossing	Very low	No mitigation required	Very low	Very low
WCX 093b	504696	165632	G	Unnamed watercourse	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - no access road	Fluvial	Very low	1%	Very low	Trenchless Crossing	Very low	No mitigation required	Very low	Very low
WCX 095	505288	166099	G	The Bourne	Main River	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 096b	505921	166732	G	River Thames	Main River	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 098	506220	167818	H	Unnamed watercourse	Ordinary Watercourse	Open	Fluvial	Medium	Flood Zone 3	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
WCX 100	505809	171293	H	River Ash	Main River	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 102d	505578	169456	H	Intake Channel	Ordinary Watercourse	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No mitigation required	Very low	Low
WCX 104f	506135	170684	H	King George VI Reservoir water	Canal	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Very low	Flood Zone 2	Very low	Trenchless Crossing	Very low	No mitigation required	Very low	Very low
WCX 105	506026	171133	H	Unnamed watercourse	Ordinary Watercourse	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Very low	Flood Zone 2	Very low	Trenchless Crossing	Very low	No mitigation required	Very low	Very low
WCX 106	506062	171670	H	Unnamed Watercourse	Main River	Open	Fluvial	Very low	Flood Zone 2	Large	Disruption to residential property and road	Medium	Refer to mitigation reference W4	Very low	Very low
WCX 094	504553	165695	G	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 108	504660	165632	G	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 111	477027	144156	C	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Medium	Flood Zone 3	Very low	Inconvenience (field flooding or local ponding)	Low	Refer to mitigation reference W4	Very low	Low
WCX 112	495947	162989	F	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Medium	3.3%	Large	Disruption to residential property and road	High	Refer to mitigation reference W4	Very low	Low
WCX 113	505790	168131	H	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very low	Flood Zone 2	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 114	473290	137592	C	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very low	No Flooding	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 115	500256	165274	F	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very low	0.1%	Very low	Inconvenience (field flooding or local ponding)	Very low	Refer to mitigation reference W4	Very low	Very low
WCX 116	502711	166055	F	Unnamed Watercourse	Ordinary Watercourse	Trenchless with launch/receptor site outside floodplain - no access road	Fluvial	Very low	0.1%	Very low	Trenchless Crossing	Very low	No mitigation required	Very low	Very low

SLP Flood Risk Assessment - Watercourse Crossing Schedule - Likelihood, Severity and Risk of Flooding

The watercourse crossings assessed in this schedule represent any location where the Order Limits are crossed by a watercourse. These include all locations where the pipeline crosses a watercourse, locations where a watercourse is within the Order Limits but may not be crossed by the pipeline itself and locations where access roads cross a watercourse to reach the main pipeline corridor. As such, the watercourse crossings included here differ from those presented in the Project Crossings Schedule as this only included crossings by the pipeline.

Note: W1, W4 and W7 refer to mitigations measures W1, W4 and W7. Refer to Table 13.2 in the FRA.

WCX/ref Number	Ref / ID	Easting	Northing	Section	Watercourse Name	Watercourse Type	Crossing Type	Flood Source	Likelihood	Justification	Risk to Construction					
											Severity	Unmitigated		Mitigated		
												Justification	Risk	Mitigation	Severity	Risk
WCX 002a	W002	451574	114737	A	Ford Lake	Main River	Trenchless without access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low
WCX 003	W003	452299	116363	A	Unnamed watercourse 2	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
W004	W004	452760	116928	A	Unnamed watercourse 3	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 005	W005	453272	117521	A	Unnamed watercourse 4	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 006	W006	453569	118010	A	Unnamed watercourse 5	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 007	W007	453735	118311	A	Unnamed watercourse 6	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
W008	W008	470548	135486	B	Unnamed watercourse 7	Ordinary Watercourse	Access Road only	Fluvial	Medium	Flood Zone 3	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
W009	W009	471430	136478	B	Unnamed watercourse 8	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
W009a	W009a	471431	136440	B	Unnamed Watercourse	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 010	W010	471637	136966	B	Unnamed watercourse 9	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 011	W011	472138	137591	C	Unnamed watercourse 10	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 012	W012	472575	137804	C	Caker Stream	Main River	Open	Fluvial	Medium	Flood Zone 3	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 013	W013	472903	137776	C	Unnamed watercourse 11	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 014a	W014	473398	137563	C	Unnamed Watercourse	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 015	W015	473622	137857	C	Unnamed watercourse 12	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 016	W016	473779	138129	C	Unnamed watercourse 13	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 017	W017	473647	138770	C	Unnamed watercourse 14	Ordinary Watercourse	Open	Surface Water	Low	1%	Large	Open cut, workers and equipment in floodplain	Medium	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 018	W018	474645	140620	C	Unnamed watercourse 15	Ordinary Watercourse	Open	Fluvial	Medium	Flood Zone 3	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 019	W019	474811	141418	C	River Wey	Main River	Trenchless with launch/receptor sites outside floodplain - No access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low

WCX/ref Number	Ref / ID	Easting	Northing	Section	Watercourse Name	Watercourse Type	Crossing Type	Flood Source	Likelihood	Justification	Unmitigated			Mitigated		
											Severity	Justification	Risk	Mitigation	Severity	Risk
WCX 020	W020	475191	142042	C	Unnamed watercourse 16	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 021	W021	476058	142975	C	Ryebriidge Stream	Ordinary Watercourse	Open	Surface Water	Low	1%	Large	Open cut, workers and equipment in floodplain	Medium	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 023	W023	477745	145220	C	Unnamed watercourse 17	Ordinary Watercourse	Open	Surface Water	Low	1%	Large	Open cut, workers and equipment in floodplain	Medium	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 025a	W025	480503	148626	D	Unnamed watercourse 18	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 026	W026	480544	148879	D	Unnamed watercourse 19	Ordinary Watercourse	Open	Surface Water	Low	1%	Large	Open cut, workers and equipment in floodplain	Medium	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 027	W027	480636	149312	D	Unnamed watercourse 20	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 029	W029	480624	149556	D	Unnamed watercourse 22	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 030	W030	480617	149674	D	Unnamed watercourse 23	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 031	W031	480770	150071	D	Unnamed watercourse 24	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - No access road	Surface Water	Very low	0.1%	Very low	Trenchless Crossing	Very low	No Mitigation	Very low	Very low
W031 west	W031 west	480900	149931	D	Unnamed Watercourse	Ordinary Watercourse	Access Road only	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 032	W032	481072	150301	D	Unnamed watercourse 25	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 033	W033	481391	150648	D	Unnamed watercourse 26	Ordinary Watercourse	Open	Surface Water	Low	1%	Large	Open cut, workers and equipment in floodplain	Medium	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 034	W034	481401	150668	D	Unnamed watercourse 27	Ordinary Watercourse	Open	Surface Water	Low	1%	Large	Open cut, workers and equipment in floodplain	Medium	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 035	W035	481747	151222	D	Unnamed watercourse 28	Ordinary Watercourse	Open	Surface Water	Very low	No Flooding	Large	Open cut, workers and equipment in floodplain	Medium	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 036	W036	482012	151475	D	Unnamed watercourse 29	Ordinary Watercourse	Open	Surface Water	Low	1%	Large	Open cut, workers and equipment in floodplain	Medium	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 038	W038	482849	152914	D	Unnamed watercourse 31	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - access road	Fluvial	Very low	Flood Zone 2	Very low	Trenchless Crossing	Very low	No Mitigation	Very low	Very low
WCX 039	W039	482970	153083	D	Unnamed watercourse 32	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low
WCX 040	W040	483005	153129	D	Gelvert Stream	Main River	Trenchless with launch/receptor sites outside floodplain - access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low
WCX 041	W041	483311	153562	D	Basingstoke Canal	Canal	Trenchless without access road	No Flooding	Very low	<0.1%	Very low	Trenchless Crossing	Very low	No Mitigation	Very low	Very low
WCX 043	W043	484072	154070	D	Unnamed watercourse 34	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 044	W044	484287	154225	D	Unnamed watercourse 35	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 045	W045 NE	484948	154734	D	Unnamed Watercourse	Ordinary Watercourse	Open	Surface Water	Very low	1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 047	W047	485309	154843	E	formerley named Unnamed wa	Main River	Open	Fluvial	Medium	Flood Zone 3	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference W7, G127, G28, W1, W4, and G184.	Very low	Low
WCX 048c	W048	485744	155897	E	Cove Brook	Main River	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low

WCX/ref Number	Ref / ID	Easting	Northing	Section	Watercourse Name	Watercourse Type	Crossing Type	Flood Source	Likelihood	Justification	Unmitigated			Mitigated		
											Severity	Justification	Risk	Mitigation	Severity	Risk
W048	W048	485761	155935	E	Cove Brook	Main River	Access Road only	Fluvial	Medium	Flood Zone 3	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 049	W049	486557	156036	E	Unnamed watercourse 38	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 051	W051	487617	157208	E	River Blackwater	Main River	Trenchless with launch/receptor sites outside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low
WCX 055	W055	487785	157296	E	Hatches (formerly Water feature)	Lake	Trenchless with launch/receptor sites outside floodplain - no access road	Fluvial	Very low	Flood Zone 2	Very low	Trenchless Crossing	Very low	No Mitigation	Very low	Very low
WCX 058a	W058a	487856	157334	E	Unnamed watercourse 44 (Adjacent to)	Main River	Trenchless with launch/receptor sites outside floodplain - access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low
WCX 058b	W058b	488013	157408	E	Unnamed watercourse 44 (177m northeast of)	Main River	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 058c	W058c	488639	157744	E	Unnamed watercourse 44	Main River	Open	Fluvial	Medium	Flood Zone 3	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 058d	W058d	487916	157302	E	Unnamed Watercourse 44	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
W060	W060	490311	158119	E	Unnamed watercourse 46	Ordinary Watercourse	Access Road only	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
W062	W062	491196	160955	F	Unnamed watercourse 48	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 063	W063	492951	161502	F	Unnamed watercourse 49	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 064	W064	493997	161721	F	Unnamed watercourse 50	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 065	W065	494149	161808	F	Unnamed watercourse 51	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 066	W066	494429	162042	F	Hale Bourne	Main River	Trenchless with launch/receptor site inside floodplain - access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low
WCX 067	W067	494611	162102	F	Unnamed watercourse 52	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 068	W068E	494822	162164	F	Unnamed watercourse 53	Ordinary Watercourse	Open	Fluvial	Medium	Flood Zone 3	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 068a	W068W	494797	162154	F	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Medium	Flood Zone 3	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 070	W070	495634	162585	F	Clappers Brook	Main River	Open	Fluvial	Medium	Flood Zone 3	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
W072	W072	496989	163352	F	Unnamed watercourse 56	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 073	W073	497876	164148	F	Unnamed watercourse 57	Main River	Trenchless with launch/receptor sites outside floodplain - access road	Surface Water	Medium	3.3%	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low
WCX 076	W076	498966	164596	F	Unnamed watercourse 59	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - access road	Surface Water	Very low	1%	Very low	Trenchless Crossing	Very low	No Mitigation	Very low	Very low
WCX 077	W077	499995	165165	F	Unnamed watercourse 60	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - no access road	No Flooding	Very low	<0.1%	Very low	Trenchless Crossing	Very low	No Mitigation	Very low	Very low
WCX 079	W079	500215	165261	F	Unnamed watercourse 62	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 079a	W079a	500125	165220	F	Unnamed Watercourse	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 079b	W079b	500097	165181	F	Unnamed Watercourse	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low

WCX/ref Number	Ref / ID	Easting	Northing	Section	Watercourse Name	Watercourse Type	Crossing Type	Flood Source	Likelihood	Justification	Unmitigated			Mitigated		
											Severity	Justification	Risk	Mitigation	Severity	Risk
WCX 080	W080	500554	165365	F	Unnamed watercourse 63	Ordinary Watercourse	Open	Surface Water	Low	1%	Large	Open cut, workers and equipment in floodplain	Medium	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 081	W081	501127	165399	F	Unnamed watercourse 64	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
W081E	W081E	501203	165341	F	Unnamed Watercourse	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 082	W082	501331	165309	F	Unnamed watercourse 65	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 083	W083	501846	165305	F	Unnamed watercourse 66	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 085a	W085	487617	157208	F	Unnamed watercourse 68	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low
WCX 086	W086	503134	165906	F	Unnamed watercourse 69	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - no access road	Surface Water	Very low	0.1%	Very low	Trenchless Crossing	Very low	No Mitigation	Very low	Very low
W087	W087	503616	165892	G	Unnamed watercourse 70	Ordinary Watercourse	Access Road only	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 092	W092	504262	165747	G	Unnamed watercourse 75	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 092a	W092a	504196	165608	G	Unnamed Watercourse	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 093	W093	504406	165726	G	Unnamed watercourse 76	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 093a	W093	504730	165656	G	Unnamed watercourse 77	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - no access road	Surface Water	Very low	1%	Very low	Trenchless Crossing	Very low	No Mitigation	Very low	Very low
WCX 093b	W094	504696	165632	G	Unnamed watercourse 76	Ordinary Watercourse	Trenchless with launch/receptor sites outside floodplain - no access road	Surface Water	Very low	1%	Very low	Trenchless Crossing	Very low	No Mitigation	Very low	Very low
WCX 095	W095	505288	166099	G	The Bourne	Main River	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low
WCX 096b	W096	505921	166732	G	River Thames	Main River	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low
WCX 098	W098	506220	167818	H	Unnamed watercourse 78	Ordinary Watercourse	Open	Fluvial	Medium	Flood Zone 3	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 100	W100	505809	171293	H	River Ash	Main River	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low
WCX 102d	W102	505578	169456	H	Intake Channel	Ordinary Watercourse	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Medium	Flood Zone 3	Very low	Trenchless Crossing	Low	No Mitigation	Very low	Low
WCX 104f	W104	506135	170684	H	air water transfer (formerly Stair	Canal	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Very low	Flood Zone 2	Very low	Trenchless Crossing	Very low	No Mitigation	Very low	Very low
WCX 105	W105	506026	171133	H	Unnamed watercourse 81	Ordinary Watercourse	Trenchless with launch/receptor site inside floodplain - no access road	Fluvial	Very low	Flood Zone 2	Very low	Trenchless Crossing	Very low	No Mitigation	Very low	Very low
WCX 106	W106	506062	171670	H	Unnamed Watercourse 85	Main River	Open	Fluvial	Very low	Flood Zone 2	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 094	W107	504553	165695	G	Unnamed Watercourse 82	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 108	W108	504660	165632	G	Unnamed Watercourse 83	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 111	W111	477027	144156	C	Unnamed Watercourse 87	Ordinary Watercourse	Open	Fluvial	Medium	Flood Zone 3	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 112	W112	495947	162989	F	Unnamed Watercourse 88	Ordinary Watercourse	Open	Surface Water	Medium	3.3%	Large	Open cut, workers and equipment in floodplain	High	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Low
WCX 113	W113	505790	168131	H	Unnamed Watercourse	Ordinary Watercourse	Open	Fluvial	Very low	Flood Zone 2	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 114	W114	473290	137592	C	Unnamed Watercourse	Ordinary Watercourse	Open	No Flooding	Very low	<0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low

WCX/ref Number	Ref / ID	Easting	Northing	Section	Watercourse Name	Watercourse Type	Crossing Type	Flood Source	Likelihood	Justification	Unmitigated			Mitigated		
											Severity	Justification	Risk	Mitigation	Severity	Risk
WCX 115	W115	500256	165274	F	Unnamed Watercourse	Ordinary Watercourse	Open	Surface Water	Very low	0.1%	Large	Open cut, workers and equipment in floodplain	Low	Refer to mitigation reference G127, G28, W1, W4, and G184.	Very low	Very low
WCX 116		502711	166055	F	Unnamed Watercourse	Ordinary Watercourse	Trenchless with launch/receptor site outside floodplain - no access road	Surface Water	Very low	0.1%	Very low	Trenchless Crossing	Very low	No Mitigation	Very low	Very low

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Appendix C. Watercourse Crossing Reports



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Appendix C1 High and Medium Risk Crossing Reports

WCX 006 Crossing Review

Watercourse name	Unnamed Watercourse 5
Crossing ID	WCX 006
Grid reference	453573,117997
Pipeline section	A
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Low
Risk of proposed crossing increasing flood risk without mitigation	Medium
Risk of proposed crossing increasing flood risk with mitigation	Low



1 WCX 006 Crossing Review

1.1 Site Details

- 1.1.1 Crossing WCX 006 located at N: 453573, E:117997 is over an unnamed watercourse and tributary of the River Hamble. The watercourse converges with another tributary approximately 1.4km downstream before joining the River Hamble a further 800m downstream.
- 1.1.2 The crossing point is located 65m downstream of Winter's Hill road where the watercourse is likely passed through a culvert beneath the highway. The surrounding land is characterised by agricultural land interrupted by rural residential properties and non-residential agricultural industry. The closest building to the crossing is a residential property 50m to the northwest. Approximately 90m to the northeast lies an equipment yard.
- 1.1.3 Figure C5 defines the location of the crossing. All available flood related information is shown below.

1.2 Flood Risk

- 1.2.1 The fluvial floodplain for the watercourse can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water map (RoFSW). This identifies that flooding is present during the 3.33% Annual Exceedance Probability (AEP) event with depths up to 600mm around the location of the crossing. During the 1% AEP event flooding is shown to achieve a maximum depth of 900mm. In addition, Winters Hill (road) upstream of the crossing has flood depths of up to 300mm in this event.

1.3 Flood History

- 1.3.1 No information regarding flooding in the area of the crossing has been identified.

1.4 Features Local to the Crossing That Could Influence Flooding

- 1.4.1 The catchment area to the watercourse is approximately 11.74km² and is understood to be largely impermeable. The catchment is rural, draining agricultural land and the village of Upham. The watercourse is culverted beneath Winters Hill road and the road sits on an embankment roughly 1.3m in height so flood water ponds upstream (north) of the road as flows are throttled by this culvert.



1.5 Crossing Impact on Flood Risk

- 1.5.1 After reviewing the data available and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increased flood extents would only affect agricultural land.
- 1.5.2 The likelihood of flooding is assessed as being **medium** given the crossing being at risk of flooding from a 3.3% AEP event.
- 1.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land and impacting minor roads. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **low**
- 1.5.4 Therefore, this crossing is identified to have a **medium** risk of increasing flood risk to receptors.



1.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Yes - Flood extent in vicinity of crossing, confined to agricultural land. Significant ponding of flood water upstream of Winters Hill (road).
RoFSW Extent 1% Annual Chance	Yes - Flood extent in vicinity of crossing confined to agricultural land. Significant ponding of flood water upstream of Winters Hill (road) and flooding across Winters Hill (road).
RoFSW Extent 0.1% Annual Chance	Yes - Flood extent in vicinity of crossing confined to agricultural land. Significant ponding of flood water upstream of Winters Hill (road) and culvert unlikely to be represented, therefore flood risk at crossing may be underestimated. Flooding across Winters Hill (road).
RoFSW Depth 3.3% Annual Chance	Depths up to 0.6m within Order Limits, flood depths upstream of Winters Hill Road of up to 1.2m, but no flooding across the road.
RoFSW Depth 1% Annual Chance	Depths up to 0.9m within Order Limits, flood depths upstream of Winters Hill Road of >1.2m, flooding across the road of up to 0.3m.
RoFSW Depth 0.1% Annual Chance	Depths up to 1.2m within Order Limits, flood depths upstream of Winters Hill Road of >1.2m, flooding across the road of up to 0.6m.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 007 Crossing Review

Watercourse name	Unnamed Watercourse 6
Crossing ID	WCX 007
Grid reference	453735, 118311
Pipeline section	A
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Large
Risk of proposed crossing increasing flood risk without mitigation	High
Risk of proposed crossing increasing flood risk with mitigation	Low



2 WCX 007 Crossing Review

2.1 Site Details

- 2.1.1 Crossing WCX 007 is a haul road that is proposed to cross a watercourse (Ordinary Watercourse), which is a drainage channel originating from the western edge of Newtown, a nearby area of residential development.
- 2.1.2 The residential development of Newtown sits 270m southeast (upstream) of the proposed crossing and the B2177 is 50m north of the crossing (parallel to the watercourse).
- 2.1.3 The crossing is situated on agricultural land south of the B2177 and northwest of residential properties on Winters Hill. The nearest residential property is 80m southeast of the crossing, on the right bank of the watercourse.
- 2.1.4 Figure C6 defines the crossing location. All available flood related information can be found below.

2.2 Flood Risk

- 2.2.1 The fluvial floodplain for the watercourse can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water map (RoFSW). Both the 3.3% Annual Exceedance Probability (AEP) and the 1% AEP events give rise to areas of flooding within areas of agricultural land and around a property to the west of Winters Hill achieving a maximum depth of 0.6m. These events also lead to maximum flood depths of 0.3m on nearby roads, Winters Hill and the B2177.

2.3 Flood History

- 2.3.1 No information regarding flooding in the area of the crossing has been identified.

2.4 Features Local to the Crossing That Could Influence Flooding

- 2.4.1 The watercourse present at this crossing begins as a small drainage ditch at the edge of Tollgate House Farm, within a constrained channel. The watercourse then runs beneath Winters Hill road, via culvert passing two residential properties before flowing in agricultural land. The presence of the culvert beneath the road just upstream of the proposed crossing may influence out of bank flows for extreme events.
- 2.4.2 In addition to flows within the watercourse, an overland flow route is present upstream of the crossing. This originates on the western side of the properties at Newtown and flows across open agricultural land, across the B2177 and joins the watercourse west of Winters Hill prior to it reaching the crossing location.



- 2.4.3 The watercourse is a drainage output for the west of Newtown, it is a small catchment but largely impermeable meaning the flood response could be flashy, but short in duration. The land either side of the banks is agricultural and has the capacity to hold floodwater if the watercourse banks are overtopped during a high rainfall event.
- 2.4.4 Where the crossing is proposed, there is no flow limiting infrastructure downstream, so there are no man-made features that would back up water towards the crossing upstream. Upstream, the proximity to the B2177 means this receptor has the potential to be flooded.

2.5 Crossing Impact on Flood Risk

- 2.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing may have an impact on flood risk to receptors in the area. Any increased flood extent would impact agricultural land with the potential to affect the B2177 and properties on Winters Hill.
- 2.5.2 The likelihood of flooding is assessed as being **medium** given the crossing being at risk of flooding from a 3.3% AEP event.
- 2.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing potentially affecting roads and isolated residential properties, therefore, the severity of any increase in flood risk as a result of the proposed crossing is **large**.
- 2.5.4 Therefore, this crossing is identified to have a **high** risk of increasing flood risk to receptors.



2.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not Applicable
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	Not Defined
Flood Zone 3	Not Defined
RoFSW Extent 3.3% Annual Chance	Yes - showing surface water flooding extent in the 3.3% annual probability event at the crossing. Flooding agricultural land, and across the B2177 to the north of the crossing and Winters Hill (road) to the east of the crossing. Flood water surrounds the northernmost property on Winters Hill.
RoFSW Extent 1% Annual Chance	Yes - showing surface water flooding extent in the 1% annual probability event at the crossing. Flooding agricultural land and across the B2177 to the north of the crossing and Winters Hill (road) to the east of the crossing. Flood water surrounds the northernmost property on Winters Hill.
RoFSW Extent 0.1% Annual Chance	Yes - showing surface water flooding extent in the 0.1% annual probability event at the crossing. Flooding agricultural land and across the B2177 to the north of the crossing and Winters Hill (road) to the east of the crossing.
RoFSW Depth 3.3% Annual Chance	Yes - showing surface water flooding depth in the 3.3% annual probability event at the crossing. Flooding agricultural land. Depth 0.3 – 0.6m at the crossing, depth on B2177 0.15 – 0.3m and depth on Winters Hill 0.15 – 0.3m. Depth around property on Winters Hill of 0.3 - 0.6m.
RoFSW Depth 1% Annual Chance	Yes - showing surface water flooding depth in the 1% annual probability event at the crossing. Flooding arable land. Depth 0.3 – 0.6m at the crossing, depth on B2177 0.15 – 0.3m and depth on Winters Hill 0.15 – 0.3m. Depth around property on Winters Hill of 0.3 - 0.6m.
RoFSW Depth 0.1% Annual Chance	Yes - showing surface water flooding depth in the 0.1% annual probability event at the crossing. Increased flooding of agricultural land. Depth 0.6m – 0.9m at crossing, depth on B2177 0.3 – 0.6m and depth on Winters Hill 0.3 – 0.6m. Depth around property on Winters Hill of 0.6 - 0.9m, and internal property flooding of 0.15 - 0.3m.
Risk of Flooding from Reservoirs - Maximum Flood Depth	None defined
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Risk



Surrey Heath BC – Flood Zone – 3a	No Records
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	Not Applicable
Flood Storage Areas	None Defined
Spatial Flood Defences	None Defined



WCX 008 Crossing Review

Watercourse name	Unnamed Watercourse 7
Crossing ID	None
Grid reference	470548, 135486
Pipeline Section	B
Chainage	45600m
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	No impact, crossed by haul road only
Likelihood of Flooding	Medium
Severity of Impacts	Moderate
Crossing Impact on Flood Risk	Medium



3 WCX 008 Crossing Review

3.1 Site Details

- 3.1.1 The crossing at W008 is over unnamed Watercourse 7 (an Ordinary Watercourse) which forms a tributary of the Lavent Stream. The crossing point is located within an agricultural area, approximately 100m east of Gosport Road (A32), at the junction with Woodside Lane. A byway (track) is located approximately 25m south of the crossing point.
- 3.1.2 There are a number of receptors around the crossing point; Farrington Cottage is approximately 130m southwest of the crossing point. A residential development at Lower Farrington is located at approximately 190m south (upstream) of the crossing point. Farrington Business Park is approximately 300m southwest of the crossing point.
- 3.1.3 Figure C07 identifies the location of the crossing. All pertinent flood risk information is presented below.

3.2 Flood Risk

- 3.2.1 The fluvial floodplain is defined by Flood Zone 2 and Flood Zone 3, which extend along the watercourse, covering parts of the A32, to the north (downstream) of the crossing point.
- 3.2.2 The Risk of Surface Water Flooding (RoFSW) map for the 3.3% Annual Exceedance Probability (AEP) event identifies scattered flooding upstream of the crossing at Lower Farrington. The map predicts flooding upstream of the byway to the south of the crossing point, with depths of less than 600mm.
- 3.2.3 The 1% AEP event identifies extended flooding upstream of the crossing to the south of the byway and in the nearby residential areas, particularly at Lower Farrington, with depths of less than 600mm.

3.3 Flood History

- 3.3.1 The crossing point is located within an area of recorded highway flooding, as provided by the Hampshire County Council.

3.4 Features Local to the Crossing That Could Influence Flooding

- 3.4.1 The catchment to the crossing point covers is primarily agricultural land but includes Lower Farrington and other residential areas (at least 3km away from the crossing). The catchment to the crossing point is approximately 84km² and is predominantly impermeable geology.
- 3.4.2 Upstream of the crossing point the watercourse is culverted under the byway approximately 25m south of the crossing point.



3.5 Crossing Impact on Flood Risk

- 3.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing would have a limited impact on flood risk to vulnerable receptors in the area. Any increased flood extents would only affect agricultural land or disrupt minor roads.
- 3.5.2 The likelihood of flooding is assessed as **medium** given the crossing is at risk of flooding from a 3.33% AEP event and is located within Flood Zone 3.
- 3.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land and the track to the south of the crossing. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is assessed as **moderate**.
- 3.5.4 Therefore, this crossing is identified to be have a **medium** risk of increasing flood risk to receptors.



3.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	Recorded highway flooding within Order Limits
Flood Zone 2	Defined at the crossing point
Flood Zone 3	Defined at the crossing point
RoFSW Extent 3.3% Annual Chance	Yes – spot flooding upstream of Order Limits south of the crossing point
RoFSW Extent 1% Annual Chance	Yes – spot flooding upstream of Order Limits south of the crossing point
RoFSW Extent 0.1% Annual Chance	Yes – flooding within Order Limits near the crossing point as part of a significant flow route
RoFSW Depth 3.3% Annual Chance	Yes – flooding upstream of the byway to the south of the crossing point, with depths of less than 600mm.
RoFSW Depth 1% Annual Chance	Yes – flow accumulation upstream of the byway to the south of the crossing point, with depths of less than 600mm.
RoFSW Depth 0.1% Annual Chance	Yes – flooding within Order Limits near the crossing point less than 300mm deep and upstream of the crossing up to 900mm deep
Risk of Flooding from Reservoirs - Maximum Flood Depth	No risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No risk
Recorded Flood Outlines	No records
Surrey Heath BC – Flood Zone – 3a	Not applicable
Surrey Heath BC – Flood Zone – 3b	Not applicable
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 012 Crossing Review

Watercourse name	Caker Stream
Crossing ID	WCX 012
Grid reference	472575, 137804
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Low
Risk of proposed crossing increasing flood risk without mitigation	Medium
Risk of proposed crossing increasing flood risk with mitigation	Low



4 WCX 012 Crossing Review

4.1 Site Details

- 4.1.1 Crossing WCX 012 is proposed to allow a haul road to cross Caker Stream (Main River). The watercourse runs through agricultural fields and grassland.
- 4.1.2 The watercourse originates at Round Groves Copse approximately 1.3km south (upstream) of the water course crossing location (as the crow flies). The majority of the watercourse upstream of the crossing runs through agricultural fields and grassland. Approximately 220m downstream of the crossing another stream joins Caker Stream, which originates as Lavant Stream west of the A339.
- 4.1.3 Approximately 270m upstream of the crossing Caker Stream runs beneath the Selborne Road (B3006). Caker stream also runs parallel to a track between Selborne Road and Water Lane (Track), passing Truncheaunts and Kiln House. The track is approximately 30m east of the crossing location.
- 4.1.4 The nearest residential development is Truncheaunts approximately 200m northeast of the crossing. There are several other buildings both farm and residential within 350m of the crossing location in a south, west and north locations.
- 4.1.5 Figure C12 defines the crossing location. All available flood related information is shown below.

4.2 Flood Risk

- 4.2.1 The crossing location is within the Flood Zone 3 extent. The track to the east of Caker Stream at WCX 012 is also within the Flood Zone 2 extent
- 4.2.2 The Risk of Flooding from Surface Water map (RoFSW) shows that during a 3.3% annual exceedance probability (AEP) event there is flooding of up to 900mm deep at the crossing location. There is also surface water flooding lining the east edge of Caker Stream, also reaching up to 900mm in depth.
- 4.2.3 During a 1% AEP event, there is an increase in flooding at the crossing. The depth of flooding associated with the 1% AEP event also reaches up to 1.2m at the crossing location, and again this is mirrored along Caker Stream upstream of the crossing.
- 4.2.4 The 0.1% AEP event shows that at the crossing surface water flooding could reach a depth of over 1.2m. Lining the channel the water depth can also reach over 1.2m deep and approximately 20m of the surrounding area at the crossing location can expect a flood depth of between 300mm and 900mm.

4.3 Flood History



- 4.3.1 There is evidence of a historic flood outline that spans the floodplain of Caker Stream in the vicinity of the crossing and therefore encompasses the crossing location. The information provided for this flood identifies that the flood occurred in March 1947 and was as a result of the river exceeding its channel capacity.
- 4.3.2 There is also information provided by Hampshire County Council of recorded highway flooding approximately 170m north (downstream) of the crossing location.

4.4 Features Local to the Crossing That Could Influence Flooding

- 4.4.1 The confluence of the Lavant and Caker Streams downstream of the crossing can influence flooding in the area and so this needs to be considered when constructing at WCX 012.

4.5 Crossing Impact on Flood Risk

- 4.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing may have an impact on flood risk to receptors in the area.
- 4.5.2 The likelihood of flooding is assessed as being **medium** given the crossing being at risk of flooding from a 3.3% AEP event and being located in Flood Zone 3.
- 4.5.3 Any increased flooding would occur upstream of the crossing, flooding agricultural land and grassland, but also potentially the track to the east of the crossing leading to Truncheaunts, limiting access to the property and to a lesser extent the B3006. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **low**.
- 4.5.4 Therefore, this crossing is identified to be have a **medium** risk of increasing flood risk in the area to receptors.



4.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not Applicable
Hampshire Lead Local Flood Authority Data	Yes -recorded highway flooding approximately 170m north (downstream) of the crossing location
Flood Zone 2	Yes – at the crossing location and surrounding area
Flood Zone 3	Yes – at the crossing location and surrounding area
RoFSW Extent 3.3% Annual Chance	Yes - showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Extent 1% Annual Chance	Yes - showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Extent 0.1% Annual Chance	Yes - showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Depth 3.3% Annual Chance	Depth of up to 900mm at the crossing.
RoFSW Depth 1% Annual Chance	Depth of up to 1.2m at the crossing.
RoFSW Depth 0.1% Annual Chance	Depth of over 1.2m at crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No
Risk of Flooding from Reservoirs - Maximum Flood Extent	No
Risk of Flooding from Reservoirs - Maximum Flood Speed	No
Recorded Flood Outlines	At the crossing, a recorded flood outline from March 1947 and was as a result of the river exceeding its channel capacity
Surrey Heath BC – Flood Zone – 3a	N/A
Surrey Heath BC – Flood Zone – 3b	N/A
Rushmoor BC – Flood Zone – 3a	N/A
Rushmoor BC – Flood Zone – 3b	N/A
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	



WCX 032 Crossing Review

Watercourse name	Unnamed Watercourse 25
Crossing ID	WCX 032
Grid reference	481072, 150301
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Large
Risk of proposed crossing increasing flood risk without mitigation	High
Risk of proposed crossing increasing flood risk with mitigation	Low



5 WCX 032 Crossing Review

5.1 Site Details

- 5.1.1 Crossing WCX 032 is required to carry the haul road over Unnamed Watercourse 25 (an Ordinary Watercourse). The crossing point is approximately 50m south of Ewshot Lane within a rural area northwest of Ewshot village and approximately 45m northwest (upstream) of Seymour Farm.
- 5.1.2 There are multiple vulnerable receptors along Ewshot Lane, the closest being approximately 150m upstream of the crossing point. The closest residential area is located approximately 460m southeast of the crossing point.
- 5.1.3 Figure C30 identifies the location of the crossing. Pertinent flood risk information is presented below.

5.2 Flood Risk

- 5.2.1 In the absence of Flood Zones 2 and 3 at the crossing, the fluvial floodplain can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. For the 3.33% Annual Exceedance Probability (AEP) event the RoFSW identifies continuous flooding along the watercourse and also reaching nearby residential properties, with depths in the vicinity of the crossing up to 600mm within the Order Limits.
- 5.2.2 The 1% AEP event predicts the extent of the flooding to increase in the surrounding area, including flooding of residential properties on Ewshot Lane approximately 60m upstream of the crossing. Flooding within the Order Limits near the crossing point is indicated up to 900mm deep.

5.3 Flood History

- 5.3.1 Hampshire County Council has recorded flood investigations (2012-15) around the crossing point. The closest highway flooding is recorded at Church Lane approximately 630m southeast of the crossing point.

5.4 Features Local to the Crossing That Could Influence Flooding

- 5.4.1 The estimated catchment up to the crossing point is approximately 0.58km² comprising agricultural land. The watercourse is culverted under a track, approximately 125m upstream and under Ewshot Lane, approximately 70m and downstream of the crossing point.

5.5 Crossing Impact on Flood Risk

- 5.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is likely to have an impact on flood risk. There are multiple receptors identified in the area. Any increased flood extents may affect agricultural land, properties and the local road.



- 5.5.2 The likelihood of flooding is assessed as being **medium** given the crossing is identified to be at risk in the 3.33% AEP event.
- 5.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land the road and nearby properties. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **large**.
- 5.5.4 Therefore, this crossing is identified to be have a **high** risk of increasing flood risk to receptors.



5.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	Flood investigations 2012-15 within Order Limits
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Yes –flooding within Order Limits
RoFSW Extent 1% Annual Chance	Yes –flooding within Order Limits
RoFSW Extent 0.1% Annual Chance	Yes –flooding within Order Limits
RoFSW Depth 3.3% Annual Chance	Yes – flood with depth less than 600mm within the Order Limits near the crossing point
RoFSW Depth 1% Annual Chance	Yes – flood with depth less than 900mm within the Order Limits near the crossing point
RoFSW Depth 0.1% Annual Chance	Yes – flood with depth less than 900mm within the Order Limits near the crossing point
Risk of Flooding from Reservoirs - Maximum Flood Depth	No risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No risk
Recorded Flood Outlines	No records
Surrey Heath BC – Flood Zone – 3a	Not applicable
Surrey Heath BC – Flood Zone – 3b	Not applicable
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 035 Crossing Review

Watercourse name	Unnamed Watercourse 28
Crossing ID	WCX 035
Grid reference	481747, 151222
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	No
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Large
Risk of proposed crossing increasing flood risk without mitigation	Medium
Risk of proposed crossing increasing flood risk with mitigation	Low



6 WCX 035 Crossing Review

6.1 Site Details

- 6.1.1 Crossing WCX 035 is over an unnamed Ordinary Watercourse located adjacent to Naishes Lane at the edge of an upstream residential area within Church Crookham village. An access road is not proposed at this crossing location.
- 6.1.2 The watercourse is likely culverted beneath Naishes Lane and the residential area immediately to the east. It then drains in a northwesterly direction through Wood Copse and Soanes Copse, towards another residential area. The closest vulnerable receptors are Naishes Lane and the residential area on the eastern edge of the road.
- 6.1.3 Figure C33 identifies the location of the crossing. Pertinent flood risk information is presented below.

6.2 Flood Risk

- 6.2.1 In the absence of flood Zones 2 and 3 at this location the fluvial floodplain can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. The RoFSW mapping does not predict the crossing point to be at risk of flooding from the 3.33%, 1% or 0.1% Annual Exceedance Probability (AEP) events. However, there is a large area of ponding approximately 60m to the east within a residential area during each event with predicted depths of up to 0.9m during the 1% AEP event. This would appear to a local depression receiving overland flow from the south.

6.3 Flood History

- 6.3.1 Hampshire County Council has recorded highway flooding at Beacon Hill Road (B3013), approximately 360m from the crossing point.

6.4 Features Local to the Crossing That Could Influence Flooding

- 6.4.1 Whilst there does not appear to be a risk of flooding at the crossing location, the watercourse is likely culverted beneath Naishes Lane. Any works to the crossing point may block the culvert or require it to be re-routed. Any restriction to drainage through the culvert may increase flooding within the residential area and along Naishes Lane.

6.5 Crossing Impact on Flood Risk

- 6.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing could have an impact on flood risk. There are multiple vulnerable receptors in the area which could be impacted if the culvert beneath Naishes Lane was blocked or altered during construction.
- 6.5.2 The likelihood of flooding at the crossing location is assessed as being **very low** since it is not within flood extents of the RoFSW.



- 6.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding the road and residential properties to the east. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **large**.
- 6.5.4 Therefore, this crossing is identified to be have a **medium** risk of increasing flood risk to receptors.



6.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	Recorded highway flooding at B3013, approximately 360m from crossing point.
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Not defined
RoFSW Extent 1% Annual Chance	Not defined
RoFSW Extent 0.1% Annual Chance	Not defined
RoFSW Depth 3.3% Annual Chance	Not defined
RoFSW Depth 1% Annual Chance	Not defined
RoFSW Depth 0.1% Annual Chance	Not defined
Risk of Flooding from Reservoirs - Maximum Flood Depth	Risk from Fleet Pond to residential area upstream of the crossing
Risk of Flooding from Reservoirs - Maximum Flood Extent	Risk from Fleet Pond to residential area upstream of the crossing
Risk of Flooding from Reservoirs - Maximum Flood Speed	Risk from Fleet Pond to residential area upstream of the crossing
Recorded Flood Outlines	No records in vicinity
Surrey Heath BC – Flood Zone – 3a	Not applicable
Surrey Heath BC – Flood Zone – 3b	Not applicable
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 036 Crossing Review

Watercourse name	Unnamed watercourse 29
Crossing ID	WCX 036
Grid reference	482012, 151475
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	No
Proposed crossing type	Open
Likelihood of flooding at crossing	Low
Potential severity of impact on receptors without mitigation	Moderate
Risk of proposed crossing increasing flood risk without mitigation	Medium
Risk of proposed crossing increasing flood risk with mitigation	Low



7 WCX 036 Crossing Review

7.1 Site Details

- 7.1.1 WCX 036 is an open cut pipeline crossing proposed to cross an Ordinary Watercourse (Unnamed Watercourse 29) located to the west of Beacon Hill Road. The watercourse rises 1.1km to the south at Beacon Hill Farm and is a drainage channel that runs parallel to Beacon Hill Road for approximately 440m. The land surrounding the watercourse and crossing is predominantly woodland.
- 7.1.2 The crossing sits approximately 3m west of Beacon Hill Road and 80m south (upstream) of Sandy Lane. Across the road from the crossing (30m east) is a large area of woodland within a managed access zone.
- 7.1.3 The closest development to the watercourse and crossing is Fleet Business Park, which lies approximately 10m west of the watercourse. The Business Park consists of seven large buildings and associated car parks. The nearest residential development to the crossing is Church Crookham, approximately 95m north (downstream) of the crossing.
- 7.1.4 Figure C34 identifies the crossing location. Pertinent flood related information is presented below.

7.2 Flood Risk

- 7.2.1 In the absence of Flood Zones 2 and 3 at the crossing, the fluvial floodplain can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. The RoFSW indicates there to be no flooding associated with the 3.33% Annual Exceedance Probability event (AEP) at the crossing, with the nearest flooding associated with this event approximately 93m north (downstream) of the crossing on Sandy Lane with a predicted depth of up to 600mm.
- 7.2.2 The 1% AEP RoFSW event identifies flooding to the east of the crossing, along Beacon Hill Road. The depth of flooding associated with the 1% AEP is predominantly shallow, up to 150mm. A small flow path is apparent along Beacon Hill Road. However, no flood extents are identified at the watercourse crossing, west of the road.
- 7.2.3 The 0.1% AEP RoFSW event shows an increase in flood extent in the vicinity of the crossing. Flood Depths associated with the 0.1% AEP event remain largely below 150mm along Beacon Hill Road and at the crossing location.

7.3 Flood History

- 7.3.1 No information regarding flooding in the area of the crossing has been identified.



7.4 Features Local to the Crossing That Could Influence Flooding

- 7.4.1 A catchment size is not available for this watercourse; however, it is a small catchment, approximately 0.5km² based on the size of a similar sized neighbouring catchment. It is likely that the watercourse is culverted beneath Sandy Lane to the north of the proposed crossing and water could back up from this point towards the proposed crossing if the culverts capacity is exceeded.

7.5 Crossing Impact on Flood Risk

- 7.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is has potential to impact flood risk. There are multiple vulnerable receptors identified in the area to the north of the crossing. Any increased flood extents may impact non-residential and residential properties as well as disrupt local roads.
- 7.5.2 The likelihood of flooding is assessed as being **low** given the crossing is not identified to be at risk in the 3.33% AEP event.
- 7.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land but also potentially flooding an urban environment. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **moderate**.
- 7.5.4 Therefore, this crossing is identified to be have a **medium** risk of increasing flood risk to receptors.



7.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey County Council Data	Not Applicable
Hampshire County Council (FWM Enquiries, Flood Investigations 2012-15 & Recorded Highway Flooding)	No Records
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No
RoFSW Extent 1% Annual Chance	No flooding at crossing, evidence downstream and on Beacon Hill road to the east of the crossing.
RoFSW Extent 0.1% Annual Chance	Yes - showing little surface water flooding extent 0.1% annual chance at the crossing.
RoFSW Depth 3.3% Annual Chance	No
RoFSW Depth 1% Annual Chance	No flooding at crossing, evidence downstream and on Beacon Hill road to the east of the crossing. Depth on road 150mm.
RoFSW Depth 0.1% Annual Chance	Yes - showing surface water flooding depth 0.1% annual chance at the crossing. Depth of 150mm at crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 047 Crossing Review

Watercourse name	Unnamed watercourse
Crossing ID	WCX 47
Grid reference	485309, 154843
Pipeline section	E
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Large
Risk of proposed crossing increasing flood risk without mitigation	High
Risk of proposed crossing increasing flood risk with mitigation	Low



8 WCX 047 Crossing Review

8.1 Site Details

- 8.1.1 Crossing WCX 047 is proposed to enable a haul road to cross the Ively Brook at the edge of Southwood Golf Course. The Brook is a tributary of the Cove Brook. The watercourse runs beneath Ively Road (A327) approximately 40m west of the crossing location, before running east across Southwood Golf Course beneath two small footpath bridges, and its confluence with the Cove Brook.
- 8.1.2 The closest buildings to the crossing location are the Southwood Golf Course buildings, approximately 40m southwest. Approximately 60m west of the crossing is the residential area of Southwood. North Farnborough is approximately 250m east of the crossing.
- 8.1.3 Figure C42 identifies the crossing location. All pertinent flood related information is shown below.

8.2 Flood Risk

- 8.2.1 The crossing location is within Flood Zone 3 and the surrounding area is either within Flood Zone 2 or 3.
- 8.2.2 The Risk of Flooding from Surface Water map (RoFSW) indicates that during a 3.33% annual exceedance probability (AEP) event there is no flooding at the crossing location. There is however, surface water flooding on Ively Road 60m upstream (west) of the crossing location, reaching over 1.2m in depth.
- 8.2.3 During a 1% AEP event, there is a greater extent of flooding at the crossing location. The depth of flooding associated with the 1% AEP event is predicted to reach up to 900mm at the crossing location, and at Ively Road over 1.2m.
- 8.2.4 The 0.1% AEP event indicates that at the crossing surface water flooding could reach a depth of over 1.2m. There is also more extensive flooding upstream and downstream of the crossing towards the Cove Brook, flooding the golf course up to a depth of 900mm.

8.3 Flood History

- 8.3.1 There are records of highway flooding held by Hampshire County Council of an incident in 2011-12 involving pluvial and fluvial flooding on the A327 approximately 130m west of the crossing.



8.4 Features Local to the Crossing That Could Influence Flooding

- 8.4.1 The culvert beneath Ively Road (A327), could exert a control on the flows reaching the crossing location from this watercourse. There are a number of small crossings already in place throughout the golf course downstream of the crossing which have the potential to restrict flows during flood events.

8.5 Crossing Impact on Flood Risk

- 8.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing may have an impact on flood risk to receptors in the area. The likelihood of flooding is assessed as **medium** given the crossing is located in Flood Zone 3.
- 8.5.2 Any increase in flood risk would directly impact Ively Road, the receptors within the golf course and potential residential receptors upstream of the crossing location. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **large**.
- 8.5.3 Resultantly, this crossing is identified to be have a **high** risk of increasing flood risk in the area to receptors.



8.6 Data Sources

Data Source	Details at this Crossing?
Surrey County Council Data	Not Applicable
Hampshire County Council (FWM Enquiries, Flood Investigations 2012-15 & Recorded Highway Flooding)	Closest records to the south of the crossing on the A327.
Flood Zone 2	Yes – at the crossing location and surrounding area
Flood Zone 3	Yes – at the crossing location and surrounding area
RoFSW Extent 3.3% Annual Chance	No - showing surface water flooding extent upstream of the crossing at Ively Road.
RoFSW Extent 1% Annual Chance	Yes - showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Extent 0.1% Annual Chance	Yes - showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Depth 3.3% Annual Chance	No flooding at crossing. Flooding upstream of crossing reaching a depth of over 1.2m.
RoFSW Depth 1% Annual Chance	Depth of up to 900mm at the crossing.
RoFSW Depth 0.1% Annual Chance	Depth of up to 900mm at crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No
Risk of Flooding from Reservoirs - Maximum Flood Extent	No
Risk of Flooding from Reservoirs - Maximum Flood Speed	No
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Yes
Surrey Heath BC – Flood Zone – 3b	Yes
Rushmoor BC – Flood Zone – 3a	Yes
Rushmoor BC – Flood Zone – 3b	Yes
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	Yes – high ground lining the channel
Surrey County Council Data	Not Applicable



WCX 049 Crossing Review

Watercourse name	Unnamed Watercourse 38
Crossing ID	WCX 049
Grid reference	486557, 156036
Pipeline section	E
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Large
Risk of proposed crossing increasing flood risk without mitigation	High
Risk of proposed crossing increasing flood risk with mitigation	Low



9 WCX 049 Crossing Review

9.1 Site Details

- 9.1.1 Crossing WCX 049 is required to carry the haul road over Unnamed Watercourse 38 (Ordinary Watercourse). The crossing point is located within Farnborough, on the western edge of Queen Elizabeth Park, adjacent to a play park and small car park. The watercourse is believed to flow westwards and eventually into the Cove Brook. The watercourse is thought to originate from a culvert at its southeastern end, adjacent to the railway line.
- 9.1.2 The crossing point is north of the railway, with Farnborough train station approximately 280m east of the crossing point. Residential housing and minor roads are located to the northwest, and there are allotments directly west of the proposed crossing on the northern side of the railway line.
- 9.1.3 Figure C45 defines the location of the crossing. All available flood related information is shown below.

9.2 Flood Risk

- 9.2.1 The fluvial floodplain can be inferred by the extent of flooding defined in the Risk of Surface Water Flooding (RoFSW) map. This identifies flooding in the vicinity of the crossing point for the 3.33% Annual Exceedance Probability (AEP) event, with depths of less than 600mm within the Order Limits.
- 9.2.2 The 1% AEP floodplain indicates the extent of the flooding to increase in the surrounding area, with depths of less than 900mm within the Order Limits near the crossing point. This is part of a flow route that originates to the east of the crossing, north of the railway line and flows westwards past the crossing location.

9.3 Flood History

- 9.3.1 Hampshire County Council have recorded highway flooding around West Heath. The closest records to the crossing point are located at Prospect Road, which crosses the railway approximately 260m west of the crossing point (downstream).

9.4 Features Local to the Crossing That Could Influence Flooding

- 9.4.1 The FEH catchment up to the crossing point is less than 0.5km². The watercourse runs through residential areas downstream of the crossing and is culverted at several locations. The railway to the south of the crossing is on a raised embankment and is a barrier to overland flows.



9.5 Crossing Impact on Flood Risk

- 9.5.1 After reviewing the data available and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it is considered that a temporary crossing of the watercourse at this location could increase flood risk to sensitive receptors including the railway line and residential properties to the east at Queen Victoria Court.
- 9.5.2 The likelihood of flooding is assessed as being **medium** given the crossing is at risk during the 3.33% AEP event.
- 9.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, potentially affecting the railway and local residential areas. This results in risk to life and in necessity for evacuation. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **large**.
- 9.5.4 Therefore, this crossing is identified to have a **high** risk of increasing flood risk to receptors.



9.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	Recorded highway flooding within Order Limits 260m west of the crossing point.
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Yes –flooding within Order Limits
RoFSW Extent 1% Annual Chance	Yes – flow route originating to the east, north of the railway line and flowing across Order Limits at crossing location.
RoFSW Extent 0.1% Annual Chance	Yes – flow route originating to the east, north of the railway line and flowing across Order Limits at crossing location.
RoFSW Depth 3.3% Annual Chance	Yes – flooding with depth less than 600mm within the Order Limits near the crossing point.
RoFSW Depth 1% Annual Chance	Yes – depth less than 900mm within the Order Limits near the crossing point.
RoFSW Depth 0.1% Annual Chance	Yes – depth less than 900mm within the Order Limits near the crossing point
Risk of Flooding from Reservoirs - Maximum Flood Depth	No risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No risk
Recorded Flood Outlines	No records at the crossing point
Surrey Heath BC – Flood Zone – 3a	Not applicable at the crossing point
Surrey Heath BC – Flood Zone – 3b	Not applicable at the crossing point
Rushmoor BC – Flood Zone – 3a	Not applicable at the crossing point
Rushmoor BC – Flood Zone – 3b	Not applicable at the crossing point
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 058b Crossing Review

Watercourse name	Unnamed Watercourse 44
Crossing ID	WCX 058b
Grid reference	488013, 157408
Pipeline section	E
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Moderate
Risk of proposed crossing increasing flood risk without mitigation	Medium
Risk of proposed crossing increasing flood risk with mitigation	Low



10 WCX 058b Crossing Review

10.1 Site Details

- 10.1.1 Crossing WCX 058b is over an unnamed watercourse (Ordinary Watercourse), which is located approximately 50m south of the SC Johnson building in Frimley, Hampshire. The crossing point is over a small watercourse and tributary of River Blackwater. It is likely that the watercourse is also connected to part of the surface water drainage network for the large residential area to the east of the intended crossing location.
- 10.1.2 The intended crossing point is found within a small area of woodland bounded by the SC Johnson factory to the north and a car park approximately 30m to the east. The crossing point is at the lower reach of the watercourse, with its likely source originating in Pine Ridge Golf Course approximately 3km to the northeast. The watercourse flows through a residential area before flowing through land occupied by the factory. Approximately 150m downstream of the crossing location the watercourse is likely culverted beneath the railway line embankment which runs perpendicular to the watercourse. From here the watercourse discharges into Frimley Lakes and then the River Blackwater. The closest alternate land use is the factory and its adjoining car park.
- 10.1.3 Figure C49 defines the location of the crossing. All available flood related information is shown below.

10.2 Flood Risk

- 10.2.1 The fluvial floodplain for the watercourse can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water map (RoFSW). This identifies that surface water flooding risk is particularly high for the area during the 3.33% Annual Exceedance Period (AEP) events and inundates the crossing location and surrounding area with depths typically up to 300mm during the 3.33% AEP event. Depths can increase up to 600mm deep in the 1% AEP event.
- 10.2.2 The crossing location is also found within the extent of Flood Zone 3 and Flood Zone 2 from the nearby River Blackwater. There are extents of flooding predicted upstream (east) of the confluence with the River Blackwater, which could be due to restricted capacity in the culvert conveying the watercourse beneath the railway line (approximately 1km to the northwest) or local lack of capacity in the watercourse.

10.3 Flood History

- 10.3.1 No information regarding historic flooding in the area of the crossing has been identified.



10.4 Features Local to the Crossing That Could Influence Flooding

10.4.1 There are existing sections of the watercourse that are culverted around the factory grounds which have the potential to constrict flows during flood events. Flooding is likely to be exacerbated by hard standing surfaces around the factory. Downstream the culvert beneath the railway line may limit flow during flood events causing a backup along the watercourse. Flooding is likely to be exacerbated as the height of the railway embankment would prevent floodwater from spreading out and re-entering the channel further downstream. The catchment covers an area of 2.28km² covering woodland in its upper reaches and urban land use in the lower reaches. The urban nature of the lower catchment would likely result in a faster response by the watercourse. Should the watercourse crossing increase flood risk in the area there is potential for floodwaters to inundate the southern building thereby increasing the existing flood risk to the factory. This is likely to be exacerbated as the area to the west of the watercourse crossing is intended to be used as a staging area for directional drilling beneath the River Blackwater.

10.5 Crossing Impact on Flood Risk

- 10.5.1 After reviewing the data available and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is likely to have an impact on flood risk to receptors in the area. Any increased flood extents would affect industry within the area.
- 10.5.2 The likelihood of flooding is assessed as **medium** given the crossing being at risk of flooding from a 3.33% AEP event and being located in Flood Zone 3.
- 10.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding the local factory and the surrounding area. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **moderate**.
- 10.5.4 Therefore, this crossing is identified to have a **medium** risk of increasing flood risk to receptors.



10.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not Applicable
Hampshire Lead Local Flood Authority Data	No Records
Flood Zone 2	Crossing located within Flood Zone
Flood Zone 3	Crossing located within Flood Zone
RoFSW Extent 3.3% Annual Chance	Surface water follows channel of watercourse and inundates the area around the proposed crossing location. Floodwater out of bank inundates the northwestern factory building.
RoFSW Extent 1% Annual Chance	Surface water follows channel of watercourse resulting in significant inundation of the area around the proposed crossing location and northwestern factory building.
RoFSW Extent 0.1% Annual Chance	Surface water follows channel of watercourse resulting in widespread inundation of the area around the proposed crossing location and northwestern factory building.
RoFSW Depth 3.3% Annual Chance	Flood depths up to 0.3-0.6m around watercourse and 0.15-0.30m around the factory.
RoFSW Depth 1% Annual Chance	Flood depths up to 0.3-0.6m around watercourse and in some locations around the factory. Flood depths of 0.30-0.60m close to car park.
RoFSW Depth 0.1% Annual Chance	Flood depths up to 0.6-0.9m around watercourse and in some locations around the factory. Flood depths of 0.9-1.2m in isolated locations along watercourse.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	Flood outline from the River Blackwater
Surrey Heath BC – Flood Zone – 3a	No Records
Surrey Heath BC – Flood Zone – 3b	No Records
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	No Records
Flood Storage Areas	No Records
Spatial Flood Defences	No Records



WCX 058c Crossing Review

Watercourse name	Unnamed watercourse
Crossing ID	WCX 058c
Grid reference	488639, 157744
Pipeline section	E
Type	Main River
Watercourse crossed by haul road?	No
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Large
Risk of proposed crossing increasing flood risk without mitigation	High
Risk of proposed crossing increasing flood risk with mitigation	Low



11 WCX 058c Crossing Review

11.1 Site Details

- 11.1.1 Crossing WCX 058c is located within a residential area in Frimley. The watercourse runs beneath Balmoral Drive, where the crossing point is located. The crossing point is located approximately 870m east of the railway.
- 11.1.2 The S C Johnson factory is located approximately 450m west (downstream) of the crossing point.
- 11.1.3 Figure C50 identifies the location of the crossing. Pertinent flood risk information is presented below.

11.2 Flood Risk

- 11.2.1 There are extents of Flood Zones 2 and 3 associated with the watercourse at this location, although the crossing point and Order Limits are only within Flood Zone 2 at this location which appears to emanate from the River Blackwater. Flood Zone 3 starts approximately 60m east and 90m southwest of the crossing point.
- 11.2.2 The fluvial floodplain for the watercourse may be inferred from the extent of flooding defined by The Risk of Surface Water Flooding (RoFSW) map. This identifies continuous flooding along the watercourse for the 3.33% Annual Exceedance Probability (AEP) event, with predominant depths within the Order Limits less than 300mm.
- 11.2.3 The 1% AEP floodplain indicates the extent of the flooding to increase in the surrounding area, with depths within the Order Limits reaching up to 600mm at the crossing point.

11.3 Flood History

- 11.3.1 Surrey County Council reports external property flooding approximately 310m southeast of the crossing point. However, this is outside the Order Limits. Several highway flood enquiry locations are reported within 500m radius of the crossing point, mostly outside the Order Limits, with the exception of a point on St Catherine's Road, located approximately 480m east of the crossing point. Published wet spots are located at Frimley Green Road, approximately 790m south of the crossing point, but outside the Order Limits.

11.4 Features Local to the Crossing That Could Influence Flooding

- 11.4.1 The estimated catchment area up to the crossing point is approximately 2.0km², mostly covering the managed access area to the east of the crossing point and a residential area between St Catherine's Road and the crossing point. The watercourse runs under several roads in culverts within this residential area before reaching the crossing point.



11.5 Crossing Impact on Flood Risk

- 11.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing may have an impact on flood risk to receptors in the area.
- 11.5.2 The likelihood of flooding is assessed as **medium** given the crossing being at risk of flooding from a 3.33% AEP event and being located in Flood Zone 3.
- 11.5.3 A temporary crossing of the watercourse at this location could increase flood risk to sensitive receptors including roads and nearby residential properties potentially causing a risk to life. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **large**.
- 11.5.4 Therefore, this crossing is identified to be have a **high** risk of increasing flood risk in the area to receptors.



11.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Highway flood enquiry location within Order Limits near the crossing point
Hampshire Lead Local Flood Authority Data	Not applicable
Flood Zone 2	Defined along water course
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Yes – flooding within Order Limits
RoFSW Extent 1% Annual Chance	Yes – flooding within Order Limits
RoFSW Extent 0.1% Annual Chance	Yes – flooding within Order Limits
RoFSW Depth 3.3% Annual Chance	Yes – flood with depths up to 300mm within the Order Limits near the crossing point
RoFSW Depth 1% Annual Chance	Yes – flood with depths up to 600mm within the Order Limits near the crossing point
RoFSW Depth 0.1% Annual Chance	Yes – flood with depths up to 600mm within the Order Limits near the crossing point
Risk of Flooding from Reservoirs - Maximum Flood Depth	No risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No risk
Recorded Flood Outlines	Records within Order Limits approximately 920m southwest of the crossing point
Surrey Heath BC – Flood Zone – 3a	Defined within Order Limits approximately 270m southwest of the crossing point
Surrey Heath BC – Flood Zone – 3b	Defined within Order Limits approximately 100m southwest of the crossing point
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	Defined along the watercourse



WCX 063 Crossing Review

Watercourse name	Unnamed watercourse 49
Crossing ID	WCX 063
Grid reference	492951, 161502
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Large
Risk of proposed crossing increasing flood risk without mitigation	High
Risk of proposed crossing increasing flood risk with mitigation	Low



12 WCX 063 Crossing Review

12.1 Site Details

- 12.1.1 Crossing WCX 063 is proposed to cross an Ordinary Watercourse (Unnamed Watercourse 49), at Red Road (B311).
- 12.1.2 The watercourse at the crossing locations begins as a drainage channel across bog and grassland on the northern edge of Pirbright Ranges, a restricted area used by the military as an army training area. The channel then runs parallel to Red Road for approximately 775m in a northeast direction, before running beneath Red Road at the WCX 063 crossing location. Approximately 250m downstream of the crossing lies a large pond which collects water from the southeastern residential area of Lightwater. There is also a smaller pond approximately 80m to the southeast of the crossing.
- 12.1.3 The closest residential development to the crossing location is the southeast border of Lightwater, 50m north of WCX 063. 60m southwest of the crossing location are several large residential houses.
- 12.1.4 Figure C54 identifies the location of the crossing. Pertinent flood risk information is presented below.

12.2 Flood Risk

- 12.2.1 The extents of Flood Zones 2 and 3 are not defined at the crossing. However, extents of Flood Zones 2 and 3 are present 200m northeast (downstream) of the crossing location. The fluvial floodplain for the watercourse may be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW indicates there to be flooding associated with the 3.33% annual exceedance probability (AEP) event at the crossing. Flooding for the 3.3% AEP event reaches 0.3 to 0.6m deep.
- 12.2.2 The 1% AEP event indicates that the extent of flooding increases at the crossing and across the road, reaching depths on 0.6m to 1.2m. The 0.1% AEP event shows a significant increase in flood extent at the crossing, upstream of the crossing and across the road. For a 0.1% AEP event the depth is recorded to be over 1.2m across the road.

12.3 Flood History

- 12.3.1 There are two Highway Flood Enquiry locations less than 20m from the proposed crossing location on Red Road, one is related to a blocked drain. There are also records of internal property flooding within Lightwater 130m north of the crossing location.



12.4 Features Local to the Crossing That Could Influence Flooding

12.4.1 The road that crosses the watercourse in this assessment is a feature local to the crossing that could influence flooding. Currently, the road is predicted to flood during a 3.33% event or greater, potentially suggesting such a flow exceeds the capacity of the highway culvert. The road also causes a backup of water upstream of the crossing, possibly inducing flooding south of Red Road.

12.5 Crossing Impact on Flood Risk

12.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area.

12.5.2 The likelihood of flooding is assessed as **medium** given the crossing being at risk of flooding from a 3.33% AEP event.

12.5.3 The severity of any increase in flood risk as a result of the proposed crossing is **large** given the potential to impact nearby residential receptors and disrupt local roads.

12.5.4 Therefore, this crossing is identified to be have a **high** risk of increasing flood risk to receptors.



12.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Yes – there are two Highway Flood Enquiry locations less than 20m from the proposed crossing location on Red Road, one is related to a blocked drain. There are also records of internal property flooding within Lightwater 130m north of the crossing location.
Hampshire Lead Local Flood Authority Data	Not Applicable
Flood Zone 2	Not defined at crossing location, Flood Zone 2 starts 200m to the northeast associated with the large pond.
Flood Zone 3	Not defined at crossing location, Flood Zone 3 starts 200m to the northeast associated with the large pond.
RoFSW Extent 3.3% Annual Chance	Yes - showing little surface water flooding extent in the 3.3% annual chance event at the crossing. Flooding across the road and on grassland/woodland either side of the road.
RoFSW Extent 1% Annual Chance	Yes - showing surface water flooding extent in the 1% annual chance event at the crossing. Flooding across the road and on grassland/woodland either side of the road.
RoFSW Extent 0.1% Annual Chance	Yes - showing substantial surface water flooding extent in the 0.1% annual chance event at the crossing. Flooding across the road and on grassland/woodland either side of the road.
RoFSW Depth 3.3% Annual Chance	Yes - showing surface water flooding depths in the 3.3% annual chance event at the crossing. Depth of 0.3 to 0.6m at crossing.
RoFSW Depth 1% Annual Chance	Yes - showing surface water flooding depths in the 1% annual chance event at the crossing. Depth of 0.6 to 0.9m at crossing.
RoFSW Depth 0.1% Annual Chance	Yes - showing surface water flooding depths in the 0.1% annual chance events at the crossing. Depth of more than 0.9 to 1.2m at crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records at crossing
Surrey Heath BC – Flood Zone – 3a	Not at the crossing
Surrey Heath BC – Flood Zone – 3b	Not at the crossing



Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 065 Crossing Review

Watercourse name	Unnamed watercourse 51
Crossing ID	WCX 065
Grid reference	494149, 161808
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Low
Risk of proposed crossing increasing flood risk without mitigation	Medium
Risk of proposed crossing increasing flood risk with mitigation	Low



13 WCX 065 Crossing Review

13.1 Site Details

- 13.1.1 Crossing WCX 065 is proposed to allow a haul road to cross a watercourse (Ordinary Watercourse) within Windemere Gold Club between the A322 and Blackstroud Lane East. The watercourse originates on the southern boundary of the golf course before flowing northeastwards to flow beneath Blackstroud Lane East at Brooklands Farm and join the Windle Brook which flows eastwards to the north of this road. The Haul Road is proposed to run along the line of this watercourse for approximately 100m within the golf course. The Base Flow Index (0.67) for the catchment that this crossing lies in indicates that the catchment is mostly impermeable.
- 13.1.2 The nearest residential development is Brooklands Farm, approximately 100m to the north of the crossing on Blackstroud Lane East. In addition, the eastern edge of Lightwater is approximately 350m west of the crossing. The A322 is also to the west of the crossing and Blackstroud Lane East is to the northeast (downstream). 320m northwest of the crossing is Windlesham sewage works.
- 13.1.3 The main land use at the crossing is a golf course, with sparse woodland along the line of the watercourse channel.
- 13.1.4 Figure C56 defines the location of the crossing. All available flood related information can be found below.

13.2 Flood Risk

- 13.2.1 The extent of Flood Zone 2 and 3 are not defined for this watercourse. The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). During a 3.3% annual exceedance probability (AEP) event there is flooding of up to 0.3m deep along the watercourse and therefore where the crossing is proposed to be. There is more extensive flooding shown for the 1% and 0.1% AEP events, with flood depth reaching up to 0.6m.

13.3 Flood History

- 13.3.1 No information regarding flooding at the crossing are identified. However, there are records of flooding along Blackstroud Lane East downstream of the crossing. There is a recorded flood outline for this area along the Windle Brook downstream of the crossing to the north.

13.4 Features Local to the Crossing That Could Influence Flooding

- 13.4.1 There are no features present that could influence flooding in the crossing's vicinity.



13.5 Crossing Impact on Flood Risk

- 13.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area however may disrupt Blackstroud Lane East.
- 13.5.2 The likelihood of flooding is assessed as being **medium** given the crossing being at risk of flooding from a 3.3% AEP event.
- 13.5.3 Any increased flooding would occur upstream of the crossing within the golf course, flooding woodland and open grass areas. Given the potential for local road disruption the severity of any increase in flood risk as a result of the proposed crossing is **low**.
- 13.5.4 Given the likelihood and severity of flooding the overall risk of increasing flooding at the crossing is considered **medium**.



13.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Yes – Historic flood incidents (indicative by roads) shows that Blackstroud Lane East – downstream of the crossing, has experienced flooding in the past flooding
Hampshire Lead Local Flood Authority Data	Not applicable
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Yes - showing some surface water flooding extent in the 3.3% annual chance event along the watercourse and at the crossing.
RoFSW Extent 1% Annual Chance	Yes - showing some surface water flooding extent in the 1% annual chance event along the watercourse and at the crossing.
RoFSW Extent 0.1% Annual Chance	Yes - showing little surface water flooding extent in the 0.1% annual chance event along the watercourse and at the crossing.
RoFSW Depth 3.3% Annual Chance	Yes - showing surface water flooding depth in the 3.3% annual chance event along the watercourse and at the crossing. Depth of 0.15 – 0.3m at the crossing.
RoFSW Depth 1% Annual Chance	Yes - showing surface water flooding depth 1% annual chance along the watercourse and at the crossing. Depth of 0.15 – 0.3m at the crossing.
RoFSW Depth 0.1% Annual Chance	Yes - showing surface water flooding depth in the 0.1% annual chance event along the watercourse and downstream of the crossing within the golf course. Depth of 0.3-0.6m at crossing and downstream.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	Downstream of the crossing, a recorded flood outline from 1968 is shown associated with the Windle Brook.
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



W072 Crossing Review

Watercourse name	Unnamed Watercourse 56
Crossing ID	None
Grid reference	496983, 163356
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Low
Risk of proposed crossing increasing flood risk without mitigation	Medium
Risk of proposed crossing increasing flood risk with mitigation	Low



14 W072 Crossing Review

14.1 Site Details

- 14.1.1 Crossing W072 is over an unnamed watercourse. Whilst the location of the crossing is not set at a defined watercourse it is likely that the crossing is over an ephemeral stream with a catchment extending into the Chobham Common Nature Reserve. The watercourse flows north to south and is likely culverted beneath the B383 (Windsor Road) on route to the Mill Bourne watercourse approximately 1.5 km to the south.
- 14.1.2 The surrounding land is characterized by woodland and scrub upstream and to the east of the crossing. To the west and across the B383 the habitat is largely agricultural land. A tree and plant nursey is located directly west of the crossing. Finally, to the south the landscape is characterized by rural residential properties, the closest of which is approximately 180m to the south of the Order Limits.
- 14.1.3 Figure C62 defines the location of the crossing. All available flood related information can be found below.

14.2 Flood Risk

- 14.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The 3.3% annual exceedance probability (AEP) identifies surface water flooding at the crossing reaching up to 150mm in depth, and up to 600mm in the surrounding area. The 1% AEP identifies two large surface water flood routes in the vicinity of the crossing. The first originates close to the junction of the B383 and Chestnut Lane and flows south along the road. The second originates on the western boundary of the nature reserve close to the junction of Staple Hill and the B383 before converging approximately 150m south of the Order Limits. Flood depths at the crossing location range between 0 – 600mm. It is likely that both surface water flow routes would have an impact on the crossing due to inundation of land on both sides of the potential channel.

14.3 Flood History

- 14.3.1 No information regarding flooding in the area of the crossing has been identified.

14.4 Features Local to the Crossing That Could Influence Flooding

- 14.4.1 Whilst the catchment is small the watercourse is likely diverted beneath the road by a series of culverts which have the potential to restrict flows close to the crossing location. The road is not believed to be embanked meaning that surface water runoff from the highway has the potential to impact flooding at the crossing location.



14.5 Crossing Impact on Flood Risk

- 14.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing has the potential to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents could affect the Windsor Road.
- 14.5.2 The likelihood of flooding is assessed as being **medium** given the crossing being at risk of flooding from a 3.3% AEP event.
- 14.5.3 Any increased flood extents would impact vulnerable receptors, including the minor road to the west. Therefore, severity of any increase in flood risk as a result of the proposed crossing is **low**.
- 14.5.4 Therefore, this crossing is identified to be have a **medium** risk of increasing flood risk to receptors.



14.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No data within the vicinity of the crossing
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Yes - Flood extent in vicinity of Order Limits upstream. Continuous Flooding
RoFSW Extent 1% Annual Chance	Yes - Flood extent in vicinity of Order Limits upstream. Continuous Flooding
RoFSW Extent 0.1% Annual Chance	Yes - Flood extent in vicinity of Order Limits upstream. Continuous Flooding
RoFSW Depth 3.3% Annual Chance	Depths up to 0.6m within extent of Order Limits. Flooding is confined to the road and the land on the western border of the nature reserve.
RoFSW Depth 1% Annual Chance	Depths up to 600mm within extent of Order Limits. Flooding is confined to the road and the land on the western border of the nature reserve.
RoFSW Depth 0.1% Annual Chance	Depths up to 0.9m within extent of Order Limits. Flooding is confined to the road and the land on the western border of the nature reserve.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 106 Crossing Review

Watercourse name	Unnamed Watercourse 85
Crossing ID	WCX 106
Grid reference	506062, 171676
Pipeline section	H
Type	Main River
Watercourse crossed by haul road?	No
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Large
Risk of proposed crossing increasing flood risk without mitigation	Medium
Risk of proposed crossing increasing flood risk with mitigation	Very low



15 WCX 106 Crossing Review

15.1 Site Details

- 15.1.1 Crossing WCX 106 is over Unnamed Watercourse 85 (Main River), within a residential area in Ashford, Surrey. The watercourse is a tributary of River Ash. The confluence of the two watercourses is approximately 540m southwest of the crossing point. The crossing point is located near the junction of Woodthorpe Road and Ashford Close.
- 15.1.2 A railway track is located approximately 140m north of the crossing point. Ashford railway station is approximately 590m northeast of the crossing point. There are several educational establishments within 1km radius of the crossing point, the closest being a school approximately 40m southeast of the crossing point.
- 15.1.3 Figure C90 defines the location of the crossing. All available flood related information can be found below.

15.2 Flood Risk

- 15.2.1 The crossing point is within Flood Zone 2, which covers part of the local residential area and rail track.
- 15.2.2 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW map for the 3.3% and 1% annual exceedance probability (AEP) events identifies scattered flooding near the crossing point, with depths of less than 300mm within the Order Limits. The 0.1% AEP event shows flooding at the crossing and in the surrounding area reaching up to 600mm deep.

15.3 Flood History

- 15.3.1 Surrey County Council has historic records of highway flooding within 110m of the crossing point. Published wet spots are shown on Ashford Close and Station Crescent, approximately 110m northeast of the crossing point.

15.4 Features Local to the Crossing That Could Influence Flooding

- 15.4.1 The crossing point located within Flood Zone 2. Staines Reservoir is approximately 960m north of the crossing point, just at the opposite side of the A30. Queen Mary Reservoir is approximately 1.4km southeast of the crossing point. The Bedfont Lakes County Park is approximately 700m northeast of the crossing point. The crossing location is at risk of flooding from reservoir failure.
- 15.4.2 The estimated catchment area to the crossing point is approximately 0.57km². The catchment covers residential areas and the southeastern section of Staines South Reservoir, as well as Ashford Hospital and Thomas Knyvett College.
- 15.4.3 The watercourse is entirely culverted in the vicinity of the crossing beneath the local roads, including the A30 and the B378, residential properties and gardens.



15.5 Crossing Impact on Flood Risk

- 15.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing could have an impact on flood risk to vulnerable receptors in the area.
- 15.5.2 The likelihood of flooding is assessed as being **very low** given the crossing is at risk of flooding from a 0.1% AEP event.
- 15.5.3 The severity of any increase in flood risk as a result of the proposed crossing is **large** given the potential to impact nearby residential receptors and disrupt local roads.
- 15.5.4 Therefore, this crossing is identified to be have a **medium** risk of increasing flood risk to receptors.



15.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Highway flood enquiry locations within the Order Limits
Hampshire Lead Local Flood Authority Data	Not applicable
Flood Zone 2	Defined at the crossing point
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Not defined within Order Limits
RoFSW Extent 1% Annual Chance	Yes – spots of flooding within Order Limits but not at the crossing point
RoFSW Extent 0.1% Annual Chance	Yes – flooding within Order Limits near the crossing point
RoFSW Depth 3.3% Annual Chance	Not defined within Order Limits
RoFSW Depth 1% Annual Chance	Yes – flood with depth less than 300mm within the Order Limits but not at the crossing point
RoFSW Depth 0.1% Annual Chance	Yes – flood with depth less than 600mm within the Order Limits near the crossing point
Risk of Flooding from Reservoirs - Maximum Flood Depth	Risk of flooding within Order Limits
Risk of Flooding from Reservoirs - Maximum Flood Extent	Risk of flooding within Order Limits
Risk of Flooding from Reservoirs - Maximum Flood Speed	Risk of flooding within Order Limits
Recorded Flood Outlines	Recorded within Order Limits approximately 230m southwest of the crossing point
Surrey Heath BC – Flood Zone – 3a	Not applicable
Surrey Heath BC – Flood Zone – 3b	Not applicable
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	Defined along the watercourse indicating the watercourse is culverted along its entire length in the vicinity of the crossing



WCX 112 Crossing Review

Watercourse name	Unnamed watercourse 88
Crossing ID	WCX-112
Grid reference	495944, 162989
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Large
Risk of proposed crossing increasing flood risk without mitigation	High
Risk of proposed crossing increasing flood risk with mitigation	Low



16 WCX 112 Crossing Review

16.1 Site details

- 16.1.1 Crossing WCX 112 is over unnamed watercourse 88 (Ordinary Watercourse), which is located approximately 1km west of Burrowhill, Surrey and just south of Windlesham Road. The watercourse is not shown on OS mapping.
- 16.1.2 The intended crossing point is over a drainage ditch of unknown dimensions located within Dingley Dell Nursery which is a semi industrial/commercial land use setting. The source of the watercourse is uncertain. However, the ditch is suspected to be approximately 100m long and runs north to south through the centre of the nursery. It is likely that the ditch was installed to manage surface water through the nursery complex and may be hydraulically connected to a series of ditches located in agricultural fields to the south. These connect with the Clappers Brook before discharging into the Hale Bourne approximately 1.3km downstream.
- 16.1.3 There are a number of sensitive receptors within the vicinity of the crossing. An office is located approximately 25m to the north and a number of greenhouses are located within 40m of the ditch. In addition, there appears to be various equipment scattered around buildings.
- 16.1.4 Figure C94 defines the location of the crossing. All available flood related information can be found below.

16.2 Flood Risk

- 16.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The 1% annual exceedance probability (AEP) floodplain for the watercourse is defined by the RoFSW map. This identifies that flooding is not confined to a particular channel but is spread across a wider area as it flows towards the Clappers Brook. Flood depths vary throughout the surrounding area of the proposed crossing, with maximum depths of up to 0.9m in a few places. Flood depths of up to 0.6m are shown within the channel during the 3.33% AEP event, therefore presenting a high risk of flooding within the nursery area. The fluvial floodplain for the Clappers Brook, defined by Flood Zone 2 and Flood Zone 3 extends to within 220m of the proposed crossing location and slightly inundates the southern border of the nursery. This has the potential to exacerbate flooding if a surface water event corresponds with an existing fluvial event as floodwaters are unable to drain from the nursery site and may backup towards the proposed crossing location.

16.3 Flood History

- 16.3.1 Highway flooding has been recorded within approximately 200m of the crossing point, at three locations along the Windlesham road which runs along the northern boundary of the nursery. Similarly, external flooding has been recorded at properties along the Windlesham Road. However, no information is currently available for these events.



16.4 Features Local to the Crossing That Could Influence Flooding

16.4.1 The land around the crossing has an existing level of flood risk. Surface water would pond over impermeable surfaces and a number of fixed structures and equipment in the vicinity of the crossing have the potential to increase the risk of flooding if surface water is constrained when flowing around it. Furthermore, the location of the Clappers Brook floodplain has the potential to exacerbate flooding if a surface water event coincides with an existing fluvial event.

16.5 Crossing Impact on Flood Risk

16.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing may have an impact on flood risk to vulnerable receptors in the area.

16.5.2 The likelihood of flooding is assessed as being **medium** given the crossing being at risk of flooding from a 1% AEP event.

16.5.3 Any increased flood extents could exacerbate the flood risk to local receptors and affect the local community and residential properties. The severity of any increase in flood risk as a result of the proposed crossing is very **large**.

16.5.4 Therefore, this crossing is identified to be have a **high** risk of increasing flood risk to receptors.



16.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	External property flooding present. Three Highway flood enquiries along Windlesham Road.
Hampshire Lead Local Flood Authority Data	N/A
Flood Zone 2	FZ2 for Clappers Brook extends to within 220m of proposed crossing location.
Flood Zone 3	FZ3 for Clappers Brook extends to within 220m of proposed crossing location.
RoFSW Extent 3.3% Annual Chance	Flood flow path is discontinuous but pools within drainage ditch.
RoFSW Extent 1% Annual Chance	Flood flow path is continuous, breaching drainage ditch and connecting to a wider flow path arising from the Clappers Brook.
RoFSW Extent 0.1% Annual Chance	Flooding is widespread, flow path is continuous, breaching drainage ditch and connecting to a wider flow path arising from the Clappers Brook.
RoFSW Depth 3.3% Annual Chance	Depths between 0.15m-0.3m contained in drainage ditches within Order Limits. Small pockets of flooding up to 0.15m are also present.
RoFSW Depth 1% Annual Chance	Average depths of 0.3m in affected areas but depths up to 0.6m around drainage ditches within the Order Limits.
RoFSW Depth 0.1% Annual Chance	Widespread flood depths of 0.3-0.6m throughout the area, increasing to 0.6-0.9m within the drainage ditches. Small pockets of flooding greater than 1.2m noted in the wider area.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	Flooding around Clappers Brook to south of crossing
Surrey Heath BC – Flood Zone – 3a	None defined
Surrey Heath BC – Flood Zone – 3b	Extends 230m to the southwest of crossing location
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 048 Crossing Review

Watercourse name	Cove Brook
Crossing ID	WCX 048
Grid reference	485761, 155935
Pipeline section	E
Type	Main River
Watercourse crossed by haul road?	Yes
Proposed crossing type	Access Road only
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Significant
Risk of proposed crossing increasing flood risk without mitigation	High
Risk of proposed crossing increasing flood risk with mitigation	Low



17 WCX 048 Crossing Review

17.1 Site Details

- 17.1.1 Crossing WCX 048 is required to carry the haul road over the Cove Brook. A trenchless crossing is envisaged to carry the pipeline beneath the watercourse. However, a haul road would still be required for access. The crossing point is located approximately 40m north of the railway in Farnborough. The Farnborough train station is approximately 1.1km east of the crossing point.
- 17.1.2 The crossing point is located within a residential area, immediately to the south of West Heath Road. The railway is elevated on an embankment several meters above the surrounding ground level.
- 17.1.3 Figure C44 defines the location of the crossing. All available flood related information can be found below.

17.2 Flood Risk

- 17.2.1 The crossing point is within Flood Zones 2 and 3, which are defined along the watercourse.
- 17.2.2 The Risk of Surface Water Flooding (RoFSW) map identifies continuous flooding along the watercourse for the 3.33% annual exceedance probability (AEP) event, with predominant depths in within the Order Limits of up to 900mm.
- 17.2.3 The 1% AEP floodplain indicates the extent of the flooding to increase in the surrounding area, with depths exceeding 1.2m within the Order Limits at the crossing point.

17.3 Flood History

- 17.3.1 Hampshire County Council have recorded highway flooding at Giffard Drive, from approximately 150m northeast of the crossing point. However, the closest records within the Order Limits is at the B3014 (Cove Road), approximately 180m southwest of the crossing point.

17.4 Features Local to the Crossing That Could Influence Flooding

- 17.4.1 The FEH catchment up to the crossing point is approximately 10.9km², and covers residential areas, a golf club and Farnborough Airport, which is located approximately 1.6km south of the crossing point.
- 17.4.2 Upstream of the crossing point, the watercourse is culverted under the railway approximately 45m south. The water course is also culverted under the West Heath Road approximately 20m northeast (downstream) of the crossing point.
- 17.4.3 The crossing point is also at risk of reservoir flooding.



17.5 Crossing Impact on Flood Risk

- 17.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing may have an impact on flood risk to receptors in the area.
- 17.5.2 The likelihood of flooding is assessed as being **medium** given the crossing being at risk of flooding from a 3.3% AEP event and being located in Flood Zone 3.
- 17.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding residential properties and potentially West Heath Road. This results in risk to life and/or in risk for required evacuation. The exception is the railway, which is unlikely to be affected as it is elevated above surrounding ground levels. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **significant**.
- 17.5.4 Therefore, this crossing is identified to be have a **high** risk of increasing flood risk in the area to receptors.



17.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	Recorded highway flooding within Order Limits near the crossing point
Flood Zone 2	Defined along water course
Flood Zone 3	Defined along water course
RoFSW Extent 3.3% Annual Chance	Yes – flooding within Order Limits
RoFSW Extent 1% Annual Chance	Yes – flooding within Order Limits
RoFSW Extent 0.1% Annual Chance	Yes – flooding within Order Limits
RoFSW Depth 3.3% Annual Chance	Yes – flood with predominant depths up to 900mm within the Order Limits near the crossing point
RoFSW Depth 1% Annual Chance	Yes – flood with predominant depths up to 1.2m within the Order Limits near the crossing point
RoFSW Depth 0.1% Annual Chance	Yes – flood with predominant depths exceeding 1.2m within the Order Limits near the crossing point
Risk of Flooding from Reservoirs - Maximum Flood Depth	Risk within Order Limits
Risk of Flooding from Reservoirs - Maximum Flood Extent	Risk within Order Limits
Risk of Flooding from Reservoirs - Maximum Flood Speed	Risk within Order Limits
Recorded Flood Outlines	Records within Order Limits at the crossing point
Surrey Heath BC – Flood Zone – 3a	Defined along water course
Surrey Heath BC – Flood Zone – 3b	Defined along water course
Rushmoor BC – Flood Zone – 3a	Defined along water course
Rushmoor BC – Flood Zone – 3b	Defined along water course
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	Defined along the watercourse



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Appendix C2 Low and Very Low Risk Crossing Reports

WCX 003 Crossing Review

Watercourse name	Unnamed Watercourse 2
Crossing ID	G-WCX3
Grid reference	452299, 116363
Pipeline section	A
Type	Ordinary Watercourse
Watercourse crossed by haul road?	No
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



1 WCX 003 Crossing Review

1.1 Site Details

- 1.1.1 Crossing W003 is over the Unnamed Watercourse 2 (Ordinary Watercourse), which is located 500m northeast of Durley, a village southern Hampshire, to the northeast of Southampton.
- 1.1.2 The crossing point is located approximately 280m east of Kytes Lane. The location of the crossing and surrounding land is characterised as agricultural land. Downstream of the crossing, the watercourse meets another watercourse that flows southwards from Kytes Lane to the north of the watercourse on which the crossing is located. There is an existing track crossing of this watercourse at the location of the proposed haul road crossing.
- 1.1.3 Downstream of the crossing, the watercourse flows in an open ditch until it is culverted beneath Gregory Lane (about 500m southwest of the crossing). The watercourse flows southwest before discharging into Ford Lake (river).
- 1.1.4 The nearest receptor is located to the northwest of the crossing; Broom Farm. The nearest residential/commercial development within the catchment of the watercourse is approximately 380m southwest (downstream) of the crossing point. Upstream of the crossing the nearest receptor is Mincingfield Lane (470m northeast) which is approximately 10m higher than the elevation of the proposed crossing.
- 1.1.5 Figure C2 defines the location of the crossing. All available flood related information can be found below.

1.2 Flood Risk

- 1.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). Localised flooding is present during the 3.33% Annual Exceedance Probability (AEP) event and the 1% AEP. A defined flow path is present in the 0.1% AEP event, with maximum depths of 600mm to 900mm within areas of agricultural land.

1.3 Flood History

- 1.3.1 The only record of flooding local to the site is a Hampshire Lead Local Flood Authority record of flooding in an area to the east of Mincingfield Lane, approx. 300m southeast of crossing. This flood event is not within the catchment of watercourse affected by this crossing.

1.4 Features Local to the Crossing That Could Influence Flooding



- 1.4.1 The catchment area of the watercourse to the crossing point is less than 0.53km². The catchment is rural, draining agricultural land. The watercourse has an existing crossing at the location of the proposed crossing which could impact local flooding. Downstream of the crossing, the watercourse is culverted beneath Gregory Lane (about 500m southwest of the crossing). However, this is unlikely to impact flood risk.

1.5 Crossing Impact on Flood Risk

- 1.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increased flood extents would only affect agricultural land.
- 1.5.2 The likelihood of flooding is assessed as being **very low** given the crossing at risk of flooding from a 0.1% AEP event.
- 1.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land as there are no nearby vulnerable receptors, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 1.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



1.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	Flooding in area by Mincingfield Lane, approx. 300m southeast of crossing, not within catchment of the watercourse affected by this crossing.
Flood Zone 2	No
Flood Zone 3	No
RoFSW Extent 3.3% Annual Chance	Yes - minimal flood extent in vicinity of crossing, confined to agricultural land, not continuous (i.e. disconnected flooding).
RoFSW Extent 1% Annual Chance	Yes - flood extent in vicinity of crossing, confined to agricultural land, scattered along the watercourse.
RoFSW Extent 0.1% Annual Chance	Yes - flood extent in vicinity of crossing, mostly on agricultural land but affecting some external areas of properties downstream of the crossing on The Sawmills (road).
RoFSW Depth 3.3% Annual Chance	Yes - minimal flood extent in vicinity of crossing, confined to agricultural land, not continuous (i.e. disconnected flooding). Depths between 300-600mm within Order Limits.
RoFSW Depth 1% Annual Chance	Yes - flood extent in vicinity of crossing, confined to agricultural land, scattered. Depths between 300-600mm within Order Limits.
RoFSW Depth 0.1% Annual Chance	Yes - flood extent in vicinity of crossing, mostly on agricultural land, but affecting some external areas of properties downstream of the crossing. Depths between 600-900mm within Order Limits.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath Borough Council (BC) – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 004 Crossing Review

Watercourse name	Unnamed Watercourse 3
Crossing ID	None
Grid Reference	452760, 116928
Pipeline section	A
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Potentially
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Very low



2 WCX 004 Crossing Review

2.1 Site Details

- 2.1.1 Watercourse W004 is located within the Order Limits and may potentially be crossed by the haul road subject to the final layout of the proposed haul road. W004 is an unnamed watercourse (Ordinary Watercourse) located approximately 1.2km northeast of Durley, a rural village in southern Hampshire, to the northeast of Southampton.
- 2.1.2 The potential crossing point is located approximately 100m east of the intersection of Kytes Lane and Manor Road. The location of the crossing and surrounding land is characterised as agricultural with the watercourse itself surrounded by dense vegetation. The connectivity of the watercourse is uncertain. The 25k Ordnance Survey mapping suggests the watercourse may be an isolated agricultural drainage ditch and soakaway and the feature does not appear on the 1937 OS mapping. However aerial imagery suggests the potential for a connection to the tributaries of the Ford Lake watercourse based on vegetation patterns in the area. This is also backed up by contour mapping which shows steep topography of the area and a potential connection to another unnamed watercourse approximately 450m to the southwest located in the same valley.
- 2.1.3 The nearest vulnerable receptor is Mincingfield Farm, located approximately 430m to the south (downstream) of the watercourse. Due to the topography of the area it is likely that any out of bank flow would travel south along Mincingfield Lane before reaching the farm, however the steep topography of the area suggests that ponding and prolonged flooding at the receptor is unlikely.
- 2.1.4 Figure C3 identifies the location of the crossing. The available flood related information is highlighted below.

2.2 Flood Risk

- 2.2.1 The fluvial floodplain for the watercourse may be inferred from the Risk of Flooding from Surface Water map (RoFSW). This identifies that flooding is not present around the watercourse crossing during the 1% event. Flooding is present during the 0.1% event, with depths of up to 0.3m emanating from within the channel and flowing south to join the unnamed watercourse located 450m to the southwest.

2.3 Flood History

- 2.3.1 The only record of flooding local to the site is a Hampshire County Council (as Lead Local Flood Authority) record of flooding in an area to the east of Mincingfield Lane, approx. 800m south of crossing. This flood event is not within the catchment of the watercourse affected by this potential crossing.

2.4 Features Local to the Crossing That Could Influence Flooding



- 2.4.1 The immediate area around the proposed crossing location, as defined by the Order Limits, is within open fields and lacks features which could substantially influence flooding. Downstream of the watercourse the RoFSW suggests that water is able to flow freely along its natural flowpath without being constricted through culverts. It was not possible to determine catchment area for the watercourse. Aerial imagery does not suggest the presence of any existing crossings.

2.5 Crossing Impact on Flood Risk

- 2.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increased flood extents would only affect agricultural land.
- 2.5.2 The likelihood of flooding is assessed as being **very low** given the crossing being at risk of flooding from a 0.1% AEP event.
- 2.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land and the adjacent minor road. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **low**.
- 2.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



2.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey Lead Local Flood Authority Data	N/A
Hampshire Lead Local Flood Authority Data	Flooding on area by Mincingfield Lane, approx. 800m south of crossing, not within catchment of the watercourse affected by this crossing.
Flood Zone 2	N/A
Flood Zone 3	N/A
RoFSW Extent 3.3% Annual Chance	Not at risk during the 3.3% Annual Probability event
RoFSW Extent 1% Annual Chance	Not at risk during the 1% Annual Probability event.
RoFSW Extent 0.1% Annual Chance	Yes - flood extent in vicinity of crossing, confined mostly on agricultural land but crosses Mincingfield Lane approximately 200m to the south of the watercourse. Does not affect vulnerable receptors.
RoFSW Depth 3.3% Annual Chance	Not at risk during the 3.3% Annual Probability event
RoFSW Depth 1% Annual Chance	Not at risk during the 1% Annual Probability event.
RoFSW Depth 0.1% Annual Chance	Yes - flood depths up to 0.3m in vicinity of crossing, confined mostly on agricultural land but crosses Mincingfield Lane approximately 200m to the south of the watercourse. Does not affect vulnerable receptors.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 005 Crossing Review

Watercourse name	Unnamed Watercourse 4
Crossing ID	WCX 005
Grid reference	453272, 117521
Pipeline section	A
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



3 WCX 005 Crossing Review

3.1 Site Details

- 3.1.1 Crossing WCX 005 is over a small watercourse known as Unnamed Watercourse 4. The source of the watercourse is located approximately 205m west of the Order Limits boundary, just east of Manor Road, south of Durley Street.
- 3.1.2 The crossing point surrounding by land characterised as agricultural land.
- 3.1.3 There are no receptors close to the crossing point. The nearest residential development that is potentially within the catchment of the watercourse is Durley Street, approximately 230m northwest (upstream) of the crossing point and upstream of the source of the watercourse.
- 3.1.4 Figure C4 defines the location of the crossing. All available flood related information is highlighted below.

3.2 Flood Risk

- 3.2.1 The fluvial floodplain for the watercourse can be inferred from the Risk of Flooding from Surface Water map (RoFSW). This identifies that flooding is not present during the 3.33% Annual Exceedance Period (AEP). Flooding is present during the 1% AEP event which gives rise to limited areas of flooding within areas of agricultural land. During the event flood depths range between 150-300mm.

3.3 Flood History

- 3.3.1 No records of flooding have been identified.

3.4 Features Local to the Crossing That Could Influence Flooding

- 3.4.1 There are no local features which might influence flooding as the crossing is located close to the upstream limit of the watercourse surrounded by agricultural land.

3.5 Crossing Impact on Flood Risk

- 3.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increased flood extents would only affect agricultural land.
- 3.5.2 The likelihood of flooding is assessed as being **low** given the crossing being at risk of flooding from a 1% AEP event.
- 3.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 3.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



3.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	No flood records.
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No flooding shown.
RoFSW Extent 1% Annual Chance	Yes - minimal flood extent in vicinity of crossing, confined to arable land.
RoFSW Extent 0.1% Annual Chance	Yes - Flooding arable land, small extent upstream of crossing with flooding continuous from upstream through to ordinary watercourse downstream.
RoFSW Depth 3.3% Annual Chance	No flooding shown.
RoFSW Depth 1% Annual Chance	Yes - minimal flood extent in vicinity of crossing, confined to arable land. Depth is below 150mm.
RoFSW Depth 0.1% Annual Chance	Yes - Flooding arable land, small extent upstream of crossing with flooding continuous from upstream through to ordinary watercourse downstream. Depth is below 300mm.
Risk of Flooding from Reservoirs - Maximum Flood Depth	Not defined
Risk of Flooding from Reservoirs - Maximum Flood Extent	Not defined
Risk of Flooding from Reservoirs - Maximum Flood Speed	Not defined
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 009 Crossing Review

Watercourse name	Unnamed Watercourse 8
Crossing ID	None
Grid reference	471430, 136478
Pipeline section	B
Type	Ordinary Watercourse
Watercourse crossed by haul road?	No
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



4 WCX 009 Crossing Review

4.1 Site Details

4.1.1 This crossing is over the Unnamed Watercourse 8 (Ordinary Watercourse), which is located 1.1km southeast of Chawton, Hampshire.

4.1.2 The crossing point is located approximately 800m east of the A32. The location of the crossing is within a woodland (Holm Wood), in the upper catchment, and is surrounded by agricultural land. Upstream of the crossing the watercourse runs southwards along the field boundary on the eastern edge of Holm Wood. From the crossing the watercourse runs northeast (downstream) along the northern edge of Three Acres Copse (woodland) and discharges into a small pond in Peck Copse (where there is a spring). This flow is then drained into the Caker Stream, which crosses Selbourne Road via a culvert (located about 1.5km northeast of the crossing point). There is an existing track crossing of this watercourse at the location of the proposed haul road crossing. Potentially the existing crossing could be used, but this assessment will consider a new crossing installed at that location. The nearest properties are around Chawton House, located 530m to the northwest of the crossing (upstream), which is not likely to be affected by the Unnamed Watercourse 8, since water flows northeast. No other property is identified to be potentially impacted by the crossing. Figure C8 defines the location of the crossing.

4.1.3 Pertinent flood risk information is included below.

4.1.4 Flood Risk

4.1.5 In the absence of fluvial flood zones the fluvial floodplain for the watercourse can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water Map (RoFSW). This indicates that the crossing is not expected to be at risk during the 3.33%, 1% or 0.1% Annual Exceedance Probability (AEP) events.

4.2 Flood History

4.2.1 No information regarding flooding in the area of the crossing has been identified.

4.3 Features Local to the Crossing That Could Influence Flooding

4.3.1 Due to the crossing being located within the upper catchment, the area contributing to the watercourse flow at the crossing location is uncertain. It is estimated to have a catchment area of less than 0.5km² with largely impermeable underlying geology. The location of the proposed crossing appears to have an existing agricultural access track crossing the watercourse which could impact local flooding.

4.4 Crossing Impact on Flood Risk



- 4.4.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.
- 4.4.2 The likelihood of flooding is assessed as **very low** given the crossing is not identified to be at risk in the 0.1% AEP event.
- 4.4.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 4.4.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



4.5 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	No
Flood Zone 3	No
RoFSW Extent 3.3% Annual Chance	No flooding shown for 3.3% annual chance event.
RoFSW Extent 1% Annual Chance	No flooding at crossing location. Minimal flood extent in vicinity of crossing, confined to agricultural land, not continuous (i.e. disconnected flooding).
RoFSW Extent 0.1% Annual Chance	No flooding at crossing location. Minimal flood extent in vicinity of crossing, confined to agricultural land, not continuous (i.e. disconnected flooding).
RoFSW Depth 3.3% Annual Chance	No flooding shown for 3.3% annual chance event.
RoFSW Depth 1% Annual Chance	No flooding at crossing location. Minimal flood extent in vicinity of crossing, confined to agricultural land, not continuous (i.e. disconnected flooding). Maximum depths between 300-600mm outside Order Limits.
RoFSW Depth 0.1% Annual Chance	No flooding at crossing location. Minimal flood extent in vicinity of crossing, confined to agricultural land, not continuous (i.e. disconnected flooding). Maximum depths between 300-600mm outside Order Limits.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 009a Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	W009a
Grid reference	471431, 136440
Pipeline section	None
Type	Ordinary Watercourse
Watercourse crossed by haul road?	No
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

5 WCX 009a Crossing Review

5.1 Site Details

- 5.1.1 Crossing W009a is over an unnamed watercourse (an Ordinary Watercourse), which is located approximately 1.1km southeast of Chawton, Hampshire.
- 5.1.2 The crossing point is located approximately 800m east of the A32. The location of the crossing is on the border of a woodland (Holm Wood), in the upper catchment, and is surrounded by agricultural land. Upstream of the crossing it is believed that the watercourse runs eastward along the field boundary on the southern edge of Holm Wood. From the crossing the watercourse runs east (downstream) along the southern edge of Three Acres Copse (woodland) and discharges into the small pond. From here the watercourse flows north and then east along the northern boundary of Three Acre Copse to Peck Copse (where there is a spring). This flow is then drains into the Caker Stream, which crosses Selbourne Road via a culvert (located about 1.5km northeast of the crossing point). There is an existing track crossing of this watercourse at the location of the proposed haul road crossing. Potentially the existing crossing could be used, but this assessment will consider a new crossing installed at that location. The nearest properties are around Chawton House, located 560m to the northwest of the crossing (upstream), which is not likely to be affected by the Unnamed Watercourse 8, since water flows northeast. No other property is identified to be potentially impacted by the crossing. Figure C9 defines the location of the crossing.
- 5.1.3 Pertinent flood risk information is included below.

5.2 Floodplain Extent

- 5.2.1 In the absence of Flood Zone mapping the fluvial floodplain for the watercourse may be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water Map (RoFSW). This indicates that the crossing is not predicted to be at risk during the 3.33%, 1% or 0.1% Annual Exceedance Probability (AEP) events.

5.3 Flood History

- 5.3.1 No information regarding flooding in the area of the crossing has been identified.

5.4 Features Local to the Crossing That Could Influence Flooding

- 5.4.1 As the crossing is located within the upper catchment, the area contributing to the watercourse flow at the crossing location is uncertain. It is estimated to have a catchment area of less than 0.5km² with largely impermeable underlying geology. The location of the proposed crossing appears to have an existing agricultural access track crossing the watercourse which could impact local flooding.

5.5 Crossing Impact on Flood Risk



- 5.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.
- 5.5.2 The likelihood of flooding is assessed as **very low** given the crossing is not identified to be at risk in the 0.1% AEP event.
- 5.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 5.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



5.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	No
Flood Zone 3	No
RoFSW Extent 3.3% Annual Chance	No flooding shown for 3.3% annual chance event.
RoFSW Extent 1% Annual Chance	No flooding at crossing location. Minimal flood extent in vicinity of crossing, confined to agricultural land, not continuous (i.e. disconnected flooding).
RoFSW Extent 0.1% Annual Chance	No flooding at crossing location. Minimal flood extent in vicinity of crossing, confined to agricultural land, not continuous (i.e. disconnected flooding).
RoFSW Depth 3.3% Annual Chance	No flooding shown for 3.3% annual chance event.
RoFSW Depth 1% Annual Chance	No flooding at crossing location. Minimal flood extent in vicinity of crossing, confined to agricultural land, not continuous (i.e. disconnected flooding). Maximum depths between 300-600mm outside Order Limits.
RoFSW Depth 0.1% Annual Chance	No flooding at crossing location. Minimal flood extent in vicinity of crossing, confined to agricultural land, not continuous (i.e. disconnected flooding). Maximum depths between 300-600mm outside Order Limits.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 010 Crossing Review

Watercourse name	Unnamed Watercourse 9
Crossing ID	WCX 010
Grid reference	471637, 136966
Pipeline section	B
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

6 WCX 010 Crossing Review

6.1 Site Details

- 6.1.1 Crossing WCX 010 is over a small watercourse (Ordinary Watercourse), known as Unnamed Watercourse 9, and is a tributary of Caker Stream that runs through the outskirts of Alton. The crossing is approximately 370m northeast (downstream) from the watercourse source which is located in upland woodland, southeast of Chawton village. The location of the crossing and surrounding land is characterized as agricultural pasture.
- 6.1.2 There are no vulnerable receptors within the surrounding area of the watercourse and crossing with the nearest residential development within the catchment of the watercourse being Chawton House approximately 700m (upstream) of the crossing point.
- 6.1.3 Figure C10 defines the location of the crossing. All available flood related information can be found below.

6.2 Flood Risk

- 6.2.1 The fluvial floodplain for the watercourse can be inferred from the extent of flooding defined in the Risk of Flooding from Surface Water (RoFSW) map. However, this shows there to be no flooding within the vicinity of the watercourse crossing for the 0.1%, 1% and 3.3% Annual Exceedance Probability (AEP) events.

6.3 Flood History

- 6.3.1 No information regarding flooding in the area of the crossing have been identified.

6.4 Features Local to the Crossing That Could Influence Flooding

- 6.4.1 The crossing is within an open agricultural field. The catchment area which drains to the Caker Stream is approximately 0.63km² and comprises largely permeable underlying geology.

6.5 Crossing Impact on Flood Risk

- 6.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.
- 6.5.2 The likelihood of flooding is assessed as being **very low** given the crossing is not identified to be at risk in the 0.1% AEP event.
- 6.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.



- 6.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



6.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	No flood records
Flood Zone 2	Not defined at this watercourse
Flood Zone 3	Not defined at this watercourse
RoFSW Extent 3.3% Annual Chance	No flooding shown.
RoFSW Extent 1% Annual Chance	No flooding shown.
RoFSW Extent 0.1% Annual Chance	No flooding shown.
RoFSW Depth 3.3% Annual Chance	No flooding shown.
RoFSW Depth 1% Annual Chance	No flooding shown.
RoFSW Depth 0.1% Annual Chance	No flooding shown.
Risk of Flooding from Reservoirs - Maximum Flood Depth	Not defined
Risk of Flooding from Reservoirs - Maximum Flood Extent	Not defined
Risk of Flooding from Reservoirs - Maximum Flood Speed	Not defined
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 011 Crossing Review

Watercourse name	Unnamed Watercourse 10
Crossing ID	WCX 011
Grid reference	472138, 137591
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Very low



7 WCX 011 Crossing Review

7.1 Site Details

- 7.1.1 Crossing WCX 011 is over an unnamed watercourse which appears to be a man-made agricultural drainage ditch. The watercourse runs roughly 360m to the north of the crossing where it discharges into the Lavant Stream.
- 7.1.2 The crossing point is located 15m upstream of the B3006 (Selborne Road) where the watercourse is likely conveyed through a culvert beneath the highway. The crossing sits on the boundary of agricultural land where there is agricultural land to the south and west and rural residential properties and non-residential agricultural industry immediately to the east and northwest. The closest property to the crossing is a residential property and farm 15m to the east and is within the proposed Order Limits. Aerial imagery suggests the location of the crossing may already be at the point of a culvert. Upstream of the crossing land is agricultural land.
- 7.1.3 Figure C11 defines the location of the crossing. All available flood related information can be found below.

7.2 Flood Risk

- 7.2.1 The fluvial flood plain can be inferred by the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. Flooding is not expected to occur during the 3.33% or 1% Annual Exceedance Probability (AEP) events. Localised flooding of up to 0.6m may occur close to the source of the watercourse during the 0.1% event, however this occurs 100m south of the crossing and away from vulnerable receptors.

7.3 Flood History

- 7.3.1 No information regarding flooding in the area of the crossing has been identified.

7.4 Features Local to the Crossing That Could Influence Flooding

- 7.4.1 The catchment area to the watercourse is approximately 1.22km² and comprises relatively impermeable underlying geology. The catchment is rural, draining agricultural land. The watercourse is likely passed through a culvert beneath the B3006 located 15m downstream.

7.5 Crossing Impact on Flood Risk

- 7.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are few vulnerable receptors identified in the area that would be impacted by flooding. Any increased flood extents would affect agricultural land and may cause slight disruption to minor roads.



- 7.5.2 The likelihood of flooding is assessed as **very low** given the crossing is not identified to be at risk in the 0.1% AEP event.
- 7.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. There is the potential to impact the local road and has the potential to disrupt the property immediately adjacent to the crossing during extreme events. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **moderate**.
- 7.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



7.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No Flooding
RoFSW Extent 1% Annual Chance	No Flooding within extent of Order Limits
RoFSW Extent 0.1% Annual Chance	Yes - Flood extent confined close to watercourse. Limited impact on works.
RoFSW Depth 3.3% Annual Chance	No Flooding
RoFSW Depth 1% Annual Chance	No Flooding
RoFSW Depth 0.1% Annual Chance	Depths of up to 0.3m but contained close to banks of watercourse
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 013 Crossing Review

Watercourse name	Unnamed Watercourse 11
Crossing ID	WCX 013
Grid reference	472903, 137776
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

8 WCX 013 Crossing Review

8.1 Site Details

- 8.1.1 Crossing WCX 013 is over an unnamed watercourse which appears to be a man-made agricultural drainage ditch. From the crossing point the watercourse runs roughly 400m to the north where it discharges into the Caker Stream.
- 8.1.2 The crossing point indicated by the haul road is located 300m east of Crossing W012 over the Caker Stream, with the closest receptor being a rural residential property 200m northwest (downstream) of the crossing. The crossing is surrounded by agricultural pasture with the only change in land use being the aforementioned property. Note that there are existing crossings over the watercourse indicated by aerial imagery located roughly 95m north of the proposed haul road (60m from the border of the Order Limits) and 60m to the south of the proposed haul road and Order Limits.
- 8.1.3 Figure C13 defines the location of the crossing. All available flood related information is shown below.

8.2 Floodplain Risk

- 8.2.1 The fluvial floodplain can be inferred by the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. Flooding is not expected to occur during the 3.33%, or 1% Annual Exceedance Probability (AEP) events. Surface water flooding is expected during the 0.1% AEP event, however the RoFSW shows it to be contained close to the banks of the watercourse.

8.3 Flood History

- 8.3.1 No information regarding flooding in the area of the crossing has been identified.

8.4 Features Local to the Crossing That Could Influence Flooding

- 8.4.1 The catchment is rural and comprises relatively impermeable underlying geology draining agricultural land. Both upstream and downstream of the watercourse are existing crossings where the watercourse is likely to be culverted and may be restricted during extreme flows.

8.5 Crossing Impact on Flood Risk

- 8.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.
- 8.5.2 The likelihood of flooding is assessed as being **very low** given the crossing is not identified to be at risk in the 1% AEP event.



- 8.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 8.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



8.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	No records
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No Flooding
RoFSW Extent 1% Annual Chance	Surface Water contained within watercourse.
RoFSW Extent 0.1% Annual Chance	Yes - Flood extent confined close to watercourse. Limited impact on works.
RoFSW Depth 3.3% Annual Chance	No Flooding
RoFSW Depth 1% Annual Chance	Surface Water appears to be contained within banks
RoFSW Depth 0.1% Annual Chance	Depths of up to 1.2m in some areas, but likely to be kept within bank. SW flooding up to 0.3m but confined to the immediate area of the watercourse.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 014a Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	WCX 014a
Grid reference	473398, 137563
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



9 WCX 014a Crossing Review

9.1 Site Details

- 9.1.1 Crossing WCX 014a is proposed to enable a haul road to cross an unnamed Ordinary Watercourse located in a rural area to the southeast of Alton.
- 9.1.2 The crossing sits approximately 1.04km southeast of the A31. The watercourse runs through agricultural land upstream of the crossing, and between a golf course and agricultural land downstream of the crossing.
- 9.1.3 The nearest receptor to the crossing is Water Lane, an access road approximately 150m to the east of the crossing. There are no properties within proximity of the watercourse crossing. The village of Truncheaunts, lies over 700m northwest (downstream) of the crossing.
- 9.1.4 Figure C14 defines the crossing location. All available flood related information is shown below.

9.2 Flood Risk

- 9.2.1 The fluvial floodplain for the watercourse can be inferred from extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. This identifies that during a 3.3% and 1% Annual Exceedance Probability (AEP) event there is no flooding upstream or within 120m downstream of the crossing. Flooding is present during a 0.1% AEP event, however is contained close to the channel. Out of bank flow is less than 150mm at the crossing.

9.3 Flood History

- 9.3.1 No information regarding flooding in the area of the crossing has been identified.

9.4 Features Local to the Crossing That Could Influence Flooding

- 9.4.1 The crossing is found within an open agricultural field. There are no features local to the crossing that could influence flooding.



9.5 Crossing Impact on Flood Risk

- 9.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.
- 9.5.2 The likelihood of flooding is assessed as being **very low** given the crossing is not identified to be at risk in the 1% AEP event.
- 9.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 9.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



9.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not Applicable
Hampshire Lead Local Flood Authority Data	No records of flooding.
Flood Zone 2	Not defined at this watercourse
Flood Zone 3	Not defined at this watercourse
RoFSW Extent 3.3% Annual Chance	No
RoFSW Extent 1% Annual Chance	Yes - showing minimal non-continuous flooding of agricultural land downstream of the crossing.
RoFSW Extent 0.1% Annual Chance	Yes - showing minimal but continuous flooding of agricultural land.
RoFSW Depth 3.3% Annual Chance	No
RoFSW Depth 1% Annual Chance	Yes - showing surface water flooding of agricultural land. Depth <150mm downstream of the crossing.
RoFSW Depth 0.1% Annual Chance	Yes - showing surface water flooding of agricultural land. Depth <150mm at crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 015 Crossing Review

Watercourse name	Unnamed Watercourse 12
Crossing ID	WCX 015
Grid reference	473622, 137857
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



10 WCX 015 Crossing Review

10.1 Site Details

- 10.1.1 Crossing WCX 015 is required to carry the haul road over an unnamed (Ordinary Watercourse) tributary of the Caker Stream. The two watercourses converge approximately 1km northwest of the crossing point. The crossing point is located in a rural area between Caker Lane (B3004) (approximately 700m to the north), Selborne Road (B3006) (approximately 1km to the south), the A31 (approximately 1km to the northwest) and Blanket Street (approximately 860m to the southeast). The crossing point is located in land characterised as agricultural.
- 10.1.2 The nearest alternative land use is Water Lane, a minor road approximately 160m to the southwest. There are no other receptors within the vicinity of the crossing.
- 10.1.3 Figure C15 defines the location of the crossing. All available flood related information is shown below.

10.2 Flood Risk

- 10.2.1 The fluvial floodplain can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. The RoFSW identifies continuous flooding for the 3.33% Annual Exceedance Probability (AEP) event, with depths in the vicinity of the crossing reaching 0.3m and for this flooding to be largely confined to the margins of the channel. The 1% AEP floodplain for the watercourse indicates the extent of flooding increasing upstream however this also remains largely confined to the margins of the channel with depths of up to 600mm at the crossing location.

10.3 Flood History

- 10.3.1 No information regarding flooding in the area of the crossing has been identified.

10.4 Features Local to the Crossing That Could Influence Flooding

- 10.4.1 The FEH catchment area of this drainage channel to the crossing point is approximately 1.08km². The catchment is rural, draining agricultural land and is comprised of a largely impermeable underlying geology. There are no vulnerable receptors within the proximity of the crossing that are likely to be affected.

10.5 Crossing Impact on Flood Risk

- 10.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.
- 10.5.2 The likelihood of flooding is assessed as being **medium** given the crossing is identified to be at risk in the 3.3% AEP event.



- 10.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 10.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



10.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	Not applicable
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Yes – flooding within Order Limits near the crossing point
RoFSW Extent 1% Annual Chance	Yes – flooding within Order Limits near the crossing point
RoFSW Extent 0.1% Annual Chance	Yes – flooding within Order Limits near the crossing point
RoFSW Depth 3.3% Annual Chance	Yes – flooding with depths less than 600mm within Order Limits at the crossing point
RoFSW Depth 1% Annual Chance	Yes – flooding with depths less than 600mm within Order Limits at the crossing point
RoFSW Depth 0.1% Annual Chance	Yes – flooding with depths less than 600mm within Order Limits at the crossing point
Risk of Flooding from Reservoirs - Maximum Flood Depth	No risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No risk
Recorded Flood Outlines	No records
Surrey Heath BC – Flood Zone – 3a	Not applicable
Surrey Heath BC – Flood Zone – 3b	Not applicable
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 016 Crossing Review

Watercourse name	Unnamed Watercourse 13
Crossing ID	WCX 016
Grid reference	473779, 138129
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

11 WCX 016 Crossing Review

11.1 Site Details

- 11.1.1 Crossing WCX 016 lies 300m between Water Lane (track) and Caker lane to the SW and NE respectively. It is sited over an unnamed minor watercourse, which appears to be a field drain.
- 11.1.2 The channel upstream of the proposed crossing is marked on the OS map as extending uphill 200m to the SE, along a field boundary. Downstream of the proposed crossing, the channel appears to be culverted for 10m and enters and runs along the boundary of Worldham Park Golf Club. The downstream surface water drainage path within the golf club is not clear, as it comprises a network of channels, which may have culverted connections. However, it appears that it may enter a section of culverted/open channel along the southern boundary of the golf club, before discharging into an unnamed stream, c. 350m to the southwest of the crossing. This stream flows northeastwards ultimately draining into the Caker Stream, 1km further downstream.
- 11.1.3 The proposed crossing and the land use to the east and south of it (containing the upstream channel reach) are agricultural fields, whereas the land use 25m to the northwest and beyond comprises the Golf Course.
- 11.1.4 There are no vulnerable receptors that would be impacted by flooding at the crossing location.
- 11.1.5 Available flood related information is depicted in Figure C16. All information on flood sources can be found below.

11.2 Flood Risk

- 11.2.1 The fluvial floodplain for the watercourse can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water Map (RoFSW). This indicates that the crossing is not expected to be at risk during the 3.33%, 1% or 0.1% Annual Exceedance Probability (AEP) events.

11.3 Flood History

- 11.3.1 No information regarding flooding in the area of the crossing has been identified.

11.4 Features Local to the Crossing That Could Influence Flooding

- 11.4.1 The catchment area of the unnamed watercourse appears to enter a short (20m long) culvert immediately downstream of the proposed crossing, after which the downstream open channel contains two 90 degree bends before joining a straightened channel section that runs parallel to the golf club boundary.
- 11.4.2 There does not appear to be any obvious restrictions on the upstream channel, although it is artificially straightened along its entire length.

11.5 Crossing Impact on Flood Risk



- 11.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.
- 11.5.2 The likelihood of flooding is assessed as being **very low** given the crossing is not identified to be at risk in the 0.1% AEP event.
- 11.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 11.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



11.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	None
Flood Zone 2	Not in a mapped Flood Zone
Flood Zone 3	Not in a mapped Flood Zone
RoFSW Extent 3.3% Annual Chance	Not in an at-risk area
RoFSW Extent 1% Annual Chance	Not in an at-risk area
RoFSW Extent 0.1% Annual Chance	Not in an at-risk area
RoFSW Depth 3.3% Annual Chance	Not in an at-risk area
RoFSW Depth 1% Annual Chance	Not in an at-risk area
RoFSW Depth 0.1% Annual Chance	Not in an at-risk area
Risk of Flooding from Reservoirs - Maximum Flood Depth	Not in an at-risk area
Risk of Flooding from Reservoirs - Maximum Flood Extent	No records published
Risk of Flooding from Reservoirs - Maximum Flood Speed	Not Applicable
Recorded Flood Outlines	Not Applicable
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	None defined
Rushmoor BC – Flood Zone – 3b	None defined
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	Yes
Spatial Flood Defences	Not applicable



WCX 018 Crossing Review

Watercourse name	Unnamed Watercourse 15
Crossing ID	WCX 018
Grid reference	474645, 140620
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



12 WCX 018 Crossing Review

12.1 Site Details

- 12.1.1 Crossing WCX 018 is proposed to convey a haul road and pipeline to cross an Ordinary Watercourse (unnamed watercourse) in a rural area. The watercourse is a small channel originating in agricultural fields approximately 1.6km south. The watercourse is a tributary of the River Wey, with its confluence approximately 560m north of the crossing location after running beneath Lower Neatham Mill Lane.
- 12.1.2 The crossing sits approximately 390m southeast of Lower Neatham Mill Lane and approximately 550m west of Clays Lane. There are no vulnerable receptors within the proximity of the crossing.
- 12.1.3 Figure C18 defines the crossing location. Pertinent flood risk information is included below.

12.2 Flood Risk

- 12.2.1 The crossing location is within Flood Zone 3. Flood Zones 2 and 3 extend approximately 190m upstream of the crossing and run downstream of the crossing until they meet the Flood Zone 2 and 3 extents for the River Wey.
- 12.2.2 The Risk of Flooding from Surface Water map (RoFSW) indicates that during a 3.3% Annual Exceedance Probability (AEP) event there is no flooding at the crossing location. Approximately 50m downstream of the crossing there is surface water flooding of up to 900mm in depth.
- 12.2.3 During a 1% AEP event, there is an increase in flooding at the crossing. The depth of flooding associated with the 1% AEP event also reaches up to 900mm at the crossing location. However, this is contained within the watercourse channel.
- 12.2.4 The 0.1% AEP event shows that at the crossing surface water flooding could again reach a depth of up to 900mm. The extent of flooding in the crossing increases during a 0.1% AEP event, but the depth does not reach more than 300mm outside of the watercourse channel.

12.3 Flood History

- 12.3.1 No information regarding historic flooding in the area of the crossing has been identified.

12.4 Features Local to the Crossing That Could Influence Flooding

- 12.4.1 The River Wey could have an impact of flooding at the crossing. As the unnamed ordinary watercourse is in a valley and the land between the River Wey and the crossing location is flat, any flooding of the River Wey could inundate the valley where the unnamed watercourse runs and flood the crossing location. This is suggested by the extents of Flood Zones 2 and 3, effectively outlining where the floodplain extends to.



12.5 Crossing Impact on Flood Risk

- 12.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it does not appear that the temporary crossing would have any impact on receptors in the area.
- 12.5.2 The likelihood of flooding is assessed as **medium** given the crossing being located in Flood Zone 3.
- 12.5.3 Any increased flood risk would only affect agricultural land surrounding the watercourse. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 12.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk in the area to receptors.



12.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not Applicable
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	Yes – at the crossing location and surrounding area
Flood Zone 3	Yes – at the crossing location and surrounding area
RoFSW Extent 3.3% Annual Chance	Yes - showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Extent 1% Annual Chance	Yes - showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Extent 0.1% Annual Chance	Yes - showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Depth 3.3% Annual Chance	Depth of up to 900mm at the crossing within the watercourse channel.
RoFSW Depth 1% Annual Chance	Depth of up to 900mm at the crossing within the watercourse channel.
RoFSW Depth 0.1% Annual Chance	Depth of over 900mm at crossing within the watercourse channel and up to 300mm outside of the channel.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 017 Crossing Review

Watercourse name	Unnamed Watercourse 14
Crossing ID	WCX 017
Grid reference	473647, 138770
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



13 WCX 017 Crossing Review

13.1 Site Details

- 13.1.1 Crossing WCX 017 is over an unnamed watercourse. It is located approximately 750m northeast of the junction of the A31 with the B3004. Unnamed Watercourse 14 drains surface water from the area of East Worldham (about 1.3km upstream of the crossing), forming a watercourse which runs parallel to the B3004 towards the A31. The crossing location is mostly rural; the gardens of two residential properties are located approximately 50m (downstream, left bank) and a solar farm is located approximately 200m (downstream, left bank).
- 13.1.2 Figure C17 defines the location of the crossing. All available flood related information is shown below.

13.2 Flood Risk

- 13.2.1 The fluvial floodplain can be inferred by the extent of flooding defined in the Risk of Flooding from Surface Water (RoFSW) map. The crossing is not shown to be at risk during the 3.33% Annual Exceedance Probability (AEP) event. However, the 1% AEP event gives rise to pockets of flooding within areas of agricultural land and commercial use (solar farm located downstream to the crossing), achieving a maximum depth of less than 600mm. A continuous flowpath can be seen during the 0.1% event.

13.3 Flood History

- 13.3.1 No information regarding flooding in the area of the crossing has been identified.

13.4 Features Local to the Crossing That Could Influence Flooding

- 13.4.1 The catchment area of the Unnamed Watercourse 14 to the crossing point is approximately 0.87km². The catchment is mostly rural at the crossing location, draining agricultural land and potentially urban drainage from the village of East Worldham. Upstream to the crossing, there is a pond (approximately 300m east) which may impact flow during flood events.

13.5 Crossing Impact on Flood Risk

- 13.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area that would be impacted by flood extents. Any increased flood extents would only affect agricultural land.
- 13.5.2 The likelihood of flooding is assessed as being **low** given the crossing is at risk during the 1% AEP event.



- 13.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 13.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



13.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Yes - minimal flood extent in vicinity of crossing, confined to agricultural land, not continuous (i.e. disconnected flooding).
RoFSW Extent 1% Annual Chance	Yes - flood extent in vicinity of crossing, continuous, mostly confined to agricultural land but may affect west end of nearby solar farm (west of crossing, downstream). However, mapping does not appear to include culvert beneath A31 which is acting as a barrier to the flow of flood water.
RoFSW Extent 0.1% Annual Chance	Yes - flood extent in vicinity of crossing, continuous, mostly confined to agricultural land, but may affect west end of nearby solar farm (west of crossing, downstream). However, mapping does not appear to include culvert beneath A31 which is acting as a barrier to the flow of flood water.
RoFSW Depth 3.3% Annual Chance	Yes - minimal flood extent in vicinity of crossing, confined to agricultural land, not continuous (i.e. disconnected flooding). Depths less than 300mm at crossing location.
RoFSW Depth 1% Annual Chance	Yes - flood extent in vicinity of crossing, continuous, mostly confined to agricultural land, but may affect west end of nearby solar farm (west of crossing, downstream). However, mapping does not appear to include culvert beneath A31 which is acting as a barrier to the flow of flood water. Depths less than 600mm at crossing location.
RoFSW Depth 0.1% Annual Chance	Yes - flood extent in vicinity of crossing, continuous, mostly confined to agricultural land, but may affect west end of nearby solar farm (west of crossing, downstream). However, mapping does not appear to include culvert beneath A31 which is acting as a barrier to the flow of flood water. Depths less than 600mm at crossing location.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable



Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 020 Crossing Review

Watercourse name	Unnamed Watercourse 16
Crossing ID	WCX 020
Grid reference	475191, 142042
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

14 WCX 020 Crossing Review

14.1 Site Details

- 14.1.1 Crossing WCX 020 is proposed to enable a haul road to cross a watercourse (Ordinary Watercourse) in a rural area. The watercourse is the runoff channel for a reservoir and weir system.
- 14.1.2 The crossing sits approximately 145m north (upstream) of the A31. The watercourse runs through agricultural land, with trees and shrubs lining the channel banks. Upstream of the watercourse crossing is a reservoir and a weir to aid water flow. Downstream, the watercourse runs beneath the A31 and the main railway line from Alton to Guilford, joining the River Wey approximately 300m south of the crossing point.
- 14.1.3 The nearest major residential development to the crossing is Upper Froyle, approximately 630m northeast (upstream) of the crossing. The nearest residential unit is a large house approximately 180m north (upstream) of the crossing point, adjacent to the reservoir.
- 14.1.4 Figure C20 defines the crossing location. All available flood related information is shown below.

14.2 Flood Risk

- 14.2.1 The fluvial floodplain can be inferred by the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. This data identifies that the crossing is not at risk of flooding during the 3.33% or 1% Annual Exceedance Probability (AEP) events. However, during a 0.1% AEP there is flooding downstream of the crossing, before the watercourse is culverted through the A31 causing a backup of flow. During the 0.1% event, the depth of the flood water downstream of the crossing site is up to 0.9m deep. Upstream of the crossing there is no flooding in the vicinity of the crossing even at 0.1% AEP as the reservoir is large enough to accommodate surface water run-off volumes up to a 0.1% AEP event.

14.3 Flood History

- 14.3.1 No information regarding flooding in the area of the crossing has been identified.

14.4 Features Local to the Crossing That Could Influence Flooding

- 14.4.1 There main feature local to the crossing that could influence flooding is the culvert that runs beneath the A31 and the railway line. As the water can be backed up during a 0.1% AEP event, this may put pressure on the crossing culvert. It is important that the new crossing culvert does not have the same effect as the A31 culvert as this would cause flooding upstream of the crossing towards the reservoir. Despite this, the only land that would be flooded would be agricultural land and fields, therefore there are no vulnerable receptors that are impacted by the features local to the crossing.



14.5 Crossing Impact on Flood Risk

- 14.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.
- 14.5.2 The likelihood of flooding is assessed as being **very low** given the crossing is only identified to be at risk in the 0.1% AEP event.
- 14.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 14.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



14.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey County Council Data (all of it)	Not Applicable
Hampshire County Council (FWM Enquiries, Flood Investigations 2012-15 & Recorded Highway Flooding)	No recorded incidents.
Flood Zone 2	Not defined at the watercourse
Flood Zone 3	Not defined at the watercourse
RoFSW Extent 3.3% Annual Chance	No
RoFSW Extent 1% Annual Chance	Yes – showing increase in reservoir level only
RoFSW Extent 0.1% Annual Chance	Yes - showing surface water flooding at the crossing. Flooding arable land
RoFSW Depth 3.3% Annual Chance	No
RoFSW Depth 1% Annual Chance	Yes – showing increase in depth of <0.3m in the reservoir and <0.6m locally just upstream of reservoir.
RoFSW Depth 0.1% Annual Chance	Yes - showing surface water flooding depth. Increased flooding of arable land. Depth <0.6m in vicinity of crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records at watercourse
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 021 Crossing Review

Watercourse name	Ryebridge Stream
Crossing ID	WCX 021
Grid reference	476058, 142975
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



15 WCX 021 Crossing Review

15.1 Site Details

- 15.1.1 Crossing WCX 021 is over the Ryebriidge Stream (Ordinary Watercourse) a tributary of the River Wye. The two watercourses converge approximately 500m south of the Order Limits boundary.
- 15.1.2 The crossing point is located approximately 70m south (downstream) of Gid Lane, with the watercourse passing beneath the A31 in culvert approximately 200m southwest of the crossing location. The location of the crossing and surrounding land is characterized as agricultural pasture. There is a culverted field crossing of the watercourse approximately 20m upstream of the pipeline crossing point that lies outside of the Order Limits.
- 15.1.3 The nearest alternative land use is located immediately to the north of Gid Lane (upstream) and appears to be a Southern Water pressure reducing station. The nearest residential development within the catchment of the watercourse is Upper Froyle, approximately 350m northwest (upstream) of the crossing point.
- 15.1.4 Figure C21 identifies the location of the crossing. Pertinent flood risk information is included below.

15.2 Flood Risk

- 15.2.1 The fluvial floodplain can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. The crossing is not shown to be at risk during the 3.33% Annual Exceedance Probability (AEP) event. The 1% AEP event gives rise to isolated areas of flooding within areas of agricultural land achieving a maximum depth of less than 300mm.

15.3 Flood History

- 15.3.1 The only record of flooding local to the site is a Hampshire County Council Lead Local Flood Authority record of flooding on the A31, downstream of the crossing location. Records indicate this was associated with a pluvial event.

15.4 Features Local to the Crossing That Could Influence Flooding

- 15.4.1 The catchment area of the Ryebriidge Stream to the crossing point is approximately 2.91km². The catchment is rural, draining agricultural land and the northern part of the village of Upper Froyle. The watercourse is culverted beneath Gid Lane and also at the field crossing between Gid Lane and the Order Limits. Gid Lane is at a similar elevation to land on either side (i.e. it is not embanked).

15.5 Crossing Impact on Flood Risk



- 15.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.
- 15.5.2 The likelihood of flooding is assessed as **low** given the crossing is not identified to be at risk in the 3.33% AEP event.
- 15.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 15.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



15.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey Lead Local Flood Authority Data	Not Applicable
Hampshire Lead Local Flood Authority Data	Highway flooding on A31 downstream (approx. 200m southwest) of crossing
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No flooding shown for 3.3% annual chance event.
RoFSW Extent 1% Annual Chance	Yes - minimal flood extent in vicinity of crossing, confined to arable land, not continuous (i.e. disconnected flooding).
RoFSW Extent 0.1% Annual Chance	Yes - Flooding arable land, upstream Gid Lane with flooding continuous from upstream of Gid Lane through to A31.
RoFSW Depth 3.3% Annual Chance	No flooding shown for 3.3% annual chance event.
RoFSW Depth 1% Annual Chance	Yes - minimal flood extent in vicinity of crossing, confined to arable land, not continuous (i.e. disconnected flooding). Depths less than 300mm within Order Limits.
RoFSW Depth 0.1% Annual Chance	Yes - Flooding arable land, upstream Gid Lane with flooding continuous from upstream of Gid Lane through to A31. Depths less than 600mm within Order Limits.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 023 Crossing Review

Watercourse name	Unnamed Watercourse 17
Crossing ID	WCX 023
Grid reference	477745, 145220
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Low
Potential severity of impact on receptors without mitigation	Low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



16 WCX 023 Crossing Review

16.1 Site Details

- 16.1.1 Crossing WCX 023 is required to carry the haul road over Unnamed Watercourse 17 (an Ordinary Watercourse). The crossing point for this watercourse is located just downstream of a culvert beneath Isnage Farm Lane. Apart from the road, there are no vulnerable receptors within the vicinity of the crossing, with the closest, a residential property located approximately 440m east (downstream) of the crossing.
- 16.1.2 Figure C22 defines the location of the crossing. Pertinent flood risk information is included below.

16.2 Flood Risk

- 16.2.1 The fluvial floodplain may be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. This identifies that the crossing is not at risk from flooding during the 3.33% Annual Exceedance Probability (AEP) event. The 1% AEP event gives rise to isolated areas of flooding within agricultural land between Isnage Farm Lane and Hole Lane, achieving a maximum depth of 300mm near the crossing point, and 300mm at Isnage Farm Lane.

16.3 Flood History

- 16.3.1 No information regarding historic flooding in the area of the crossing have been identified.

16.4 Features Local to the Crossing That Could Influence Flooding

- 16.4.1 The catchment is relatively small: 2.76km², rural and drains agricultural land. The watercourse is culverted beneath Isnage Farm Lane just upstream of the crossing and then Hole Lane, approximately 250m downstream of the crossing. Both lanes are at a similar elevation to land on either side (i.e. the roads are not embanked). Aside from the roads there are no features that may influence flooding.

16.5 Crossing Impact on Flood Risk

- 16.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.
- 16.5.2 The likelihood of flooding is assessed as **low** given the crossing is identified to be at risk in the 1% AEP event.
- 16.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land and temporarily inundating minor roads. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **low**.



16.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



16.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	No records
Flood Zone 2	Defined from approximately 100m downstream of the crossing, but not within Order Limits
Flood Zone 3	Defined from approximately 100m downstream of the crossing, but not within Order Limits
RoFSW Extent 3.3% Annual Chance	No – flooding upstream at Isnage Farm Lane
RoFSW Extent 1% Annual Chance	Yes – minimal flooding within Order Limits
RoFSW Extent 0.1% Annual Chance	Yes – minimal flooding within Order Limits
RoFSW Depth 3.3% Annual Chance	No – minimal flooding less than 300mm deep upstream at Isnage Farm Lane
RoFSW Depth 1% Annual Chance	Yes – minimal flooding less than 300mm deep within Order Limits
RoFSW Depth 0.1% Annual Chance	Yes – minimal flooding less than 600mm deep within Order Limits
Risk of Flooding from Reservoirs - Maximum Flood Depth	No risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No risk
Recorded Flood Outlines	No records
Surrey Heath BC – Flood Zone – 3a	Not applicable
Surrey Heath BC – Flood Zone – 3b	Not applicable
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 025a Crossing Review

Watercourse name	Unnamed Watercourse 18
Crossing ID	WCX 025a
Grid reference	480503, 148626
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



17 WCX 025a Crossing Review

17.1 Site Details

- 17.1.1 Crossing WCX 025a is required to convey a temporary haul road over an unnamed tributary (Ordinary Watercourse) of the Ashley Head Spring. The crossing lies approximately 550m to the east of Crondall, Hampshire within a golf course.
- 17.1.2 The channel is marked on the Ordnance Survey 1:25,000 map as extending 20m into the Order Limits, upstream of this it appears to be in culvert for 200m, further upstream it extends 600m in open channel as far as its source close to Dora's Green Lane (approximately 900m to the southeast).
- 17.1.3 Downstream of the crossing, the channel flows northwest for approximately 240m, before entering a culvert beneath Heath Lane to flow northwest between the golf course and the rear of properties on Dippenhall Street.
- 17.1.4 The land use for 200m upstream and downstream of the crossing is a golf course. There are no vulnerable receptors within proximity of the crossing, the nearest residential property to the crossing is on Heath Lane approximately 275m northwest (downstream).
- 17.1.5 Available flood related information is included in Figure C23. Pertinent flood risk information is included below.

17.2 Flood Risk

- 17.2.1 In the absence of Flood Zones 2 and 3 the fluvial floodplain can be inferred from the extent of flooding defined in the Risk of Flooding from Surface Water (RoFSW) map. The RoFSW indicates flooding for the 3.33% annual exceedance probability event (AEP) would be up to 600mm in depth in a floodplain following the route of the watercourse from the crossing onto and west along Heath Lane. The 1% AEP event identifies the extent of flooding to increase to include a property on Heath Lane, however the maximum depth of flooding does not increase on the watercourse. No new flood routes are present in this event with all flow following the watercourse.

17.3 Flood History

- 17.3.1 Hampshire County Council records a pluvial flood event on Heath Lane, near the junction with Dippenhall Street (510m west of the crossing) in 2011-2012. A further record is also held for the same period and source at the junction of Pankridge Street and Redlands Lane (approximately 700m northwest of the crossing). Neither of these historical events are indicated to have impacted the crossing location.

17.4 Features Local to the Crossing That Could Influence Flooding



- 17.4.1 The estimated catchment for the watercourse at the crossing is approximately 0.4km². The crossing is immediately downstream of a culvert through the golf course. The watercourse is present within a well-defined valley with the RoFSW indicating out of bank flows confined to the valley floor for all events up to and including the 0.1%AEP.

17.5 Crossing Impact on Flood Risk

- 17.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect areas within the golf course.
- 17.5.2 The likelihood of flooding is assessed as being **medium** given the crossing is likely to be impacted during the 3.33% AEP event.
- 17.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding the golf course. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 17.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



17.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	None at crossing site, two records within 700m
Flood Zone 2	Not Defined
Flood Zone 3	Not Defined
RoFSW Extent 3.3% Annual Chance	Yes - showing surface water flooding extent 3.33% annual chance at the crossing. Flooding golf course and following route of watercourse.
RoFSW Extent 1% Annual Chance	Yes - showing surface water flooding extent 1% annual chance at the crossing. Flooding golf course and following route of watercourse.
RoFSW Extent 0.1% Annual Chance	Yes - showing surface water flooding extent 0.1% annual chance at the crossing. Flooding golf course and following route of watercourse.
RoFSW Depth 3.3% Annual Chance	The depth is up to 0.30m at the precise location of the crossing, increasing to a maximum of 0.3- 0.60m
RoFSW Depth 1% Annual Chance	The depth is up to 0.60m at the precise location of the crossing and in the immediate vicinity.
RoFSW Depth 0.1% Annual Chance	The depth is up to 0.9m at the precise location of the crossing, increasing to a maximum of 0.90- 1.2m to the northwest of the crossing (downstream).
Risk of Flooding from Reservoirs - Maximum Flood Depth	Not in an at-risk area
Risk of Flooding from Reservoirs - Maximum Flood Extent	Not in an at-risk area
Risk of Flooding from Reservoirs - Maximum Flood Speed	Not in an at-risk area
Recorded Flood Outlines	No records published
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 026 Crossing Review

Watercourse name	Unnamed Watercourse 19
Crossing ID	WCX 26
Grid reference	4850544, 148879
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Low
Potential severity of impact on receptors without mitigation	Low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



18 WCX 026 Crossing Review

18.1 Site Details

- 18.1.1 Crossing WCX 026 carries the haul road over Unnamed Watercourse 19 (an Ordinary Watercourse). The crossing point is surrounded mainly by agricultural land and the Oak Park Golf Course.
- 18.1.2 The crossing point is located adjacent to a minor road; Heath Lane in Ewshot. The closest vulnerable receptor is located 140m east (upstream) of the crossing point. Downstream there are properties located approximately 330m to the west. Whilst these are a considerable distance from the crossing point they are on a predicted surface water flow path.
- 18.1.3 Figure C24 identifies the location of the crossing. Pertinent flood risk information is included below.

18.2 Flood Risk

- 18.2.1 In the absence of Flood Zones 2 and 3 the fluvial floodplain for the watercourse can be inferred by the extent of flooding defined in the Risk of Flooding from Surface Water (RoFSW) map. The RoFSW identifies scattered ponding for the 3.33% annual exceedance probability (AEP) event, with depths in the vicinity of the crossing of up to 0.15m.
- 18.2.2 The 1% AEP floodplain indicates an increased extent of flooding in the surrounding area and at the crossing location, primarily confined to the golf course and agricultural land to the south of the watercourse. Flooding near the crossing point is less than 150mm deep within Order Limits but exceeds 1.2m depth approximately 190m downstream of the crossing point adjacent to Heath Lane. There is also a pond approximately 90m southeast of the crossing point, which the overland flow route appears to flow through.
- 18.2.3 Consideration of the local topography suggests that the flow route identified as crossing the Order Limits to the south of the crossing point is incorrect; caused by poor LiDAR filtering to create the terrain model used by the RoFSW mapping. The thick coverage of trees on Heath Lane immediately north of the crossing may not have introduced this inaccuracy. Flow within the watercourse that passes beneath Heath Lane, 250m upstream of the crossing is more likely to continue to flow within the watercourse south of Heath Lane rather than being diverted south past the Tileries and through the pond. Therefore, it is likely that flood risk at the crossing is underestimated.

18.3 Flood History

- 18.3.1 No information regarding flooding in the area of the crossing has been identified.

18.4 Features Local to the Crossing That Could Influence Flooding



- 18.4.1 The estimated catchment area up to approximately 100m downstream of the crossing point is 0.59km², encompassing The Tileries and part of another residential area approximately 750m northeast of the crossing point.
- 18.4.2 The watercourse is culverted beneath an existing field access track at the location of the crossing south of Heath Lane and passes beneath tracks approximately 110m and 150m downstream of the crossing point. The watercourse joins another watercourse approximately 210m downstream of the crossing point.
- 18.4.3 Upstream of the crossing point, the watercourse passes under Heath Lane approximately 260m northeast of the crossing point. The watercourse is also culverted under The Hollow, approximately 350m northeast of the crossing point.

18.5 Crossing Impact on Flood Risk

- 18.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing could have an impact on flood risk. There are few vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land and cause minor disruption to the adjacent road.
- 18.5.2 The likelihood of flooding is assessed as being **low** given the crossing is identified to be at risk in the 1% AEP event.
- 18.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land and the adjacent minor road. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **low**.
- 18.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



18.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	No records within Order Limits
Flood Zone 2	Not defined within Order Limits near the crossing
Flood Zone 3	Not defined within Order Limits near the crossing
RoFSW Extent 3.3% Annual Chance	No – some flooding within Order Limits to the south of the crossing, as well as upstream and downstream of the crossing on the watercourse.
RoFSW Extent 1% Annual Chance	Yes – flooding within Order Limits, as well as upstream and downstream of the crossing on the watercourse.
RoFSW Extent 0.1% Annual Chance	Yes – flooding within Order Limits, as well as upstream and downstream of the crossing on the watercourse.
RoFSW Depth 3.3% Annual Chance	Yes – flood with depth less than 150mm within the Order Limits near the crossing point and exceeding 1.2m further downstream.
RoFSW Depth 1% Annual Chance	Yes – flood with depth less than 150mm within the Order Limits at the crossing point and exceeding 1.2m further downstream.
RoFSW Depth 0.1% Annual Chance	Yes – flood with depth less than 300mm within the Order Limits near the crossing point and exceeding 1.2m further downstream.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No risk
Recorded Flood Outlines	No records
Surrey Heath BC – Flood Zone – 3a	Not applicable
Surrey Heath BC – Flood Zone – 3b	Not applicable
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 027 Crossing Review

Watercourse name	Unnamed Watercourse 20
Crossing ID	WCX 027
Grid reference	480636, 149312
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



19 WCX 027 Crossing Review

19.1 Site Details

- 19.1.1 Crossing WCX 027 is over an unnamed watercourse, likely a historic drainage ditch as indicated by unnatural straightening of the channel. The watercourse is located within a steep catchment with land falling 15m in elevation over a 250m span between the source of the watercourse and the proposed crossing location. The watercourse joins another ordinary watercourse 360m downstream before discharging into a pond after a further 200m.
- 19.1.2 The crossing point is located 85m upstream of a small rural road that runs north-south between Redlands Lane and the A287. It is likely that the watercourse is culverted beneath the road. The surrounding land is characterised by agricultural land interrupted by sporadic woodland and residential properties. The closest alternate land use to the crossing is a residential property 100m to the northwest however this remains outside the extent of the Order Limits.
- 19.1.3 Figure C25 identifies the location of the crossing. Pertinent flood risk information is included below.

19.2 Flood Risk

- 19.2.1 The fluvial floodplain can be inferred by the extent of flooding defined in the Risk of Flooding from Surface Water (RoFSW) map. The crossing is not predicted to be at risk during the 3.33% Annual Exceedance Probability (AEP) event. The 1% AEP event predicts flooding in the area is sporadic but does not arise from the watercourse. Only the 0.1% event shows a defined flow path that inundates the crossing point.

19.3 Flood History

- 19.3.1 No historic information regarding flooding in the area of the crossing has been identified.

19.4 Features Local to the Crossing That Could Influence Flooding

- 19.4.1 The catchment is small but steep, draining agricultural land and sitting on impermeable bedrock. At the crossing point a sharp turn in the watercourse of roughly 120 degrees has the potential to cause overtopping during periods of high flows. Further downstream the watercourse is likely funnelled through a culvert beneath the road.

19.5 Crossing Impact on Flood Risk

- 19.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.



- 19.5.2 The likelihood of flooding is assessed as **very low** given the crossing is not identified to be at risk in the 0.1% AEP event.
- 19.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 19.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



19.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No Flooding
RoFSW Extent 1% Annual Chance	No - Flood extent in vicinity of crossing confined to arable land. Sporadic areas of Localised ponding.
RoFSW Extent 0.1% Annual Chance	No - Flood extent in vicinity of crossing affecting arable land, roads and properties. Flooding does not inundate the entire length of haul road or Order Limits.
RoFSW Depth 3.3% Annual Chance	No Flooding.
RoFSW Depth 1% Annual Chance	Depths up to 0.15m within Order Limits to the north of the crossing.
RoFSW Depth 0.1% Annual Chance	Depths up to 0.15m within Order Limits at crossing point, depths up to 0.3m within confines of Order Limits roughly 75m north of crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 029 Crossing Review

Watercourse name	Unnamed Watercourse 22
Crossing ID	WCX 029
Grid reference	480624, 149556
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



20 WCX 029 Crossing Review

20.1 Site Details

- 20.1.1 Crossing WCX 029 is proposed to enable a temporary haul road to cross an Ordinary Watercourse (Unnamed Watercourse 22) in a rural area. The watercourse is a drainage channel from Bushylease Farm House and Ewshot Wood.
- 20.1.2 The crossing sits approximately 310m southwest (downstream) of the A287. The watercourse runs parallel to the access track to Bushylease Farm. The watercourse then runs through agricultural land and sparse woodland downstream of the crossing. The only receptors within 100m of the watercourse are a large residential house and stables to the east and a residential cul-de-sac to the northwest.
- 20.1.3 The nearest residential development to the crossing is Warren Corner, approximately 600m east (upstream) of the crossing.
- 20.1.4 Figure C26 identifies the crossing location. Pertinent flood risk information is included below.

20.2 Flood Risk

- 20.2.1 The fluvial floodplain can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW indicates there to be no flooding associated with the 3.33% Annual Exceedance Probability event (AEP) at the crossing, with the nearest flooding associated with this event approximately 240m west at the confluence with another watercourse to the south. Flooding is not present during the 1% event. The 0.1% event identifies a flow path at the crossing with depths less than 150mm.

20.3 Flood History

- 20.3.1 No historic information regarding flooding in the area of the crossing has been identified.

20.4 Features Local to the Crossing That Could Influence Flooding

- 20.4.1 There are no features local to the crossing that would influence flooding. The catchment to the watercourse drains agricultural land.

20.5 Crossing Impact on Flood Risk

- 20.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.
- 20.5.2 The likelihood of flooding is assessed as **very low** given the crossing is only identified to be at risk in the 0.1% AEP event.



- 20.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 20.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



20.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey County Council Data	Not Applicable
Hampshire County Council (FWM Enquiries, Flood Investigations 2012-15 & Recorded Highway Flooding)	No Records
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No
RoFSW Extent 1% Annual Chance	No flooding at crossing, evidence downstream at confluence with watercourse from the south
RoFSW Extent 0.1% Annual Chance	Yes - showing little surface water flooding extent 0.1% annual chance at the crossing. Flooding agricultural land and along the farm track
RoFSW Depth 3.3% Annual Chance	No
RoFSW Depth 1% Annual Chance	No
RoFSW Depth 0.1% Annual Chance	Yes - showing surface water flooding depth 0.1% annual chance at the crossing. Increased flooding of agricultural land. Depth <150mm at crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 031 West Access Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	WCX 031 West
Grid reference	480900, 149931
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



21 WCX 031 East Access Crossing Review

21.1 Site Details

- 21.1.1 The intended crossing (W031 East Access) is over an unnamed watercourse (an Ordinary Watercourse), which is located approximately 700m west of Ewshot village, Hampshire. The crossing is required to provide a temporary access road from the A287 to the pipeline route.
- 21.1.2 The crossing point is located within a semi-wooded landscape that backs on to agricultural land and is located approximately 130m northeast of the A287. The source of the watercourse can be found at the western edge of the residential properties in Ewshot. The watercourse flows from southeast to northwest and is likely culverted beneath the A287 (approximately 600m downstream of the proposed crossing location) before flowing north and eventually discharging into the River Hart (approximately 2km from the crossing point).
- 21.1.3 Besides the A287, the closest alternate land use is Pockocks garden centre located approximately 200m downstream (northwest) of the crossing location, Dares Farm located approximately 500m downstream of the crossing and a single house approximately 300m upstream of the crossing. The watercourse flows along the northern boundary of the garden centre and adjacent to Dares Farm.
- 21.1.4 Figure C29 identifies the location of the crossing. Pertinent flood risk information is included below.

21.2 Flood Risk

- 21.2.1 The fluvial floodplain can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. This indicates that flooding is not present during the 3.33% or 1% Annual Exceedance Probability (AEP) events. Flooding along the length of the watercourse is present during the 0.1% event; however, with depths of up to 0.6m within 20m of the crossing point.

21.3 Flood History

- 21.3.1 Highway flooding was recorded in 2011-12 in Ewshot at the upstream limit of the watercourse catchment. Additionally, an internal flooding investigation was undertaken in 2014, however this was north of the crossing location and related to a neighbouring catchment.

21.4 Features Local to the Crossing That Could Influence Flooding

- 21.4.1 The immediate area around the proposed crossing location is woodland and backs onto an open field which lacks features that could influence flooding. The watercourse in the vicinity of the crossing follows a defined valley and there do not appear to be any existing crossings or restrictions upstream or downstream.

21.5 Crossing Impact on Flood Risk



- 21.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect agricultural land.
- 21.5.2 The likelihood of flooding is assessed as **very low** given the crossing is only identified to be at risk in the 0.1% AEP event.
- 21.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 21.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



21.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey Lead Local Flood Authority Data	N/A
Hampshire Lead Local Flood Authority Data	No records present within immediate catchment, however highway flooding recorded in Ewshot
Flood Zone 2	N/A
Flood Zone 3	N/A
RoFSW Extent 3.3% Annual Chance	Not at risk during the 3.3% Annual Probability event
RoFSW Extent 1% Annual Chance	Not at risk during the 1% Annual Probability event
RoFSW Extent 0.1% Annual Chance	At risk during the 0.1% Annual Probability event, with a continuous flood extent following the path of the watercourse
RoFSW Depth 3.3% Annual Chance	Not at risk during the 3.3% Annual Probability event
RoFSW Depth 1% Annual Chance	Not at risk during the 1% Annual Probability event.
RoFSW Depth 0.1% Annual Chance	Flood depths of up to 0.6m within 20m of the crossing location
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 033 Crossing Review

Watercourse name	Unnamed Watercourse 26
Crossing ID	WCX 033
Grid reference	481391, 150648
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Low
Potential severity of impact on receptors without mitigation	Low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



22 WCX 033 Crossing Review

22.1 Site Details

- 22.1.1 Crossing WCX 033 conveys a haul road across an Ordinary Watercourse (Unnamed Watercourse 26), north of Ewshot, Surrey in a rural area. The watercourse is a drainage channel from agricultural fields and grassland to the north of Ewshot.
- 22.1.2 The watercourse is a tributary of the River Hart which has its source approximately 600m southeast of the crossing point. The watercourse runs beneath Tadpole Lane approximately 500m southeast (upstream) of the crossing location, before running northwest across grassland.
- 22.1.3 The crossing sits approximately 50m southeast (upstream) of a minor road - Naishes Lane. The watercourse runs below the minor road (likely via culvert) before continuing northwest into agricultural fields.
- 22.1.4 The nearest residential development to the crossing is Quetta Park, approximately 260m north of the crossing. The nearest vulnerable receptor (aside from Naishes Lane) is a non-residential building situated alongside allotments approximately 150m northwest of the crossing point.
- 22.1.5 Figure C31 identifies the crossing location. Pertinent flood risk information is included below.

22.2 Flood Risk

- 22.2.1 In the absence of Flood Zones 2 and 3, the fluvial floodplain can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) mapping. During a 3.33% Annual Exceedance Probability (AEP) event the RoFSW indicates there is no flooding predicted at the crossing location, but there is flooding to the north and east of the crossing, which may be associated with another small watercourse which runs alongside. Pockets of shallow flooding are also shown occurring in the allotments to the north. The depth of flooding during a 3.33% AEP event is shown as up to 150mm in depth.
- 22.2.2 During a 1% AEP event flooding can be seen along the length of the watercourse, generally of up to 150mm depth but with pockets reaching a depth of up to 300mm within 50m of the crossing.
- 22.2.3 The 0.1% AEP event shows a considerable increase in flood extent in the vicinity of the crossing. Flood Depths associated with the 0.1% AEP event at the crossing remain largely at 150mm. However, they do reach up to 600mm deep approximately 50m east of the crossing.

22.3 Flood History

- 22.3.1 No information regarding flooding at the crossing has been identified. Hampshire County Council conducted a flood investigation on a site approximately 120m south of the crossing location in 2014 however there is no further detail available.



22.4 Features Local to the Crossing That Could Influence Flooding

- 22.4.1 The estimated catchment upstream of the crossing to be less than 0.5 km². The watercourse to the north of the crossing location could have an impact on flooding. This watercourse is also proposed to be crossed by the haul road (at WCX 034) and therefore placing a culvert in the watercourse at WCX 034 could increase flooding upstream and towards crossing WCX 033. The RoFSW map shows flooding in close proximity for these two watercourses.
- 22.4.2 Naishes Lane, which Unnamed Watercourse 26 runs beneath, could influence flooding at the crossing since the watercourse is culverted beneath the road. If water is held up here during a rainfall event, it could back up to WCX 033 and result in an increase in flooding at the crossing.

22.5 Crossing Impact on Flood Risk

- 22.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have a significant impact on flood risk. The only vulnerable receptor identified in the area is the minor road: Naishes Lane. Any increased flood extents are anticipated to only affect this road and agricultural land.
- 22.5.2 The likelihood of flooding is assessed as being **low** given the crossing is not identified to be at risk in the 3.33% AEP event.
- 22.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land and impacting the road. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **low**.
- 22.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



22.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey County Council Data	Not Applicable
Hampshire County Council (FWM Enquiries, Flood Investigations 2012-15 & Recorded Highway Flooding)	Yes – South of the crossing a Flood Investigation between 2012 and 2015 is shown. This was an internal flooding incident in October 2014.
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No - showing limited surface water flooding extent north of the crossing. Flooding agricultural land and across the minor road.
RoFSW Extent 1% Annual Chance	Yes - showing surface water flooding extent at the crossing. Flooding agricultural land and across the minor road.
RoFSW Extent 0.1% Annual Chance	Yes - showing surface water flooding extent at the crossing. Flooding agricultural land and across the minor road.
RoFSW Depth 3.3% Annual Chance	Depth <150mm to the north of the crossing.
RoFSW Depth 1% Annual Chance	Depth <150mm at the crossing.
RoFSW Depth 0.1% Annual Chance	Depth <150mm at the crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk – closest risk 380m northeast of crossing
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk – closest risk 380m northeast of crossing
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk – closest risk 380m northeast of crossing
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 034 Crossing Review

Watercourse name	Unnamed Watercourse 27
Crossing ID	WCX 034
Grid reference	481401, 150668
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Low
Potential severity of impact on receptors without mitigation	Low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



23 WCX 034 Crossing Review

23.1 Site Details

- 23.1.1 Crossing W034 would enable a haul road to cross an Ordinary Watercourse in a rural area to the north of Ewshot, Surrey. The watercourse is a drainage channel from agricultural fields and grassland to the north of Ewshot.
- 23.1.2 The crossing is approximately 30m east (upstream) of a minor road: Naishes Lane, which the watercourse runs beneath. Upstream of the crossing is the watercourse's source (in agricultural land) and downstream of the crossing it also runs through agricultural land.
- 23.1.3 The nearest residential development to the crossing is Leipzig Barracks, approximately 260m northwest of the crossing. The nearest vulnerable receptor (aside from Naishes Lane) is an unknown non-residential building situated alongside allotments approximately 140m northwest of the crossing point.
- 23.1.4 Figure C32 identifies the location of the crossing. Pertinent flood risk information is included below.

23.2 Flood Risk

- 23.2.1 In the absence of flood Zones 2 and 3 at this location the the fluvial floodplain can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. During a 3.33% Annual Exceedance Probability (AEP) event the RoFSW predicts isolated ponding in the vicinity of the crossing at depths up to 150mm.
- 23.2.2 During the 1% and 0.1% AEP events there is an increase in flood extent and depth, with flood water reaching 0.6m deep during a 0.1% AEP event. Agricultural land is flooded and the road downstream of the crossing.

23.3 Flood History

- 23.3.1 No information regarding flooding at the crossing has been identified. Hampshire County Council conducted a flood investigation on a site approximately 140m south of the crossing location in 2014; however, there is no further detail on this flood available.

23.4 Features Local to the Crossing That Could Influence Flooding

- 23.4.1 The watercourse to the south of the crossing location could have an impact on flooding. This watercourse is also proposed to be crossed by the haul road (at WCX 033) and therefore placing a culvert in the watercourse at WCX 033 could increase flooding upstream and towards crossing WCX 034. The RoFSW map predicts flooding in close proximity for these two watercourses.
- 23.4.2 Naishes Lane could influence flooding at the crossing since the watercourse is culverted beneath the road. If water is held up here during a high rainfall event, it could back up to WCX034 and result in an increase in flooding at the crossing.



23.5 Crossing Impact on Flood Risk

- 23.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have a significant impact on flood risk. The only vulnerable receptor identified in the area is Naishes Lane. Any increased flood extents would only affect the road and agricultural land.
- 23.5.2 The likelihood of flooding is assessed as being low. Despite ponding in the area during the 3.33% AEP event, there is only a continuous flow path at this location in a 1% AEP event.
- 23.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land and impacting the road. There are alternative access routes in the area, therefore the severity of any increase in flood risk as a result of the proposed crossing is low.
- 23.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



23.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey County Council Data	Not Applicable
Hampshire County Council (FWM Enquiries, Flood Investigations 2012-15 & Recorded Highway Flooding)	Yes – South of the crossing a Flood Investigation between 2012 and 2015 is shown. This was an internal flooding incident in October 2014.
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Yes - showing ponding of surface water flooding extent in the 3.3% annual chance event at the crossing. Flooding agricultural land and across the minor road.
RoFSW Extent 0.1% Annual Chance	Yes - showing surface water flooding extent in the 1% annual chance event at the crossing. Flooding agricultural land and across the minor road.
RoFSW Extent 1% Annual Chance	Yes - showing surface water flooding extent in the 0.1% annual chance event at the crossing. Flooding agricultural land and across the minor road.
RoFSW Depth 3.3% Annual Chance	Yes - showing surface water flooding depth in the 3.3% annual chance event upstream of the crossing. Increased flooding of agricultural land. Depth <150mm at the crossing and across the minor road downstream.
RoFSW Depth 1% Annual Chance	Yes - showing surface water flooding depth in the 1% annual chance event upstream of the crossing. Increased flooding of agricultural land. Depth <150mm at the crossing and across the minor road downstream.
RoFSW Depth 0.1% Annual Chance	Yes - showing surface water flooding depth in the 0.1% annual chance event at the crossing. Increased flooding of agricultural land. Depth 0.15 – 0.3m at the crossing and across the minor road downstream.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined



Data Source	Details at this Crossing?
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 043 Crossing Review

Watercourse name	Unnamed Watercourse 34
Crossing ID	WCX 043
Grid reference	484072, 154070
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	No
Proposed crossing type	Not intended to be crossed
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Moderate
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Very low



24 WCX 043 Crossing Review

24.1 Site Details

- 24.1.1 The project Order Limits run parallel to an Ordinary Watercourse (Unnamed Watercourse 34) as the route passes through the Cody Technology Park. The watercourse is a drainage channel collecting surface runoff from the Technology Park and highway.
- 24.1.2 The watercourse lies in the verge of Comet Road. The open channel section of the watercourse runs parallel to the road (and Order Limits) for approximately 160m.
- 24.1.3 The nearest development to the watercourse is Cody Technology Park, approximately 15m south of the crossing. The closest residential properties to the watercourse are located over 1km to the northeast and west.
- 24.1.4 Figure C39 identifies the crossing location. All pertinent flood related information is included below.

24.2 Flood Risk

- 24.2.1 In the absence of Flood Zones 2 and 3 at this location, the fluvial floodplain can be inferred by the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. The RoFSW indicates there is no risk of flooding associated with the watercourse for the 3.33%, 1% and 0.1% Annual Exceedance Probability (AEP) events. The nearest flooding to the crossing location during the 3.33% and 1% AEP events is approximately 70m east of the crossing location on the opposite side of Comet Road and around the perimeter of buildings 40m northwest and southeast.

24.3 Flood History

- 24.3.1 No information regarding flooding in the area of the crossing has been identified.

24.4 Features Local to the Crossing That Could Influence Flooding

- 24.4.1 The presence of the Technology Park and roads around the watercourse could influence the response of the watercourse to rainfall events, giving rise to a 'flashy' (rapid) response. The developed nature of the immediate surroundings to the watercourse is also likely to include culverted sections, which may have an influence on capacity.

24.5 Crossing Impact on Flood Risk

- 24.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing has the potential to have an impact on flood risk. There are multiple receptors surrounding the crossing point which could be impacted by an increase in flood extent.
- 24.5.2 The likelihood of flooding is assessed as being very low given the crossing is not identified to be at risk in the 0.1% AEP event.



- 24.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding roads and non-residential properties. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is moderate.
- 24.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.

24.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey County Council Data	Not Applicable
Hampshire County Council (FWM Enquiries, Flood Investigations 2012-15 & Recorded Highway Flooding)	Closest records to the northeast and southwest not associated with catchment of watercourse
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No
RoFSW Extent 1% Annual Chance	No
RoFSW Extent 0.1% Annual Chance	No
RoFSW Depth 3.3% Annual Chance	No
RoFSW Depth 1% Annual Chance	No
RoFSW Depth 0.1% Annual Chance	No
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs -Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable



Data Source	Details at this Crossing?
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 044 Crossing Review

Watercourse name	Unnamed Watercourse 35
Crossing ID	484287, 154225
Grid reference	WCX 044
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	No
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Moderate
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Very low



25 WCX 044 Crossing Review

25.1 Site Details

- 25.1.1 The Order Limits run parallel to an Ordinary Watercourse (Unnamed Watercourse 35) as the route passes through the Cody Technology Park. The watercourse is a drainage channel collecting surface runoff from the Technology Park and highway.
- 25.1.2 The watercourse lies in the verge of Comet Road. The open channel section of the watercourse runs parallel to the road (and Order Limits) for approximately 50m.
- 25.1.3 The nearest development to the watercourse is Cody Technology Park, approximately 30m north of the crossing. The closest residential properties are to the watercourse are located over 1km to the northeast or west.
- 25.1.4 Figure C40 identifies the crossing location. Pertinent flood risk information is included below.

25.2 Flood Risk

- 25.2.1 In the absence of Flood Zones 2 and 3 the fluvial floodplain can be inferred by the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. The RoFSW map indicates there is no risk of flooding associated with the watercourse for the 3.33%, 1% and 0.1% Annual Exceedance Probability (AEP) events. The nearest flooding to the crossing location during the 3.33% and 1% AEP events is located approximately 30m northwest of the crossing location on the opposite side of Comet Road and around the perimeter of buildings.

25.3 Flood History

- 25.3.1 No information regarding flooding in the area of the crossing has been identified.

25.4 Features Local to the Crossing That Could Influence Flooding

- 25.4.1 The catchment of this watercourse is a small proportion of a 2.2km² catchment measured at the confluence with Cove Brook. The presence of the Technology Park and roads around the watercourse could influence the response of the watercourse to rainfall events, giving rise to a 'flashy' (rapid) response. The developed nature of the immediate surroundings to the watercourse is also likely to mean the watercourse is culverted, which may influence its capacity.
- 25.4.2 The watercourse is likely to be culverted at the location of the crossing beneath the exiting road within Cody Technology Park.

25.5 Crossing Impact on Flood Risk

- 25.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing has the potential to have an impact on flood risk. There are multiple receptors surrounding the crossing point which could be impacted by an increase in flood extent.



- 25.5.2 The likelihood of flooding is assessed as being **very low** given the crossing is not identified to be at risk in the 0.1% AEP event.
- 25.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding roads and non-residential properties. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **moderate**.
- 25.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.

25.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	FWM enquiry approximately 920m northeast of the crossing point. Recorded highway flooding at Kennels Lane and Old Kennels Lane cycle path.
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No – minimal, disconnected flood extent within Cody Technology Park, but not at crossing location.
RoFSW Extent 1% Annual Chance	No – minimal, disconnected flood extent within Cody Technology Park, but not at crossing location.
RoFSW Extent 0.1% Annual Chance	No – disconnected flood extent within Cody Technology Park, but not at crossing location.
RoFSW Depth 3.3% Annual Chance	No – minimal disconnected flood extent with depth less than 300mm within the Order Limits, but not at crossing location.
RoFSW Depth 1% Annual Chance	No – minimal disconnected flood extent with depth less than 600mm within the Order Limits, but not at crossing location.
RoFSW Depth 0.1% Annual Chance	No – disconnected flood extent with depth less than 600mm within the Order Limits, but not at crossing location.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No risk
Recorded Flood Outlines	No records



Data Source	Details at this Crossing?
Surrey Heath BC – Flood Zone – 3a	None defined
Surrey Heath BC – Flood Zone – 3b	None defined
Rushmoor BC – Flood Zone – 3a	None defined
Rushmoor BC – Flood Zone – 3b	None defined
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



NE of WCX 045 Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	NE of WCX 045
Grid reference	484948, 154734
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



26 NE of WCX 045 Crossing Review

26.1 Site Details

- 26.1.1 Northeast of Crossing WCX 045 lies a small watercourse (noted as a drainage channel) that is intended to be crossed by the haul road. The watercourse lies within a golf course.
- 26.1.2 The watercourse is approximately 170m in length, spanning from the Ively Road to the northern edge of the golf course. The crossing sits 30m south from the northern extent of the channel.
- 26.1.3 Ively Road is approximately 125m south of the crossing location and the nearest residential development to the watercourse is Southwood, 180m north (downstream) of the proposed crossing. Ively Roundabout sits 260m east of the crossing. The northeast extent of Farnborough Airport is approximately 330m southeast of the crossing location.
- 26.1.4 Figure C41 identifies the crossing location. Pertinent flood risk information is included below.

26.2 Flood Risk

- 26.2.1 The extents of Flood Zones 2 and 3 are not defined for this watercourse. The closest Flood Zone extent to the crossing is a Flood Zone 3 extent 90m north (downstream) of the crossing.
- 26.2.2 In the absence of published Flood Zones the fluvial floodplain for the watercourse may be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water Map (RoFSW). This indicates that the crossing is not expected to be at risk during the 3.33% or 1% Annual Exceedance Probability (AEP) events. All flow is kept within the channel during these events. In the 0.1% AEP event there is limited flooding outside of the channel at the crossing location to a depth of 600mm.

26.3 Flood History

- 26.3.1 No information regarding historic flooding in the area of the crossing has been identified.

26.4 Features Local to the Crossing That Could Influence Flooding

- 26.4.1 There are very few features that might influence flooding. Ively Road has the potential to influence flooding at the crossing location during a high rainfall event where the water is being channelled away from the road quickly. This could cause flooding at the upstream end of the watercourse by the road.



26.5 Crossing Impact on Flood Risk

- 26.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area. Any increased flood extents would only affect the golf course.
- 26.5.2 The likelihood of flooding is assessed as **very low** given the crossing is only identified to be at risk in the 0.1% AEP event.
- 26.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding the golf course. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 26.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



26.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey County Council Data	Not Applicable
Hampshire County Council (FWM Enquiries, Flood Investigations 2012-15 & Recorded Highway Flooding)	Closest records to the east and west not associated with catchment of watercourse
Flood Zone 2	Defined within Order Limits approximately 90m north of the crossing point.
Flood Zone 3	Defined within Order Limits approximately 90m north of the crossing point.
RoFSW Extent 3.3% Annual Chance	No - showing very little surface water flooding extent near the crossing.
RoFSW Extent 1% Annual Chance	No - showing little surface water flooding extent near the crossing.
RoFSW Extent 0.1% Annual Chance	No - showing surface water flooding extent at the crossing and upstream of the crossing.
RoFSW Depth 3.3% Annual Chance	No flooding at crossing, downstream flooding up to 300mm deep.
RoFSW Depth 1% Annual Chance	No flooding out of watercourse channel at crossing, upstream and downstream flooding up to 1.2m deep.
RoFSW Depth 0.1% Annual Chance	Yes - showing surface water flooding depth 0.1% annual chance at the crossing. Depth of up to 1.2m within the channel and up to 600mm adjacent to the watercourse at the crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Defined within Order Limits approximately 90m north of the crossing point.
Surrey Heath BC – Flood Zone – 3b	Defined within Order Limits approximately 90m north of the crossing point.
Rushmoor BC – Flood Zone – 3a	Defined within Order Limits approximately 90m north of the crossing point.
Rushmoor BC – Flood Zone – 3b	Defined within Order Limits approximately 90m north of the crossing point.
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 058d Crossing Review

Watercourse name	Unnamed Watercourse 44
Crossing ID	WCX 058d
Grid reference	487916, 157302
Pipeline section	E
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



27 WCX 058d Crossing Review

27.1 Site Details

- 27.1.1 Crossing WCX 058d is over Unnamed Watercourse 44 (Ordinary Watercourse), which is located approximately 200m southwest of the SC Johnson building in Frimley, Hampshire. The crossing point is over a small watercourse and tributary of the River Blackwater. It is likely that the watercourse forms part of the surface water drainage network for the large residential area to the east of the intended crossing location.
- 27.1.2 The intended crossing point is found within an area of woodland. Upstream, and to the north the watercourse converges with the northern branch flowing through an urbanised catchment with an industrial factory. The southern branch flows through a wooded area however may be culverted further upstream. Approximately 25m downstream of the crossing location the watercourse is likely culverted beneath the railway line embankment which runs perpendicular to the watercourse and discharges into Frimley Lakes and then the River Blackwater. Aside from the railway line, the closest alternate land use is the factory approximately 200m to the north of the crossing location.
- 27.1.3 Figure C51 defines the location of the crossing. All available flood related information can be found below.

27.2 Flood Risk

- 27.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). Surface Water flooding can be seen during the 3.33% Annual Exceedance Probability (AEP) event with flood depths up to 600mm. During the 1% AEP event surface water flooding inundates the location of the crossing with depths up to 900mm.
- 27.2.2 The crossing location is also found within the extent of Flood Zone 3 and Flood Zone 2 from the nearby River Blackwater. There are extents of flooding predicted upstream (east) of the confluence with the River Blackwater, which could be due to restricted capacity in the culvert conveying the watercourse beneath the railway line (approximately 1km to the northwest) or local lack of capacity in the watercourse.

27.3 Flood History

- 27.3.1 No information regarding historic flooding in the area of the crossing has been identified.

27.4 Features Local to the Crossing That Could Influence Flooding

- 27.4.1 The greatest influence on flooding is the culvert beneath the railway line downstream of the crossing. The culvert may limit flow during flood events causing a backup along the watercourse. Flooding is likely to be exacerbated as the height of the railway embankment would prevent floodwater from spreading out and re-entering the channel further downstream.



27.5 Crossing Impact on Flood Risk

- 27.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect woodland.
- 27.5.2 The likelihood of flooding is assessed as **medium** given the crossing being at risk of flooding from a 1% AEP event.
- 27.5.3 Any increased flood extents would likely be held within the wooded area to the east of the crossing point and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 27.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



27.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not Applicable
Hampshire Lead Local Flood Authority Data	No Records
Flood Zone 2	Crossing located within Flood Zone
Flood Zone 3	Crossing located within Flood Zone
RoFSW Extent 3.3% Annual Chance	Surface water follows channel of watercourse and inundates the area around the proposed crossing location as flow paths are blocked by the railway embankment.
RoFSW Extent 1% Annual Chance	Surface water follows channel of watercourse resulting in significant inundation of the area around the proposed crossing location as flow paths are blocked by the railway embankment.
RoFSW Extent 0.1% Annual Chance	Surface water follows channel of watercourse resulting in widespread inundation of the area around the proposed crossing location as flow paths are blocked by the railway embankment.
RoFSW Depth 3.3% Annual Chance	Flood depths of 0.3-0.6m around watercourse and extending across the width of the Order Limits.
RoFSW Depth 1% Annual Chance	Flood depths of 0.3-0.6m around the watercourse extending approximately 60m back from the railway embankment. Small pockets of flooding 0.6-0.9m deep.
RoFSW Depth 0.1% Annual Chance	Flood depths of 0.6-0.9m around the watercourse extending approximately 55m back from the railway embankment. Small pockets of flooding 0.9-1.2m deep.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	Flood outline from the River Blackwater.
Surrey Heath BC – Flood Zone – 3a	No Records
Surrey Heath BC – Flood Zone – 3b	No Records
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	No Records
Flood Storage Areas	No Records
Spatial Flood Defences	No Records



W060 Crossing Review

Watercourse name	Unnamed Watercourse 46
Crossing ID	W060
Grid reference	490311, 158119
Pipeline section	E
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



28 W060 Crossing Review

28.1 Site Details

- 28.1.1 Crossing W060 is proposed to allow a haul road to cross a watercourse (ordinary watercourse) in a rural area approximately 1.3km east of Frimley, Surrey. The watercourse's source is a pond in the Pine Ridge golf course. It is intended that the haul road would follow Frith Hill Road which crosses the Unnamed Watercourse 46. Consequently a new culvert may not be required at this crossing.
- 28.1.2 The nearest residential development is Deepcut, approximately 400m east of the crossing. To the north (upstream) of the crossing is the Pine Ridge golf course and the crossing sits in an area of managed access, a military area where access is permitted within managed controls, for example local byelaws.
- 28.1.3 Figure C52 identifies the location of the crossing. Pertinent flood risk information is included below.

28.2 Flood Risk

- 28.2.1 The extents of Flood Zones 2 and 3 are not defined for this watercourse. The fluvial floodplain for the watercourse may be inferred from the Risk of Flooding from Surface Water Map (RoFSW). The 3.33% annual exceedance probability (AEP) event identifies ponding of up to 0.9m deep downstream of the crossing after the watercourse passes beneath the road, probably a result of rainfall filling a local depression, the flow path to this point is only evident in the RoFSW 0.1% AEP event. There is more extensive flooding shown for the 1% and 0.1% AEP events, with the downstream flooding becoming more prominent – greater than 1.2m on the downstream side of the road, and less than 0.3m upstream of the crossing. There is likely to be an existing culvert beneath Frith Hill Road to convey the watercourse, however this is unlikely to be represented in the modelling which could lead to uncertainty in the predicted depths of flooding. In addition, the area is woodland and therefore localised ponding of water south of the road may be a result of poor filtering of LiDAR data rather than a true topographic low point.

28.3 Flood History

- 28.3.1 No information regarding historic flooding in the area of the crossing has been identified.

28.4 Features Local to the Crossing That Could Influence Flooding

- 28.4.1 Frith Hill Road is likely to be elevated above the watercourse to the north and there is likely to be a culvert beneath Frith Hill Road for this watercourse. The capacity of this culvert is unknown, and it is unlikely that this is represented in the RoFSW mapping.

28.5 Crossing Impact on Flood Risk



- 28.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect woodland.
- 28.5.2 The likelihood of flooding is assessed as **very low** given the crossing being at risk of flooding from a 1% AEP event.
- 28.5.3 Any increased flood extents would likely be held within the wooded area and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 28.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



28.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No local Flood Records of relevance to crossing.
Hampshire Lead Local Flood Authority Data	Not Applicable
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Yes - showing a small amount of surface water flooding extent in the 3.3% annual chance event downstream of the crossing.
RoFSW Extent 1% Annual Chance	Yes - showing surface water flooding extent in the 1% annual chance event downstream of the crossing.
RoFSW Extent 0.1% Annual Chance	Yes - showing surface water flooding extent in the 0.1% annual chance event across and downstream of the crossing.
RoFSW Depth 3.3% Annual Chance	Yes - showing surface water flooding depth in the 3.3% annual chance event downstream of the crossing. Depth 0.3-0.9m downstream of the crossing.
RoFSW Depth 1% Annual Chance	Yes - showing surface water flooding depth in the 1% annual chance event downstream of the crossing. Increased flooding of woodland. Depth >1.2m at crossing.
RoFSW Depth 0.1% Annual Chance	Yes - showing surface water flooding depth 0.1% annual chance downstream of the crossing. Increased flooding of woodland. Depth >1.2m at crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



W062 Crossing Review

Watercourse name	Unnamed Watercourse 48
Crossing ID	W062
Grid reference	491196, 160955
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	No
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Very low



29 W062 Crossing Review

29.1 Site Details

- 29.1.1 Crossing W062 is proposed to cross an Ordinary Watercourse (Unnamed Watercourse 48), a drainage channel that runs south from Red Road to the wooded area adjacent to the road.
- 29.1.2 The crossing sits approximately 5m south (downstream) of Red Road and lies on the north most edge of Pirbright Ranges, a restricted military training area. Surrounding the watercourse is woodland, with grassland to the south and woodland to the north of Red Road. The terrain surrounding the watercourse is steep and Red Road appears to be located in a valley.
- 29.1.3 The nearest dwellings to the crossing are the southwest corner of Lightwater, 400m northeast of the crossing location. Other than Lightwater, there are no residential areas in the vicinity of the crossing due to the proximity of Pirbright Ranges and vehicle testing area in the woodland north of Red Road.
- 29.1.4 Figure C53 identifies the location of the crossing. Pertinent flood risk information is included below.

29.2 Flood Risk

- 29.2.1 The extents of Flood Zones 2 and 3 are not defined for this watercourse. The fluvial floodplain for the watercourse may therefore be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW indicates there to be no flooding associated with the 3.33% annual exceedance probability event (AEP) at the crossing, with the nearest flooding associated with this event approximately 90m northwest (upstream) of the crossing. Flooding for the 3.33% AEP to the northwest of the crossing reaches a depth of up to 0.9m.
- 29.2.2 The 1% AEP event identifies the extent of flooding to increase upstream of the crossing location. The maximum depth of flooding associated with the 1% AEP event remains predominately 0.9m. This flooding is approximately 36m northwest (upstream) of the road. No new flood routes are present in this event with all flow following the watercourse.
- 29.2.3 The 0.1% AEP event indicates an increase in flood extent in the vicinity of the crossing, however the crossing itself remains unaffected. Flood Depths associated with the 0.1% AEP event remain largely at 0.9m with depths. The main area that has a noticeable increase in risk is south of the crossing site, bordering the southern Order Limits for approximately 442m. The average depth here is mostly 150mm to 300mm.

29.3 Flood History

- 29.3.1 No information regarding historic flooding in the area of the crossing has been identified.



29.4 Features Local to the Crossing That Could Influence Flooding

- 29.4.1 The watercourse channel appears to run beneath Red Road, which could cause an increase in flooding upstream of the road and proposed crossing location. Placing a temporary culvert in the watercourse downstream of the road could cause surface water flooding across the road at times of peak rainfall as it could restrict flow capacity.

29.5 Crossing Impact on Flood Risk

- 29.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing may have an impact on flood risk to Red Road, a vulnerable receptor. This would be mitigated by using an appropriate size culvert.
- 29.5.2 The likelihood of flooding is assessed as **very low** given the crossing is at risk of flooding from a <0.1% AEP event.
- 29.5.3 The severity of any increase in flood risk as a result of the proposed crossing is **low** given flooding is likely to only impact agricultural fields and minor roads.
- 29.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



29.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No Records
Hampshire Lead Local Flood Authority Data	Not applicable
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No flooding at the crossing, some 90m upstream to the northwest.
RoFSW Extent 1% Annual Chance	No flooding at crossing, evidence upstream
RoFSW Extent 0.1% Annual Chance	No flooding at crossing, evidence upstream and downstream of crossing location
RoFSW Depth 3.3% Annual Chance	No flooding at the crossing, some 90m upstream to the northwest up to 0.9m deep.
RoFSW Depth 1% Annual Chance	No flooding at the crossing, some 90m upstream to the northwest up to 0.9m deep.
RoFSW Depth 0.1% Annual Chance	No, flooding at the crossing, some 90m upstream to the northwest up to 0.9m deep and immediately south of the crossing (downstream) up to 0.3m deep.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 064 Crossing Review

Watercourse name	Unnamed Watercourse 50
Crossing ID	WCX 064
Grid reference	493997, 161721
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

30 WCX 064 Crossing Review

30.1 Site Details

- 30.1.1 Crossing WCX 064 is over an unnamed watercourse, formed by a man-made drainage ditch, located within Windlemere Golf Club east of Lightwater. The watercourse is a small, isolated feature which is likely to be a soakaway to aid drainage of the surrounding golf course. As such it is contained within the bounds of the Golf Course. It is unclear as to whether there is a hydraulic connection with the Windle Brook located approximately 300m to the north however, local geology of sands, silts and clays suggests the area to be freely draining to groundwater.
- 30.1.2 As the watercourse runs parallel to the proposed haul road and within the Order Limits it is unlikely that the watercourse would need to be crossed unless stipulated by the landowner. The surrounding land is characterized by amenity grassland interrupted by sporadic woodland. The closest alternate land use to the crossing is the A322 approximately 100m to the west which is being crossed via directional drilling. The nearest residence is located at the eastern edge of Lightwater, just west of the A322.
- 30.1.3 Figure C55 defines the location of the crossing. All available flood related information can be found below.

30.2 Flood Risk

- 30.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). Both the 3.3% and 1% annual exceedance probability (AEP) events identify that surface water flooding is not present at the location of the watercourse. However, flooding is shown within the extents of the Order Limits approximately 90m to the northeast of the crossing and follows the line of the proposed haul road before spilling on to Blackstroud Lane East.

30.3 Flood History

- 30.3.1 No information regarding flooding in the area of the crossing has been identified. However, there are historic flood incidents indicated by road on Blackstroud Lane East to the north and east of the crossing.

30.4 Features Local to the Crossing That Could Influence Flooding

- 30.4.1 The catchment is small and likely contained within the boundary of the golf course. There may be a number of small watercourse crossings already present to enable golfers to move around the course. These have the potential to restrict flooding both upstream and downstream of the crossing point with the watercourse discharging into a soakaway feature.

30.5 Crossing Impact on Flood Risk



- 30.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. However, a crossing may not be needed here as plant material can be maneuvered around the watercourse.
- 30.5.2 The likelihood of flooding is assessed as being **very low** given the crossing being at risk of flooding from a 1% AEP event.
- 30.5.3 Any increased flood extents would likely be held within the Golf Course and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 30.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



30.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No data within the vicinity of the crossing, historic flood incidents at Blackstroud Lane East.
Hampshire Lead Local Flood Authority Data	Not applicable
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No Flooding
RoFSW Extent 1% Annual Chance	Yes - Flood extent in vicinity of Order Limits downstream. Continuous Flooding
RoFSW Extent 0.1% Annual Chance	Yes - Flood extent in vicinity of Order Limits downstream. Continuous Flooding
RoFSW Depth 3.3% Annual Chance	No Flooding
RoFSW Depth 1% Annual Chance	Depths up to 0.6m within extent of Order Limits but confined to a stream approximately 6m wide.
RoFSW Depth 0.1% Annual Chance	Depths up to 0.9m within extent of Order Limits but confined to a stream approximately 12m wide.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 067 Crossing Review

Watercourse name	Unnamed Watercourse 52
Crossing ID	None
Grid reference	494611, 162102
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low

31 WCX 067 Crossing Review

31.1 Site Details

- 31.1.1 Crossing WCX 067 is proposed to allow a haul road to cross an Ordinary Watercourse (Unnamed Watercourse 52). The watercourse runs through a wooded area and is a tributary to the Hale Bourne. The watercourse is a drainage channel from Manor Farm land to its confluence with the Hale Bourne which is located approximately 80m downstream of the crossing point. A small footpath bridge crosses the watercourse just north (upstream) of the proposed crossing location.
- 31.1.2 The nearest residence is Hookstone Farm, approximately 200m south of the crossing, however this is located on the other side of the Hale Bourne. The nearest residences on the same side of the Hale Bourne are Manor Farm and other isolated houses located approximately 400m west of the crossing. The closest roads to the crossing are Hookstone Lane (approximately 250m south of the crossing), Burnt Pollard Lane (approximately 370m west of the crossing) and Rye Grove (240m north of the crossing location).
- 31.1.3 The main land use at the crossing is woodland and grassland, with agricultural fields lining the wooded areas to the south of the Hale Bourne.
- 31.1.4 Figure C58 defines the location of the crossing. All available flood related information can be found below.

31.2 Flood Risk

- 31.2.1 The entire extent of the Order Limits (including this watercourse crossing) between Blackstroud Lane and Blind Lane (path) are within the Flood Zone 2 extent associated with the Hale Bourne valley and large parts are within Flood Zone 3.
- 31.2.2 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW shows that during a 3.3% annual exceedance probability (AEP) event there is flooding up to 900mm deep at the crossing location. There is extensive surface water flooding across the whole of the north portion of the Hale Bourne floodplain, with surface water depths reaching over 1.2m in some places and the flood extent encompassing the houses to the west of the crossing.
- 31.2.3 During a 1% AEP event, there is an increase in flooding at the crossing and the surrounding area. The depth of flooding associated with the 1% AEP event also reaches up to 900mm at the crossing location, however in the surrounding area there is an increase of surface water flooding reaching over 900mm and 1.2m deep.
- 31.2.4 The 0.1% AEP event shows that an area of up to 200m north of the Hale Bourne is flooded, including the crossing location. At the crossing, surface water flooding could reach a depth of up to 1.2m during a 0.1% AEP event. Most of the surrounding area can expect a depth of between 300mm and 900mm.



31.3 Flood History

31.3.1 There is evidence of a historic flood outline that spans the floodplain of the Hale Bourne in the vicinity of the crossing and therefore encompasses the crossing location. The information provided for this flood identifies that the flood occurred in September 1968 and was as a result of the river exceeding its channel capacity. There is also information provided by Surrey County Council on historical flooding of roads, which identifies that both Hook Mill Lane and Burnt Pollard Lane have flooded and there has been external property damage to the Mill Lane Cottages on Burnt Pollard Lane due to flooding.

31.4 Features Local to the Crossing That Could Influence Flooding

31.4.1 The Hale Bourne river has a major impact on flooding in the area in which the crossing is proposed. The crossing location is prone to flooding and this should be considered during the construction phase of the project.

31.5 Crossing Impact on Flood Risk

31.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect woodland and grassland.

31.5.2 The likelihood of flooding is assessed as being medium given the crossing being at risk of flooding from a 3.3% AEP event.

31.5.3 Any increased flood extents would likely be held within the wooded area and grassland north of the crossing point and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.

31.5.4 Therefore, this crossing is identified to have a **low** risk of increasing flood risk to receptors.



31.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Yes – Historic flood incidents (indicative by roads) shows that Burnt Pollard Lane and Hook Mill Lane have both experienced flooding in the past.
Hampshire Lead Local Flood Authority Data	Not applicable
Flood Zone 2	Yes – at the crossing location and surrounding area
Flood Zone 3	Yes – at the crossing location and surrounding area
RoFSW Extent 3.3% Annual Chance	Yes – showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Extent 1% Annual Chance	Yes – showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Extent 0.1% Annual Chance	Yes – showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Depth 3.3% Annual Chance	Depth of up to 900mm at the crossing.
RoFSW Depth 1% Annual Chance	Depth of up to 900mm at the crossing.
RoFSW Depth 0.1% Annual Chance	Depth of up to 1.2m at crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	At the crossing, a recorded flood outline from 1968 is shown associated with Hale Bourne.
Surrey Heath BC – Flood Zone – 3a	Yes
Surrey Heath BC – Flood Zone – 3b	Yes
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 068 Crossing Review

Watercourse name	Unnamed Watercourse 53
Crossing ID	WCX 068
Grid reference	494822, 162164
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low

32 WCX 068 Crossing Review

32.1 Site Details

- 32.1.1 Crossing WCX 068 is proposed to allow a haul road to cross an Ordinary Watercourse (Unnamed Watercourse 53). The watercourse runs through a wooded area and grassland and is a tributary to the Hale Bourne. The watercourse is identified as a drainage channel starting at Rye Grove (minor road). The watercourse flows in a southeasterly direction and appears to split into two channels approximately 210m downstream of the road, and then split again a further 80m downstream. Both of the channels after the second split flow into the Hale Bourne approximately 100m downstream of the bifurcation. The WCX 068 crossing sits across the east channel, just after the second channel split. The Base flow index for the catchment that this crossing lies in indicates that the ground is mostly impermeable.
- 32.1.2 The nearest residential development is Hookstone Farm, approximately 300m southwest of the crossing, though this is on the other side of the Hale Bourne river. On the same side of the Hale Bourne the nearest houses are approximately 600m away, both west and east of the crossing location. The nearest road to the crossing is Rye Grove, approximately 350m northwest of the crossing. There is also a footpath in the crossing vicinity (Blind Lane approximately 100m north of the crossing).
- 32.1.3 The main land use at the crossing is grassland, with agricultural fields to the east of the crossing location and woodland to the west.
- 32.1.4 Figure C59 defines the location of the crossing. All available flood related information can be found below.

32.2 Flood Risk

- 32.2.1 The entire extent of the Order Limits between Blackstroud Lane and Blind Lane (path) are within the Flood Zone 2 extent associated with the Hale Bourne valley and large parts of the working area, including this crossing location, are within Flood Zone 3.
- 32.2.2 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW shows that during a 3.3% annual exceedance probability (AEP) event there is flooding of up to 900mm deep at the crossing location. There is extensive surface water flooding across the whole of the north portion of the Hale Bourne floodplain, with surface water depths reaching 1.2m in some places.
- 32.2.3 During a 1% AEP event, there is an increase in flooding at the crossing and the surrounding area. The depth of flooding associated with the 1% AEP event also reaches up to 900mm at the crossing location, however north of the haul road location and south of the crossing there are flooding depths identified of up to 1.2m deep.



- 32.2.4 The 0.1% AEP event shows that an area of up to 200m north of the Hale Bourne is flooded, including the crossing location. At the crossing surface water flooding could reach a depth of up to 1.2m during a 0.1% AEP event. The majority of the surrounding area can expect a flood depth of between 300mm and 900mm, with areas directly south of the crossing location over 1.2m deep.

32.3 Flood History

- 32.3.1 There is evidence of a historic flood outline that spans the floodplain of the Hale Bourne in the vicinity of the crossing and therefore encompasses the crossing location. The information provided for this flood identifies that the flood occurred in September 1968 and was as a result of the river exceeding its channel capacity.
- 32.3.2 There is also information provided by Surrey County Council of historical flooding on roads in the area.

32.4 Features Local to the Crossing That Could Influence Flooding

- 32.4.1 Hale Bourne river has a major impact on flooding in the area in which the crossing is proposed. The crossing location is prone to flooding and this should be considered during the construction phase of the project.

32.5 Crossing Impact on Flood Risk

- 32.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect woodland and grassland.
- 32.5.2 The likelihood of flooding is assessed as being **medium** given the crossing being at risk of flooding from a 3.3% AEP event.
- 32.5.3 Any increased flood extents would likely be held within the wooded area and grassland north of the crossing point and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 32.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



32.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Yes – Historic flood incidents (indicative by roads) shows that Burnt Pollard Lane and Hook Mill Lane have both experienced flooding in the past.
Hampshire Lead Local Flood Authority Data	Not applicable
Flood Zone 2	Yes – at the crossing location and surrounding area
Flood Zone 3	Yes – at the crossing location and surrounding area
RoFSW Extent 3.3% Annual Chance	Yes - showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Extent 1% Annual Chance	Yes - showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Extent 0.1% Annual Chance	Yes - showing surface water flooding extent along the watercourse and at the crossing.
RoFSW Depth 3.3% Annual Chance	Depth of up to 900mm at the crossing.
RoFSW Depth 1% Annual Chance	Depth of up to 900mm at the crossing.
RoFSW Depth 0.1% Annual Chance	Depth of up to 1.2m at crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	Yes - south of the crossing following the Hale Bourne. Depth of below 0.3m.
Risk of Flooding from Reservoirs - Maximum Flood Extent	Yes - south of the crossing following the Hale Bourne.
Risk of Flooding from Reservoirs - Maximum Flood Speed	Yes - south of the crossing following the Hale Bourne. Velocity of below 0.5m/s.
Recorded Flood Outlines	At the crossing, a recorded flood outline from 1968 is shown associated with Hale Bourne.
Surrey Heath BC – Flood Zone – 3a	Yes – shown at the crossing and across the floodplain
Surrey Heath BC – Flood Zone – 3b	Yes – shown at the crossing and across the floodplain
Rushmoor BC – Flood Zone – 3a	N/A
Rushmoor BC – Flood Zone – 3b	N/A
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 068a Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	WCX 068a
Grid reference	494797, 162154
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



33 WCX 068a Crossing Review

33.1 Site Details

- 33.1.1 Crossing WCX 068a is proposed to allow a haul road to cross an Ordinary Watercourse (an unnamed watercourse). The watercourse runs alongside a wooded area and is a tributary to the Hale Bourne. This watercourse is identified as a drainage channel starting at Rye Grove (road), which then splits into two channels 205m downstream of the road, and again 80m downstream. The WCX 068a crossing sits across the west channel after the second channel split, 70m upstream of the watercourses confluence with the Hale Bourne. The Base flow index for the catchment that this crossing lies in indicates that the ground is mostly impermeable.
- 33.1.2 The nearest residential development is Hookstone Farm, approximately 270m southwest of the crossing. The closest road to the crossing is Rye Grove, approximately 295m northwest of the crossing. There is also a footpath in the crossing vicinity.
- 33.1.3 The main land use at the crossing is woodland and grassland, with agricultural fields bordering the wooded areas to the east of the crossing location.
- 33.1.4 Figure C60 defines the location of the crossing. All flood related information can be found below.

33.2 Flood Risk

- 33.2.1 The extent of Flood Zone 2 and 3 are defined for this watercourse, the crossing itself identified to be within a Flood Zone 3 extent. The entire extent of the Order Limits between Hookstone Lane and Blind Lane (path) are within the Flood Zone 2 and 3. The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). During a 3.3% annual exceedance probability (AEP) event there is flooding of up to 600mm deep at the crossing location. There is extensive surface water flooding across the whole of the north portion of the Hale Bourne floodplain, with surface water depths reaching over 1.2m in some places.
- 33.2.2 During a 1% AEP event, there is an increase in flooding at the crossing and the surrounding area. The depth of flooding associated with the 1% AEP event also reaches up to 900mm at the crossing location, however north of the haul road location there are flooding depths identified of over 1.2m deep.
- 33.2.3 The 0.1% AEP event shows that an area of up to 200m north of the Hale Bourne is flooded, including the crossing location. At the crossing, surface water flooding could reach a depth of up to 900mm during a 0.1% AEP event. Most of the surrounding area can expect a depth of between 600mm and 900mm.

33.3 Flood History



33.3.1 There is evidence of a historic flood outline that spans the floodplain of the Hale Bourne in the vicinity of the crossing and therefore encompasses the crossing location. The information provided for this flood identifies that the flood occurred in September 1968 and was as a result of the river exceeding its channel capacity.

33.4 Features Local to the Crossing That Could Influence Flooding

33.4.1 Hale Bourne river has a huge impact on flooding in the area that the crossing is proposed to sit in. The crossing location is prone to flooding and this must be considered during the construction phase of the project.

33.5 Crossing Impact on Flood Risk

33.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect woodland and grassland.

33.5.2 The likelihood of flooding is assessed as being **medium** given the crossing being at risk of flooding from a 3.3% AEP event.

33.5.3 Any increased flood extents would likely be held within the wooded area and open grassland upstream of the crossing point and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.

33.5.4 Therefore, this crossing is identified to have a **low** risk of increasing flood risk to receptors.



33.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Yes – Historic flood incidents (indicative by roads) shows that Burnt Pollard Lane and Hookstone lane have both experienced flooding in the past.
Hampshire Lead Local Flood Authority Data	Not applicable
Flood Zone 2	Yes – at the crossing location and surrounding area
Flood Zone 3	Yes – at the crossing location and surrounding area
RoFSW Extent 3.3% Annual Chance	Yes – showing surface water flooding extent in the 3.3% annual chance event along the watercourse and at the crossing.
RoFSW Extent 1% Annual Chance	Yes – showing surface water flooding extent in the 1% annual chance event along the watercourse and at the crossing.
RoFSW Extent 0.1% Annual Chance	Yes – showing surface water flooding extent in the 0.1% annual chance event along the watercourse and at the crossing.
RoFSW Depth 3.3% Annual Chance	Yes – showing surface water flooding depth in the 3.3% annual chance event along the watercourse and at the crossing. Depth of up to 600mm at the crossing.
RoFSW Depth 1% Annual Chance	Yes – showing surface water flooding depth 1% annual chance along the watercourse and at the crossing. Depth of up to 900mm at the crossing.
RoFSW Depth 0.1% Annual Chance	Yes – showing surface water flooding depth in the 0.1% annual chance event along the watercourse and downstream of the crossing within the golf course. Depth of up to 900mm at crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	Yes – south of the crossing following the Hale Bourne. Depth of below 0.3m.
Risk of Flooding from Reservoirs - Maximum Flood Extent	Yes – south of the crossing following the Hale Bourne.
Risk of Flooding from Reservoirs - Maximum Flood Speed	Yes – south of the crossing following the Hale Bourne. Velocity of below 0.5m/s.
Recorded Flood Outlines	At the crossing, a recorded flood outline from 1968 is shown associated with Hale Bourne.
Surrey Heath BC – Flood Zone – 3a	Yes – shown at the crossing and across the floodplain
Surrey Heath BC – Flood Zone – 3b	Yes – shown at the crossing and across the floodplain
Rushmoor BC – Flood Zone – 3a	Yes – shown at the crossing and across the floodplain



Rushmoor BC – Flood Zone – 3b	Yes – shown at the crossing and across the floodplain
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined

WCX 070 Crossing Review

Watercourse name	Clappers Brook
Crossing ID	WCX 070
Grid reference	495634, 162585
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low

34 WCX 070 Crossing Review

34.1 Site Details

- 34.1.1 Crossing WCX 070 is required to carry the haul road over Clappers Brook and is located within farm land. The closest road is Halebourne Lane approximately 310m west of the crossing point.
- 34.1.2 The closest residential area is located approximately 325m southwest of the crossing point. Higher Park Farm is approximately 350m southwest of the crossing point. Shrubbs Farm is approximately 700m southeast of the crossing point. A plant nursery is located approximately 275m northeast of the crossing point.
- 34.1.3 Figure C61 defines the location of the crossing. All available flood related information can be found below.

34.2 Flood Risk

- 34.2.1 The crossing point is within Flood Zones 2 and 3, which are defined along the watercourse.
- 34.2.2 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW map identifies continuous flooding along the watercourse for the 3.33% annual exceedance probability (AEP) event, with predominant depths in within the Order Limits less than 150mm but reaching up to 600mm at the crossing point.
- 34.2.3 The 1% AEP floodplain indicates the extent of the flooding to increase in the surrounding area, with predominant depths within the Order Limits of less than 300mm but reaching up to 600mm at the crossing point.

34.3 Flood History

- 34.3.1 Surrey County Council reports external property flooding within 1km radius of the crossing point, but outside the Order Limits. Highway flood enquiry locations are reported within the Order Limits at Windlesham Road, approximately 655m northeast of the crossing point. Published wet spots are reported at Halebourne Lane approximately 410m southwest of the crossing point, but outside the Order Limits.

34.4 Features Local to the Crossing That Could Influence Flooding

- 34.4.1 The FEH catchment up to the crossing point is approximately 3.9km², covering mainly agricultural land. A section of the M3 motorway and the B386 are within the catchment.

34.5 Crossing Impact on Flood Risk



- 34.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely have an impact on flood risk to receptors in the area.
- 34.5.2 The likelihood of flooding is assessed as being **medium** given the crossing being at risk of flooding from a 3.3% AEP event and being located in Flood Zone 3.
- 34.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, but this would only affect open agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 34.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk in the area to receptors.



34.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Highway flood enquiry location within Order Limits, approximately 655m northeast of the crossing point
Hampshire Lead Local Flood Authority Data	Not applicable
Flood Zone 2	Defined along water course
Flood Zone 3	Defined along water course
RoFSW Extent 3.3% Annual Chance	Yes – flooding within Order Limits
RoFSW Extent 1% Annual Chance	Yes – flooding within Order Limits
RoFSW Extent 0.1% Annual Chance	Yes – flooding within Order Limits
RoFSW Depth 3.3% Annual Chance	Yes – flood with depths up to 150mm within the Order Limits near the crossing point
RoFSW Depth 1% Annual Chance	Yes – flood with depths up to 300mm within the Order Limits near the crossing point
RoFSW Depth 0.1% Annual Chance	Yes – flood with depths up to 600mm within the Order Limits near the crossing point
Risk of Flooding from Reservoirs - Maximum Flood Depth	No risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No risk
Recorded Flood Outlines	Records within Order Limits at the crossing point
Surrey Heath BC – Flood Zone – 3a	Defined within Order Limits approximately 890m southwest of the crossing point
Surrey Heath BC – Flood Zone – 3b	Defined within Order limits at the crossing point
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 079 Crossing Review

Watercourse name	Unnamed Watercourse 62
Crossing ID	WCX 079
Grid reference	500215, 165261
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

35 WCX 079 Crossing Review

35.1 Site Details

- 35.1.1 Crossing WCX 079 crosses an Ordinary Watercourse (Unnamed Watercourse 62) situated at the northwest corner of Foxhills Golf Club & Resort. The watercourse is a drainage channel running from Accommodation Road, eastwards through the golf course.
- 35.1.2 The watercourse begins at the eastern edge of Accommodation Road, before flowing eastwards across the golf course. The closest residential property is Longcross Lodge, approximately 204m northeast of the crossing. The closest road to the crossing is Longcross Road (B386), which is 157m north (downstream) of the crossing. The crossing is situated in an area of grass, 6m east (downstream) of a gravel path. This track could be used as access to the crossing location. There is also pond approximately 40m upstream of the crossing location.
- 35.1.3 Figure C66 identifies the location of the crossing. All available flood related information can be found below.

35.2 Flood Risk

- 35.2.1 The extents of Flood Zones 2 and 3 are not defined at this watercourse. The closest Flood Zone to the watercourse is over a kilometre away. The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW does not predict flooding from the 3.33% annual exceedance probability event (AEP) at the crossing, with the nearest flooding associated with this event approximately 15m east of the crossing location. Flooding for the 3.33% AEP at the location predicts a depth of up to 900mm.
- 35.2.2 The 1% AEP event predicts an increased extent of flooding to the east of the crossing location compared to the 3.33% event. The depth of flooding associated with the 1% AEP event is predicted to reach up to 1.2m.
- 35.2.3 The 0.1% AEP event predicts a substantial increase in flood extent near the crossing, especially downstream of the crossing, where the flood water crosses the channel 3.5m north of the crossing location. Here the flood water is predicted to reach a depth of up to 600mm and 19m northeast of WCX 079 surface water flood depths can reach over 1.2m.

35.3 Flood History

- 35.3.1 No historical information regarding flooding in the area of the crossing has been identified.

35.4 Features Local to the Crossing That Could Influence Flooding



- 35.4.1 The main feature that could influence flooding at the crossing location is the pond upstream of WCX 079. During a period of high rainfall, the pond could allow an increased amount of water down the drainage channel towards the crossing due to increase runoff from Accommodation Road. This would mean that the area upstream of WCX 079 would flood. However, this is not considered a vulnerable area as only the golf course would be affected.

35.5 Crossing Impact on Flood Risk

- 35.5.1 After reviewing the available data and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it is considered that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect the golf course.
- 35.5.2 The likelihood of flooding is assessed as being **very low** as the crossing is not predicted to flood from the 3.33% AEP event.
- 35.5.3 Any increased flood extents would likely be held within the golf course and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is assessed as **very low**.
- 35.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



35.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Highway flood enquiry location within Order Limits, approximately 655m northeast of the crossing point
Hampshire Lead Local Flood Authority Data	Not applicable
Flood Zone 2	Defined along water course
Flood Zone 3	Defined along water course
RoFSW Extent 3.3% Annual Chance	Yes – flooding within Order Limits
RoFSW Extent 1% Annual Chance	Yes – flooding within Order Limits
RoFSW Extent 0.1% Annual Chance	Yes – flooding within Order Limits
RoFSW Depth 3.3% Annual Chance	Yes – flood with depths up to 150mm within the Order Limits near the crossing point
RoFSW Depth 1% Annual Chance	Yes – flood with depths up to 300mm within the Order Limits near the crossing point
RoFSW Depth 0.1% Annual Chance	Yes – flood with depths up to 600mm within the Order Limits near the crossing point
Risk of Flooding from Reservoirs - Maximum Flood Depth	No risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No risk
Recorded Flood Outlines	Records within Order Limits at the crossing point
Surrey Heath BC – Flood Zone – 3a	Defined within Order Limits approximately 890m southwest of the crossing point
Surrey Heath BC – Flood Zone – 3b	Defined within Order limits at the crossing point
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 079a Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	WCX 079a
Grid reference	500098, 165181
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



36 WCX 079a Crossing Review

36.1 Site Details

- 36.1.1 Crossing WCX 079a covers the haul road across an Ordinary Watercourse (unnamed) situated at the northwest corner of Foxhills Golf Club & Resort. The watercourse is a drainage channel from Accommodation Road and lies in an area of grass, with a wooded area 15m upstream and 20m downstream of the crossing. There is also a small pond 20m downstream of the crossing.
- 36.1.2 The watercourse begins to the east of Accommodation Road before flowing eastwards into the golf course. The crossing is situated 155m east (downstream) of Accommodation Road. The closest residential property is approximately 215m west of the crossing. The nearest residential development is approximately 320m northwest of the watercourse crossing. Several paths cross the watercourse in the golf course. There is a gravel track that finishes just north of the crossing location, which may be used for access.
- 36.1.3 Figure C67 defines the location of the crossing. All available flood related information can be found below.

36.2 Flood Risk

- 36.2.1 Flood Zones 2 and 3 are not attributed to this watercourse. The closest of these to the watercourse is over a kilometre away. The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW predicts no flooding for the 3.33% annual exceedance probability event (AEP) at the crossing, with the nearest flooding associated with this event approximately 20m east (downstream) of the crossing location. Predicted flooding for the 3.33% AEP event at that location is up to 600mm in depth.
- 36.2.2 The 1% AEP event predicts an increased extent of flooding compared to the 3.33% event upstream and southeast of the crossing location. The predicted depth of flooding associated with the 1% AEP event is also up to 600mm deep to the east crossing, just upstream of the pond.
- 36.2.3 The 0.1% AEP event shows an increase in flood extent near the crossing, especially to the east (downstream) of the crossing, where the flood water reaches a depth of up to 900mm.

36.3 Flood History

- 36.3.1 No historical information regarding flooding in the area of the crossing has been identified.

36.4 Features Local to the Crossing That Could Influence Flooding



- 36.4.1 The road upstream of the crossing is the main local feature that could influence flooding. As the watercourse originates at the edge of Accommodation Road, it can be assumed that any surface runoff would be collected in the watercourse channel. As a result, during times of high rainfall a temporary culvert for the crossing may restrict the capacity of the watercourse and flood the road.
- 36.4.2 The pond downstream of the crossing could also influence flooding during an intense rainfall event, however, due to the topography of the land, it is unlikely that any flooding of the pond would affect the crossing location.

36.5 Crossing Impact on Flood Risk

- 36.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flooding would only affect the golf course.
- 36.5.2 The likelihood of flooding is assessed as being **very low** as the crossing is not at risk from a 3.33% AEP event.
- 36.5.3 Any increased flooding as a result of the temporary crossing would likely be retained within the golf course and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is therefore assessed as **very low**.
- 36.5.4 Consequently, this temporary crossing is assessed as having a **very low** risk of increasing flood risk to receptors.



36.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	Not Applicable
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No flooding at crossing, flooding east of crossing.
RoFSW Extent 1% Annual Chance	No flooding at crossing, flooding east of crossing.
RoFSW Extent 0.1% Annual Chance	No flooding at crossing, flooding east of crossing.
RoFSW Depth 3.3% Annual Chance	No flooding at crossing, flooding east of the crossing (<600mm deep)
RoFSW Depth 1% Annual Chance	No flooding at crossing, flooding east of the crossing (<600mm deep)
RoFSW Depth 0.1% Annual Chance	No flooding at crossing, flooding east of the crossing (<900mm deep)
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records at crossing
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 079b Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	WCX 079b
Grid reference	500124, 165220
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

37 WCX 079b Crossing Review

37.1 Site Details

- 37.1.1 Crossing WCX 079b is proposed to allow a Haul Road to cross an Ordinary Watercourse (an unnamed watercourse) situated at the northwest corner of Foxhills Golf Club & Resort. The watercourse is approximately 90m in length, with the crossing sitting 8m upstream of the watercourses confluence with the drainage channel beginning at Accommodation Road. The watercourse that the crossing is location on is a drainage channel from the golf course and lies in a wooded area.
- 37.1.2 The watercourse begins approximately 75m east of Accommodation Road, at the edge of a fairway, before flowing north through a wooded area. The closest residential property is approximately 170m west of the crossing. The nearest residential development is approximately 305m northwest of the watercourse crossing.
- 37.1.3 Figure C68 defines the location of the crossing. All available flood related information can be found below.

37.2 Flood Risk

- 37.2.1 The extent of Flood Zone 2 and 3 are not defined at this watercourse. The closest Flood Zone to the watercourse is over a kilometre away. The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW indicates there to be no flooding predicted for the 3.33% annual exceedance probability event (AEP) at the crossing, with the nearest flooding associated with this event approximately 30m south (upstream) of the crossing location. Flooding for the 3.3% AEP at the location achieves a depth of up to 900mm.
- 37.2.2 The 1% AEP event identifies the extent of flooding to increase upstream of the crossing location. The depth of flooding associated with the 1% AEP event also reaches up to 1.2m deep.
- 37.2.3 The 0.1% AEP event shows a considerable increase in flood extent near the crossing, especially to south (upstream) of the crossing, where the flood water reaches a depth of over 1.2m.

37.3 Flood History

- 37.3.1 No historical information regarding flooding in the area of the crossing has been identified.

37.4 Features Local to the Crossing That Could Influence Flooding

- 37.4.1 There are no features local to the crossing that could influence flooding.

37.5 Crossing Impact on Flood Risk



- 37.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect the golf course.
- 37.5.2 The likelihood of flooding is assessed as being **very low** given the crossing not being at risk of flooding from a 0.1% AEP event.
- 37.5.3 Any increased flood extents would likely be held within the golf course and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 37.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



37.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	Not Applicable
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No flooding at crossing, flooding south of crossing.
RoFSW Extent 1% Annual Chance	No flooding at crossing, flooding south of crossing.
RoFSW Extent 0.1% Annual Chance	No flooding at crossing, flooding south of crossing.
RoFSW Depth 3.3% Annual Chance	No flooding at crossing, flooding south of the crossing (<900mm deep)
RoFSW Depth 1% Annual Chance	No flooding at crossing, flooding south of the crossing (<1.2m deep)
RoFSW Depth 0.1% Annual Chance	No flooding at crossing, flooding south of the crossing (>1.2m deep)
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records at crossing
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 079c Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	WCX 079c
Grid reference	500027, 165185
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Very low

38 WCX 079c Crossing Review

38.1 Site Details

- 38.1.1 Crossing WCX 079c is proposed to allow a haul road to cross an ordinary watercourse (an unnamed watercourse) situated at the northwest corner of Foxhills Golf Club & Resort. The crossing itself lies in an area of short grass and has a wooded area approximately 15m upstream and 15m downstream of the crossing.
- 38.1.2 The watercourse begins to the east of Accommodation Road before flowing east onto the golf course. The crossing is approximately 50m east (downstream) of Accommodation Road, where an access road would cross the watercourse. The closest residential property is approximately 100m northwest of the crossing. The nearest residential development is approximately 300m north of the watercourse crossing. Several paths cross the watercourse in the golf course to allow golfers to move around the course and across the drainage channels. The gravel track crossing the watercourse at the crossing location would be utilised by the access road.
- 38.1.3 Figure C69 defines the location of the crossing. All available flood related information can be found below.

38.2 Flood Risk

- 38.2.1 The extent of Flood Zone 2 and 3 are not defined at this watercourse. The closest Flood Zone to the watercourse is over a kilometer away. The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW indicates there to be no flooding associated with the 3.33% annual exceedance probability event (AEP) at the crossing, with the nearest flooding associated with this event approximately 45m southeast of the crossing location and approximately 85m west (upstream) of the crossing, west of Accommodation Road. Flooding for the 3.3% AEP for both of these locations achieves a depth of less than 1.2m.
- 38.2.2 The 1% AEP event identifies the extent of flooding to increase upstream and southeast of the crossing location. The depth of flooding associated with the 1% AEP event reaches more than 1.2m deep to the west of Accommodation Road and up to 1.2m deep southwest of the crossing.
- 38.2.3 The 0.1% AEP event shows a considerable increase in flood extent near the crossing, especially to the east (downstream) of the crossing and to the west of the crossing on the west side of Accommodation Road, where the flood water at both locations reaches a depth of over 1.2m.

38.3 Flood History

- 38.3.1 No information regarding flooding in the area of the crossing has been identified.

38.4 Features Local to the Crossing That Could Influence Flooding



38.4.1 The road upstream of the crossing is the only local feature that could influence flooding. As the watercourse originates at the edge of Accommodation Road, it can be assumed that any surface runoff would be collected in the watercourse channel and flow through the watercourse. As a result, during times of high rainfall, the watercourse would be under pressure to divert water away from the road. A culvert therefore may restrict the watercourses ability to act as a drainage channel and cause flooding across the road.

38.5 Crossing Impact on Flood Risk

38.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is may have an impact on flood risk to receptors in the area. Any increase in flood extents would affect the golf course and the road.

38.5.2 The likelihood of flooding is assessed as being **very low** given the crossing not being at risk of flooding from a 0.1% AEP event.

38.5.3 Any increased flood extents would affect the golf course and Accommodation Road. The severity of any increase in flood risk as a result of the proposed crossing is **low**.

38.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



38.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	Not Applicable
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No flooding at crossing, flooding west of Accommodation Road and east of crossing.
RoFSW Extent 1% Annual Chance	No flooding at crossing, flooding west of Accommodation Road and east of crossing.
RoFSW Extent 0.1% Annual Chance	No flooding at crossing, flooding west of Accommodation Road and east of crossing.
RoFSW Depth 3.3% Annual Chance	No flooding at crossing, flooding west of Accommodation Road and east of crossing (0.9-1.2m deep)
RoFSW Depth 1% Annual Chance	No flooding at crossing, flooding west of Accommodation Road (>1.2m deep) and east of crossing (<1.2m)
RoFSW Depth 0.1% Annual Chance	No flooding at crossing, flooding west of Accommodation Road and east of crossing (>1.2m deep)
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records at crossing
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 080 Crossing Review

Watercourse name	Unnamed Watercourse 63
Crossing ID	500524, 165444
Grid reference	WCX 080
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



39 WCX 080 Crossing Review

39.1 Site Details

- 39.1.1 Crossing WCX 080 is required to carry the haul road over Unnamed Watercourse 63 (an Ordinary Watercourse).
- 39.1.2 The watercourse flows in a northerly direction and is located in a rural area, and within the Foxhill Golf Course that covers most of the southern catchment area upstream of the crossing point and immediately downstream of the crossing to Longcross Road.
- 39.1.3 Longcross Road (B386) runs east-west and is approximately 50m north of the crossing point at the closest point. Longcross Kennels is located immediately across the road. Accommodation Road is approximately 660m west of the crossing point. Stonehill Road is approximately 1.14km southeast of the crossing point at the closest point.
- 39.1.4 The closest residential development to the crossing point is Lyne, approximately 1km northeast of the crossing point.
- 39.1.5 Figure C70 defines the location of the crossing. All available flood related information can be found below.

39.2 Flood Risk

- 39.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). This identifies the 1% annual exceedance probability (AEP) event to give rise to isolated areas of flooding within the golf course both upstream and downstream of the crossing point. Some deep flooding occurs in the immediate vicinity of the crossing point which is likely caused by flood water backing up at the culvert under Longcross Road, just downstream of the crossing point.
- 39.2.2 The RoFSW map for 3.3% AEP also shows isolated areas of flooding within the golf course and agricultural land. The depth near the crossing point exceeds 1.2m, due to the accumulation of flow south of Longcross Road, but does not affect the crossing location.
- 39.2.3 It is noted that even at the 0.1% AEP event the localised flooding shown on the RoFSW map is confined to the south side of Longcross Road and does not extend to Longcross Kennels on the north side of Longcross Road.

39.3 Flood History

- 39.3.1 No information regarding flooding in the area of the crossing has been identified.

39.4 Features Local to the Crossing That Could Influence Flooding

- 39.4.1 The catchment upstream of the crossing point comprises the golf course up to Foxhills Club and Resort, and Dower House.



39.4.2 The watercourse is culverted under Longcross Road approximately 50m downstream of the crossing point. The watercourse also runs beneath tracks within the golf course, approximately 10m downstream of the crossing point, 80m upstream of the crossing point and 190m upstream of the crossing point.

39.5 Crossing Impact on Flood Risk

39.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect the golf course.

39.5.2 The likelihood of flooding is assessed as being **low** given the crossing being at risk of flooding from a 1% AEP event.

39.5.3 Any increased flood extents would likely be held within golf course upstream of the crossing point and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.

39.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



39.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Historic flood records exist in the locality, but not within Order Limits.
Hampshire Lead Local Flood Authority Data	No applicable.
Flood Zone 2	Not defined.
Flood Zone 3	Not defined.
RoFSW Extent 3.3% Annual Chance	No – flood risk downstream of the Order Limits
RoFSW Extent 1% Annual Chance	Yes – disconnected flood extent within the Order Limits.
RoFSW Extent 0.1% Annual Chance	Yes – continuous flood extent along the watercourse within Order Limits.
RoFSW Depth 3.3% Annual Chance	No – flood with depth reaching 1.2m to the north of the Order Limits near the crossing point.
RoFSW Depth 1% Annual Chance	Yes – flood with depth up to 600mm within the Order Limits at the crossing point.
RoFSW Depth 0.1% Annual Chance	Yes – flood with depth up to 600mm within the Order Limits at the crossing point.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No risk
Recorded Flood Outlines	No records
Surrey Heath BC – Flood Zone – 3a	Not applicable
Surrey Heath BC – Flood Zone – 3b	Not applicable
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 081 Crossing Review

Watercourse name	Unnamed Watercourse 64
Crossing ID	WCX 081
Grid reference	501199, 165455
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



40 WCX 081 Crossing Review

40.1 Site Details

- 40.1.1 Crossing WCX 0081 is required to carry a temporary haul road over an unnamed (Ordinary) watercourse. The crossing site (shown in Figure 1) lies approximately 2km to the west of Addlestone, Surrey at NGR 501199, 165455. The crossed channel is referred to as 'Unnamed Watercourse 64' and flows northeast.
- 40.1.2 The drainage system upstream of the proposed crossing is marked on the Ordnance Survey 1:25,000 map as extending approximately 275m southwest, this network of channels appears to provide drainage for part of Foxhills Golf Course.
- 40.1.3 Downstream of the proposed crossing, the channel extends a further 250m to the east-northeast where it drains into a pond, which has an outlet on its northern side, which is culverted beneath Longcross Road. Downstream of Longcross Road the channel flows north and is culverted beneath Lyne Lane adjacent to a school (c. 420m northeast) before flowing northeast in open channel before it eventually joins The Bourne (Main River) approximately 3km downstream of the proposed crossing.
- 40.1.4 The land use immediately upstream and downstream of the proposed crossing (within the Order Limits) is a golf course. Further upstream the catchment of the watercourse remains within the golf course, whilst downstream the land use gives way to a mixture of low density residential/mixed use and woodland.
- 40.1.5 The closest vulnerable receptor is located approximately 100m to the north-northeast of the crossing, however this is not indicated to be at risk. There are no upstream properties near the crossed watercourse.
- 40.1.6 Figure C71 defines the location of the crossing. All available flood related information can be found below.

40.2 Floodplain Extent

- 40.2.1 The extent of Flood Zone 2 and 3 is not defined for this watercourse, or any watercourses within 1km.
- 40.2.2 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW map identifies that the proposed crossing does not lie in an area at risk for flooding for all events up to and including the 0.1% annual exceedance probability (AEP).
- 40.2.3 The 1%AEP RoFSW map indicates there is flooding associated with the watercourse downstream of the crossing to the pond and beyond. This flood extent is narrow and well-defined achieving depths of up to 300mm in the channel to the pond, depths of up to 600mm at the pond and 150mm between Longcross Road and the school.

40.3 Flood History



40.3.1 There is a report of flooding event along Lyne Lane, although this road is approximately 2km long, so it is not clear whether this event happened in the vicinity of the crossing, or its the downstream watercourse.

40.4 Features Local to the Crossing That Could Influence Flooding

40.4.1 The channel upstream of the crossing (within the golf course) are likely to be artificial and well maintained, which may lead to more rapid transmission of flows than natural sections.

40.4.2 There is an access road over the watercourse 20m upstream of the crossing site, where the channel may be culverted; and it is likely that there are further culverted sections on the contributing upstream channels within the golf course.

40.4.3 The pond downstream of the watercourse would likely attenuate peak flows in the channel to the north of Longcross Lane.

40.5 Crossing Impact on Flood Risk

40.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area.

40.5.2 The likelihood of flooding is assessed as being **very low** risk given the crossing not being at risk of flooding from a 0.1% AEP event.

40.5.3 Any increased flood extents would only affect the golf course and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.

40.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



40.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Flooding event along Lyne Lane, (>250m to the north/northeast of the crossing)
Hampshire Lead Local Flood Authority Data	Not Applicable
Flood Zone 2	Not in a defined Flood Zone
Flood Zone 3	Not in a defined Flood Zone
RoFSW Extent 3.3% Annual Chance	Not in an at-risk zone or immediately adjacent to an at-risk zone
RoFSW Extent 1% Annual Chance	Not in an at-risk zone or immediately adjacent to an at-risk zone
RoFSW Extent 0.1% Annual Chance	Not in an at-risk zone, but downstream channel immediately adjacent (i.e. <1m) of the crossing falls within this zone.
RoFSW Depth 3.3% Annual Chance	Not in an at-risk zone or immediately adjacent to an at-risk zone
RoFSW Depth 1% Annual Chance	Not in an at-risk zone or immediately adjacent to an at-risk zone
RoFSW Depth 0.1% Annual Chance	Not in an at-risk zone, but downstream channel immediately adjacent to crossing has depths of 0.15 to 0.30; and 0.30 to 0.60m
Risk of Flooding from Reservoirs - Maximum Flood Depth	Not in an at-risk area
Risk of Flooding from Reservoirs - Maximum Flood Extent	Not in an at-risk area
Risk of Flooding from Reservoirs - Maximum Flood Speed	Not in an at-risk area
Recorded Flood Outlines	No records published
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 081a Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	WCX 081a
Grid reference	501203, 165341
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

41 WCX 081a Crossing Review

41.1 Site Details

- 41.1.1 Crossing WCX 081a is over an unnamed watercourse (Ordinary Watercourse), which is located in the northeast corner of Foxhills Golf Club, Surrey. The intended crossing point is over a man-made drainage ditch most likely built as part of a system of drainage ditches that serve the surrounding golf course. The crossing point is close to the head of the drainage ditch which joins a further watercourse approximately 100m to the northwest. This in turn flows for approximately 300m before passing under the B386 Longcross Road. It eventually discharges into The Bourne at Chertsey, approximately 2km downstream, after flowing through agricultural fields.
- 41.1.2 The surrounding land is characterised by amenity grassland interrupted by sporadic woodland. There are a number of small watercourses in the vicinity of the crossing which form part of the drainage network for the golf course and converge close to the Order Limits. Aerial imagery also suggests several small crossings upstream and downstream of the proposed Order Limits to allow users of the golf club to access the course.
- 41.1.3 The closest alternate land use is the B386 Longcross Road approximately 250m north of the crossing point. The nearest residential properties are Foxhill Mews approximately 400m to the east, with Foxhill Farm and Oakleaf Farm located 300m and 400m northeast on the other side of Longcross Road.
- 41.1.4 Figure C72 defines the location of the crossing. All available flood related information can be found below.

41.2 Flood Risk

- 41.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The 3.3% and 1% annual exceedance probability (AEP) floodplain for the identifies that surface water flooding is sporadic throughout the area.
- 41.2.2 Upslope of the proposed crossing point small ponds form in depressions that are most likely bunkers throughout the golf course. Downstream of the crossing point there is some flooding along the line of the watercourse which backs up to a depth of up to 0.6m on the south side of Longcross Road in an area where there is already a pond and the watercourse is culverted beneath the road.

41.3 Flood History

- 41.3.1 The only history of flooding in the area is flooding of Lyne Lane, located to the north of Longcross Road.

41.4 Features Local to the Crossing That Could Influence Flooding



- 41.4.1 The catchment to the watercourse is small and contained within the boundary of the golf course. The influences on flooding are likely to be existing crossings or culverts that may impede flows either upstream or downstream of the proposed crossing.

41.5 Crossing Impact on Flood Risk

- 41.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect the golf course.
- 41.5.2 The likelihood of flooding is assessed as being **very low** given the crossing not being at risk of flooding from a 0.1% AEP event.
- 41.5.3 Any increased flood extents would likely be held within the golf course and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 41.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



41.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Road flooding on Lyne Lane to the north.
Hampshire Lead Local Flood Authority Data	Not applicable.
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No - Localised flooding contained within pockets of low-lying land outside of Order Limits. Overflow of possible pond/attenuation basin downstream of crossing point.
RoFSW Extent 1% Annual Chance	No - Localised flooding contained within bank or pockets of low-lying land outside of Order Limits. Overflow of possible pond/attenuation basin downstream of crossing point.
RoFSW Extent 0.1% Annual Chance	No - Connected surface water flow route with out of bank flooding. Overflow of possible pond/attenuation basin downstream of crossing point.
RoFSW Depth 3.3% Annual Chance	No - Depths of up to 1.2m in very isolated locations. Most areas of ponding between 0.15 and 0.6m in depth.
RoFSW Depth 1% Annual Chance	No - Depths of up to 1.2m in isolated locations. Most areas of ponding between 0.15 and 0.6m in depth.
RoFSW Depth 0.1% Annual Chance	No - Depths greater than 1.2m in several locations. Most areas of ponding between 0.15 and 0.6m in depth.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	No Records
Flood Storage Areas	No Records
Spatial Flood Defences	No Records



WCX 082 Crossing Review

Watercourse name	Unnamed Watercourse 65
Crossing ID	WCX 082
Grid reference	503717, 165892
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



42 WCX 082 Crossing Review

42.1 Site Details

- 42.1.1 Crossing WCX 082 is proposed to enable a temporary haul road to cross an Ordinary Watercourse (Unnamed Watercourse 65) that runs across Fox Hills Golf Club. The watercourse links several ponds that make up part of a feature through the east side of the golf course.
- 42.1.2 The crossing sits 245m south (upstream) of Longcross Road. The nearest residential buildings to the crossing is Foxhills Mews, which sits 240m northeast (downstream) of the crossing. The closest village is Lyne, more than 700m north of the crossing.
- 42.1.3 Figure C73 defines the location of the crossing. All available flood related information can be found below.

42.2 Flood Risk

- 42.2.1 The extent of Flood Zone 2 and 3 are not defined at this watercourse. The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW indicates there to be no flooding associated with the 3.33% annual exceedance probability event (AEP) at the crossing, with the nearest flooding associated with this event approximately 160m north (downstream) of the crossing in one of the golf course ponds and to the south of Longcross Road. Flooding for the 3.3% AEP to the northeast of the crossing achieves a depth of up to 0.6m.
- 42.2.2 The 1% AEP event identifies the extent of flooding to increase downstream of the crossing. The depth of flooding associated with the 1% AEP event remains predominately 0.6m. In between Longcross Road and the crossing (200m downstream of the crossing) there is extensive flooding where the watercourse runs beneath the road. The flooding here during a 1% AEP event reaches up to 0.9m deep.
- 42.2.3 The 0.1% AEP event shows an increase in flood extent in the vicinity of the crossing, especially to the north (downstream) of the crossing and 30m to the east of the crossing, where the flood water reaches a depth of 300mm. Flood Depths associated with the 0.1% AEP event do not exceed 0.9m deep to the north (downstream) of the crossing.

42.3 Flood History

- 42.3.1 No information regarding flooding in the area of the crossing has been identified.

42.4 Features Local to the Crossing That Could Influence Flooding



- 42.4.1 The terrain of the crossing vicinity is sloped from the south to the north, towards Longcross Road. Any rainfall and resulting surface water runoff in the east part of the golf course would be directed towards the ponds and proposed crossing location. With the added flow restriction of the crossing culvert, this could cause a backup of water towards the pond during high rainfall events, resulting in increased local flooding.

42.5 Crossing Impact on Flood Risk

- 42.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to receptors in the area. Any increase in flood extents would only affect the golf course.
- 42.5.2 The likelihood of flooding is assessed as being **very low** risk given the crossing being at risk of flooding from a <0.1% AEP event.
- 42.5.3 Any increased flood extents would likely be held within the golf course and would not impact receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 42.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



42.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	Not Applicable
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No - flooding at crossing
RoFSW Extent 1% Annual Chance	No - flooding at crossing
RoFSW Extent 0.1% Annual Chance	Yes - flooding at crossing
RoFSW Depth 3.3% Annual Chance	No flooding at crossing, evidence downstream (<0.6m)
RoFSW Depth 1% Annual Chance	No flooding at crossing, evidence downstream (<0.9m)
RoFSW Depth 0.1% Annual Chance	Yes, flooding at crossing up to 600mm, increased flooding downstream (<0.9m)
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records at crossing
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 083 Crossing Review

Watercourse name	Unnamed Watercourse 66
Crossing ID	WCX 083
Grid reference	501857, 165311
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	No
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



43 WCX 083 Crossing Review

43.1 Site Details

- 43.1.1 Crossing WCX 083 (N:501857, E:165311) does not specify that a haul road would physically cross a watercourse, however the watercourse is present within the area of the Order Limits. The watercourse appears to be an isolated drainage ditch for the surrounding golf course. The watercourse is approximately 25m in length. Whilst mapping does not show any hydraulic connection with any nearby watercourses it is possible that the drainage ditch joins a watercourse flowing along the west of B386 Longcross Road.
- 43.1.2 The surrounding land is characterised by a golf course to the south and by sporadic woodland. The closest alternate land use is the B386 Longcross Road, located approximately 25m to the north and runs perpendicular to the watercourse. Soils are classed as having a slightly impeded drainage¹ which supports the evidence for the watercourse being a drainage ditch or attenuation feature.
- 43.1.3 Figure C74 defines the location of the crossing. All available flood related information can be found below.

43.2 Flood Risk

- 43.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The 3.3% annual exceedance probability (AEP) map shows that there is no flooding at the crossing or within the Order Limits in the vicinity of the crossing for this return period. The 1% annual AEP shows localised flooding of up to 1.2m, occurs sporadically forming small pools across low points in the topography however these do not define the extents of the floodplain for the watercourse and only affect the borders of the proposed Order Limits to the southeast of the crossing. This is associated with a depression around a pond within the golf course. The 0.1% AEP event shows an increase in the depth of ponding in the same location as the 1% AEP event.

43.3 Flood History

- 43.3.1 No information regarding flooding in the area of the crossing has been identified.

43.4 Features Local to the Crossing That Could Influence Flooding

- 43.4.1 The catchment to the watercourse is small and contained within the boundary of the golf course. The influences on flooding are likely to be the means by which the watercourse drains, either into the ground or whether it is culverted beneath the road. It is not possible to confirm the destination of discharge at this stage of the assessment.

43.5 Crossing Impact on Flood Risk

¹ <http://www.landis.org.uk/soilscapes/#>



- 43.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect the golf course.
- 43.5.2 The likelihood of flooding is assessed as being **very low** given the crossing not being at risk of flooding from a 0.1% AEP event.
- 43.5.3 Any increased flood extents would likely be held within the golf course and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 43.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



43.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Localised flooding contained within pockets of low-lying land outside of Order Limits
RoFSW Extent 1% Annual Chance	Localised flooding contained within pockets of low-lying land outside of Order Limits.
RoFSW Extent 0.1% Annual Chance	Localised flooding contained within pockets of low-lying land outside of Order Limits.
RoFSW Depth 3.3% Annual Chance	Depths of up to 1.2m in very isolated places. Most areas of ponding between 0.15 and 0.6m in depth.
RoFSW Depth 1% Annual Chance	Depths of up to 1.2m in very isolated places. Most areas of ponding between 0.15 and 0.6m in depth.
RoFSW Depth 0.1% Annual Chance	Depths greater than 1.2m in some places.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 087 Crossing Review

Watercourse name	Unnamed Watercourse 70
Crossing ID	WCX 087
Grid reference	503616, 165892
Pipeline section	G
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Moderate
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low

44 WCX 087 Crossing Review

44.1 Site Details

- 44.1.1 Crossing W087 is required to carry a temporary haul road over an unnamed (Ordinary) watercourse. The crossing site lies on the southern side of Chertsey, Surrey, at NGR 503616 165892. The crossed channel is referred to as 'Unnamed Watercourse 70' and flows north-northwest. It is a straight watercourse, marked as a ditch on the Ordnance Survey mapping.
- 44.1.2 Upstream of the proposed crossing the watercourse is shown (on Ordnance Survey 1:25,000 mapping) as extending upstream (south-southeast) by a further 75m.
- 44.1.3 The channel extends a further 10m downstream of the proposed crossing, to the north-northwest, after which it turns at a right angle and then it forms part of a network of ditches (partly culverted) that appear to drain to the east towards The Bourne (Main River), which lies approximately 850m to the east-northeast of the crossing.
- 44.1.4 The land use immediately downstream of the proposed crossing is scrubland, giving way to residential and commercial properties approximately 100m north of the crossing point. Upstream of the crossing point the nearest property are storage buildings associated with Pannells Farm 25m southeast of the crossing. The residential property at Pannells Farm is located downstream of this crossing.
- 44.1.5 Figure C77 defines the location of the crossing. All available flood related information can be found below.

44.2 Flood Risk

- 44.2.1 The extent of Flood Zone 2 and 3 is not defined for this watercourse. The nearest defined Flood Zone 2 or 3 is associated with the River Bourne, which is approximately 400m from the site at its closest point.
- 44.2.2 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW indicates the location of the proposed crossing is not at risk for all events up to and including the 1% annual exceedance probability (AEP) event. The 0.1% AEP event indicates a small area of isolated flooding immediately to the south of the crossing achieving a depth of 150mm.

44.3 Flood History

- 44.3.1 No information regarding flooding in the area of the crossing has been identified.

44.4 Features Local to the Crossing That Could Influence Flooding

- 44.4.1 There appears to be a culverted watercourse approximately 130m northeast which may act as a constraint on downstream flow.

44.5 Crossing Impact on Flood Risk



- 44.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is may to have an impact on flood risk to receptors in the area. Any increase in flood extents would only affect scrubland and the non-residential properties associated with Pannells Farm.
- 44.5.2 The likelihood of flooding is assessed as being **very low** risk given the crossing being at risk of flooding from a 0.1% AEP event.
- 44.5.3 Any increased flood extents would be likely to affect scrubland and non-residential properties. The severity of any increase in flood risk as a result of the proposed crossing is **moderate**.
- 44.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



44.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No records of flooding within 250m of the site, some flooding events in Chertsey 500m-1km from the crossing.
Hampshire Lead Local Flood Authority Data	Not Applicable
Flood Zone 2	Not in a defined Flood Zone (River Bourne Floodzone 2 approximately 400m to the north at its closest point)
Flood Zone 3	Not in a defined Flood Zone (River Bourne Floodzone 3 approximately 400m to the north at its closest point)
RoFSW Extent 3.3% Annual Chance	Not in an at-risk zone
RoFSW Extent 1% Annual Chance	Not in an at-risk zone
RoFSW Extent 0.1% Annual Chance	Evidence of surface water flooding south of the crossing
RoFSW Depth 3.3% Annual Chance	Not in an at-risk zone
RoFSW Depth 1% Annual Chance	Not in an at-risk zone
RoFSW Depth 0.1% Annual Chance	Evidence of surface water flooding south of the crossing reaching a depth of up to 150mm.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No records published
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 092 Crossing Review

Watercourse name	Unnamed Watercourse 75
Crossing ID	WCX 092
Grid reference	504253, 165749
Pipeline section	G
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



45 WCX 092 Crossing Review

45.1 Site Details

- 45.1.1 The crossing is over Unnamed Watercourse W092 (Ordinary Watercourse), which is located approximately 800m southeast of Chertsey Railway Station, Surrey. The intended crossing point is over a drainage ditch likely used to drain nearby agricultural land. Note that there is a network of similar sized ditches that run parallel in a northeasterly direction.
- 45.1.2 The land use at the intended crossing point comprises agricultural grassland to the west and a golf course to the east. The drainage ditch is approximately 430m in length upstream of the intended crossing point. It flows west to east before making a sharp 90 degree turn north approximately 140m upstream from the crossing point. Although the watercourse continues northward a further channel intersects at 90 degrees close to the crossing point which flows east before crossing the railway line.
- 45.1.3 The closest receptors are a cemetery located approximately 140m south of the proposed crossing location, new residential properties located on Kennett Lane approximately 200m north, and an industrial/retail/office complex located on Hanworth Lane, approximately 300m northwest of the proposed crossing point. At its closest point the railway line is 200m northeast of the crossing point, however it is on embankment in this area and so unlikely to be vulnerable to flooding.
- 45.1.4 Figure C78 defines the location of the crossing. All available flood related information can be found below.

45.2 Flood Risk

- 45.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The 3.3% and 1% annual exceedance probability (AEP) extents predict that surface water flooding is sporadic throughout the area. In general flooding appears to be contained close to the banks of the watercourse, however ponding does occur to the north of the crossing location with a large expanse of shallow flooding predicted within the agricultural field to the north as well as isolated pockets at the new residential properties and the industrial complex. Despite the close proximity to The Bourne, the crossing point is not located in either FZ3 or FZ2.

45.3 Flood History

- 45.3.1 No information regarding flooding in the area of the crossing has been identified. However, there are numerous cases of highway flooding in the wider area surrounding the crossing (A320, Green Lane, Guildford Road and close to the railway) as well as internal property flooding.

45.4 Features Local to the Crossing That Could Influence Flooding



- 45.4.1 The number of watercourses or drainage features in close proximity to each other has the potential for widespread flooding should they be affected by a flood event however specific connectivity of the watercourses are unknown. Furthermore, sharp turns in the watercourse may increase the risk of flooding during extreme rainfall events.

45.5 Crossing Impact on Flood Risk

- 45.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area.
- 45.5.2 The likelihood of flooding is assessed as **medium** given the crossing being at risk of flooding from a 3.3% AEP event.
- 45.5.3 Any increased flood extents would likely be held within the wooded area to the east of the crossing point and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 45.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



45.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Numerous cases of highway flooding and internal flooding in the wider area.
Hampshire Lead Local Flood Authority Data	N/A
Flood Zone 2	Crossing outside of Flood Zone
Flood Zone 3	Crossing outside of Flood Zone
RoFSW Extent 3.3% Annual Chance	Flooding typically confined to the drainage ditch. Small areas of isolated ponding in the agricultural fields to the north.
RoFSW Extent 1% Annual Chance	Flooding mostly confined to the drainage ditch however some out of bank flooding around proposed crossing point. Areas of isolated ponding out of bank in the agricultural fields, housing development and industrial complex to the north.
RoFSW Extent 0.1% Annual Chance	Widespread and continuous out of bank flooding to the west of the drainage ditch. Large expanses of ponding throughout the area.
RoFSW Depth 3.3% Annual Chance	Depths of up to 0.6-0.9m in some places within the drainage ditch close to crossing location. Out of bank ponding depths of 0.15-0.30m
RoFSW Depth 1% Annual Chance	Depths of up to 0.6-0.9m in most places within the drainage ditch close to crossing location. Out of bank ponding depths generally of 0.15-0.30m
RoFSW Depth 0.1% Annual Chance	Depths of 0.6-0.9m in most places within the drainage ditch close to crossing location. Out of bank ponding depths up to 0.6m.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	Pockets of flooding within 200m to the north.
Surrey Heath BC – Flood Zone – 3a	No Records
Surrey Heath BC – Flood Zone – 3b	No Records
Rushmoor BC – Flood Zone – 3a	N/A
Rushmoor BC – Flood Zone – 3b	N/A
Areas benefitting from Flood Defences	No Records
Flood Storage Areas	No Records
Spatial Flood Defences	No Records



WCX 092a Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	WCX 092a
Grid reference	504210, 165599
Pipeline section	G
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

46 WCX 092a Crossing Review

46.1 Site Details

- 46.1.1 Crossing WCX 092a is over Unnamed Watercourse W092 (Ordinary Watercourse), which is located approximately 900m southeast of Chertsey Railway Station, Surrey. The crossing point is over a drainage ditch likely used to drain nearby agricultural land. Note that there is a network of similar sized ditches that form an approximate grid around the small hedged fields to the north and west of the crossing point.
- 46.1.2 The crossing point is at the intersection of four land use types. To the northwest the land is characterised by small hedged fields, to the southwest open agricultural land, to the southeast a cemetery and to the northeast a golf course.
- 46.1.3 According to the Ordnance Survey 25k mapping the drainage ditch is approximately 275m in length upstream of the crossing point and flows from west to east. At the crossing point, the watercourse makes a sharp 90 degree turn north to form the eastern side of the drainage network. Although the watercourse continues northward a further channel intersects at 90 degrees approximately 140m north of the crossing point which flows east before crossing the railway line.
- 46.1.4 Besides the cemetery, the closest alternate land uses are a new residential development on Kennett Lane approximately 350m to the north of the crossing point and an industrial/retail/office complex located on Hanworth Lane approximately 380m northwest of the intended crossing point.
- 46.1.5 Figure C79 defines the location of the crossing. All available flood related information can be found below.

46.2 Flood Risk

- 46.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The 1% annual exceedance probability (AEP) identifies that surface water flooding is sporadic throughout the area but does not affect the crossing location during the 1% annual exceedance event. However, isolated areas of ponding do occur to the north of the crossing, including in the new residential development and the industrial complex. Despite the close proximity to The Bourne, the crossing point is not located in either Flood Zones 2 or 3.

46.3 Flood History

- 46.3.1 No information regarding flooding in the area of the crossing has been identified. However, there are numerous cases of highway flooding in the wider area surrounding the crossing (A320, Green Lane, Guildford Road and close to the railway) as well as internal flooding.

46.4 Features Local to the Crossing That Could Influence Flooding



- 46.4.1 The number of watercourses or drainage features in close proximity to each other has the potential for widespread flooding should they be affected by a flood event; however, specific connectivity of the watercourses is unknown. Furthermore, sharp turns in the watercourse may increase the risk of flooding during extreme rainfall events.

46.5 Crossing Impact on Flood Risk

- 46.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area.
- 46.5.2 The likelihood of flooding is assessed as being **very low** given the threshold for flooding of the crossing is the 0.1% AEP event.
- 46.5.3 The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 46.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



46.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Numerous cases of highway flooding and internal flooding in the wider area.
Hampshire Lead Local Flood Authority Data	Not applicable.
Flood Zone 2	Crossing outside of Flood Zone
Flood Zone 3	Crossing outside of Flood Zone
RoFSW Extent 3.3% Annual Chance	No flooding at watercourse, small pockets of flooding in agricultural land to the north.
RoFSW Extent 1% Annual Chance	No flooding at watercourse; pockets of flooding in land to the north including at receptors.
RoFSW Extent 0.1% Annual Chance	No flooding at crossing point. However sporadic flooding in vicinity of Order Limits.
RoFSW Depth 3.3% Annual Chance	Watercourse not at risk of flooding.
RoFSW Depth 1% Annual Chance	Watercourse not at risk of flooding. Pockets of flooding to the north up to 0.3m deep.
RoFSW Depth 0.1% Annual Chance	Crossing point is not at risk of flooding. However, depths of up to 0.3m out of bank are present along the watercourse immediately downstream of the crossing point.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	Pockets of flooding approximately 300m to both north and south of the crossing point.
Surrey Heath BC – Flood Zone – 3a	No Records
Surrey Heath BC – Flood Zone – 3b	No Records
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	No Records
Flood Storage Areas	No Records
Spatial Flood Defences	No Records



WCX 093 Crossing Review

Watercourse name	Unnamed Watercourse 76
Crossing ID	WCX 093
Grid reference	504406, 165731
Pipeline section	G
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



47 WCX 093 Crossing Review

47.1 Site details

- 47.1.1 Crossing WCX 093 is over the Unnamed Watercourse 76. It is located approximately 1.5km northwest of Addlestone Railway Station. Watercourse 76 has a catchment area of approximately 1.04km² to the crossing point. The crossing is located at the Abbey Moor Golf Course approximately 100m southwest of the railway and 400m northwest of the A320.
- 47.1.2 Figure C80 defines the location of the crossing. All available flood related information can be found below.

47.2 Flood Risk

- 47.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The 3.3% and 1% Annual Exceedance Probability (AEP) events predict areas of flooding within the golf course, with a maximum depth of less than 600mm. However, there is no flooding predicted at the crossing location from these events.

47.3 Flood History

- 47.3.1 Flooding has been reported: south of the crossing - on the A320, east of the crossing – at the junction of the A320 and A317, and north of the crossing – on Wheatash Road, in the residential area.

47.4 Features Local to the Crossing That Could Influence Flooding

- 47.4.1 The culvert crossing the rail track located approximately 250m downstream of crossing W093 could influence flood risk by backing up surface water during extreme events, as indicated in the RoFSW.

47.5 Crossing Impact on Flood Risk

- 47.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect arable land.
- 47.5.2 The likelihood of flooding is assessed as being **very low** given the crossing is not at risk during the 1% AEP event.
- 47.5.3 Any increased flood extents would likely be held areas of arable land and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 47.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors



47.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Flooding has been reported: south of the crossing - on the A320, east of the crossing – at the intersect A320/A318, and north of the crossing at the residential area.
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No – flood extent confined to the watercourse channel immediately downstream of the proposed crossing.
RoFSW Extent 1% Annual Chance	No – flood extent confined to the watercourse channel immediately downstream of the proposed crossing.
RoFSW Extent 0.1% Annual Chance	Yes – flood extent at the crossing, continuous, mostly confined to golf course and open recreational land backing up from the culvert beneath the railway line.
RoFSW Depth 3.3% Annual Chance	No – discontinuous flooding along the watercourse downstream of the crossing. Depths up to 600mm downstream of the crossing location.
RoFSW Depth 1% Annual Chance	No – discontinuous flooding along the watercourse downstream of the crossing. Depths up to 600mm downstream of the crossing location.
RoFSW Depth 0.1% Annual Chance	Yes – flood extent in vicinity of crossing, continuous, confined to golf course and open recreational land. Depths less than 600mm at crossing location and up to 900mm downstream of the crossing.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 094 Crossing Review

Watercourse name	Unnamed Watercourse 82
Crossing ID	WCX 094
Grid reference	50418.55, 165654.88
Pipeline section	G
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



48 WCX 094 Crossing Review

48.1 Site Details

- 48.1.1 Crossing WCX 094 facilitates a temporary haul road crossing of an Ordinary Watercourse (Unnamed Watercourse 82) located in Abbey Moor Golf Course. This watercourse is one of four that drain the golf course. The drainage channel network is a tributary of The Bourne river, their confluence is approximately 935m northeast of the crossing.
- 48.1.2 The crossing is approximately 270m northwest of the A320. Addlestone Cemetery lies 180m southwest of the crossing. 100m northeast of the crossing is the railway line that runs from Chertsey to Addlestone Station.
- 48.1.3 The nearest residential development is South Chertsey, 130m northeast (downstream) of the crossing on the north side of the railway line.
- 48.1.4 The land use surrounding the crossing is predominantly the golf course. There is a pond upstream of the crossing location; a feature of the golf course.
- 48.1.5 Figure C91 defines the location of the crossing. All available flood related information can be found below.

48.2 Flood Risk

- 48.2.1 The extent of Flood Zones 2 and 3 are not defined for this watercourse. The closest Flood Zone 2 area is over 430m northeast of the crossing. The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW indicates there to be no flooding associated with the 3.33% annual exceedance probability event (AEP) at the crossing, with the nearest flooding associated with this event approximately 60m northeast (downstream) of the crossing. Flooding for the 3.33% AEP to the northeast of the crossing is predicted to achieve a depth of up to 600mm.
- 48.2.2 The 1% AEP event predicts flooding downstream of the crossing, along the drainage channel that the watercourse drains into, and at the pond upstream of the crossing. The depth of flooding associated with the 1% AEP event is up to 600mm. No flood extents are identified at the watercourse crossing.
- 48.2.3 The 0.1% AEP event predicts a substantial increase in flood extent at the crossing compared to the more frequent events. Flood Depths associated with the 0.1% AEP event remain largely at 600mm at the crossing point and across the golf course. Downstream of the crossing flood depths of up to 1.2m are identified in the drainage channel.

48.3 Flood History

- 48.3.1 No information regarding flooding in the area of the crossing has been identified.

48.4 Features Local to the Crossing That Could Influence Flooding



48.4.1 There are no features local to the crossing that could influence flooding. The pond upstream of the crossing has the capacity to collect and hold back water from the runoff of the golf course.

48.5 Crossing Impact on Flood Risk

48.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect the golf course.

48.5.2 The likelihood of flooding is assessed as being **very low** given the crossing is only predicted to be at risk of flooding from a 0.1% AEP event.

48.5.3 Any increased flood extents would likely be held within golf course and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.

48.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



48.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Not Applicable
Hampshire Lead Local Flood Authority Data	No Records
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No flooding at crossing, evidence downstream.
RoFSW Extent 1% Annual Chance	No flooding at crossing, evidence upstream and downstream
RoFSW Extent 0.1% Annual Chance	Yes - showing surface water flooding extent 0.1% annual chance at the crossing.
RoFSW Depth 3.3% Annual Chance	No flooding at crossing, downstream flooding up to 600mm deep.
RoFSW Depth 1% Annual Chance	No flooding at crossing, upstream and downstream flooding up to 600mm deep.
RoFSW Depth 0.1% Annual Chance	Yes - showing surface water flooding depth 0.1% annual chance at the crossing. Depth of up to 600mm at crossing and up to 1.2m downstream.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 098 Crossing Review

Watercourse name	Unnamed Watercourse 78
Crossing ID	WCX 098
Grid reference	505829, 167865
Pipeline section	H
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



49 WCX 098 Crossing Review

49.1 Site Details

- 49.1.1 Crossing WCX 098 traverses an Ordinary Watercourse (Unnamed Watercourse 78) which runs from a flooded gravel pit between Thames Side (road) and Littleton Lane, to another gravel pit to the east, east of Littleton Lane.
- 49.1.2 The crossing sits approximately 700m north of the M3. The watercourse originates at the northern edge of the western gravel pit, most likely as an overflow channel and flows eastwards to the north of gravel extraction works and beneath Littleton Lane and into the lake to the east of Littleton Lane. The land to the north of the watercourse consists of agricultural land and to the south gravel extraction works. Littleton Lane is 420m east (downstream) of the crossing.
- 49.1.3 The nearest residential development to the crossing is Shepperton Green, 540m east of the crossing and Laleham Farm 510m north of the crossing on Shepperton Green Road. There are several office hubs 200m south of the crossing location, including Aaron Skip Hire's office and DB Cases, as well as Breedon Shepperton Concrete Plant.
- 49.1.4 Figure C85 defines the location of the crossing. All available flood related information can be found below.

49.2 Flood Risk

- 49.2.1 The extent of Flood Zones 2 and 3 are defined for this watercourse, the crossing is within Flood Zone 3. The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW indicates there to be a little flooding associated with the 3.33% annual exceedance probability event (AEP) at the crossing, with flooding within a separate drainage channel immediately to the northeast of the crossing predicted to reach a depth of up to 0.9m.
- 49.2.2 Flooding is predicted from the 1% AEP event from the watercourse to the northeast, however no risk is identified associated at the crossing location. The depth of flooding associated with the 1% AEP event remains predominately 0.9m.
- 49.2.3 The 0.1% AEP event indicates an increase in flood extent in the vicinity of the crossing compared to the 1% event, however it appears to remain in the channel of the other watercourse. Flood Depths associated with the 0.1% AEP event reach over 1.2m at the crossing.
- 49.2.4 The crossing is in an area at risk of flooding from a reservoir breach, primarily associated with the Queen Mary Reservoir 1.45km to the northeast. The depth of flooding is predicted to be up to 2m with peak velocities between 0.5 and 2.0m/s.

49.3 Flood History

- 49.3.1 There two flood extent records that encompass the crossing both associated with the River Thames in Spring 1947 and Autumn 1968.



49.4 Features Local to the Crossing That Could Influence Flooding

49.4.1 The features local to the crossing that could influence flooding are culverts beneath tracks in the vicinity of the crossing. It is likely that the watercourse is culverted beneath the track that runs north-south downstream of the crossing.

49.5 Crossing Impact on Flood Risk

49.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect agricultural land.

49.5.2 The likelihood of flooding is assessed as being **medium** given the crossing being at risk of flooding from a 3.3% AEP event.

49.5.3 Any increased flood extents would likely be held within agricultural land upstream of the crossing point and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.

49.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk to receptors.



49.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Historic flood incident on Littleton Lane, 450m east of the crossing.
Hampshire Lead Local Flood Authority Data	Not Applicable
Flood Zone 2	Yes
Flood Zone 3	Yes
RoFSW Extent 3.3% Annual Chance	Yes - showing surface water flooding extent 3.3% annual chance at the crossing within the watercourse channel to the northeast.
RoFSW Extent 1% Annual Chance	Yes - showing little surface water flooding extent 1% annual chance at the crossing within the watercourse channel to the northeast.
RoFSW Extent 0.1% Annual Chance	Yes - showing little surface water flooding extent 0.1% annual chance at the crossing within the watercourse channel to the northeast.
RoFSW Depth 3.3% Annual Chance	Yes - showing surface water flooding depth 3.3% annual chance at the crossing. Depth <0.9m at crossing within the channel to the northeast.
RoFSW Depth 1% Annual Chance	Yes - showing surface water flooding depth 1% annual chance at the crossing. Depth <0.9m at crossing within the channel to the northeast.
RoFSW Depth 0.1% Annual Chance	Yes - showing surface water flooding depth 0.1% annual chance at the crossing. Depth >1.2 at crossing within the channel to the northeast.
Risk of Flooding from Reservoirs - Maximum Flood Depth	Yes – depth of between 0.3 and 2m
Risk of Flooding from Reservoirs - Maximum Flood Extent	Yes
Risk of Flooding from Reservoirs - Maximum Flood Speed	Yes – speeds of between 0.5 and 2m/s
Recorded Flood Outlines	Yes – in Spring 1947 and 1968 the River Thames exceeded channel capacity.
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 108 Crossing Review

Watercourse name	Unnamed Watercourse 83
Crossing ID	WCX 108
Grid reference	504657, 165629
Pipeline section	G
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

50 WCX 108 Crossing Review

50.1 Site Details

- 50.1.1 Crossing WCX 108 is over the Unnamed Watercourse 83. It is located approximately 1.2km northwest of Addlestone Railway Station. Unnamed Watercourse 83 has a catchment area of approximately 0.62km² at the crossing point. The crossing is located at the Abbey Moor Golf Course and close to important infrastructure assets, such as the railway line (approximately 40m northeast), and the A317 (approximately 170m southeast).
- 50.1.2 Figure C92 defines the location of the crossing. All available flood related information is included below.

50.2 Flood Risk

- 50.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The 3.3% annual exceedance probability (AEP) on the RoFSW map predicts that there would be no flooding during a 3.3% AEP event. The RoFSW mapping predicts areas of flooding at the crossing and within the golf course - achieving a maximum depth of up to 600mm for the 1% AEP event.

50.3 Flood History

- 50.3.1 Flooding has been reported: south of the crossing - on the A317, east of the crossing – at the intersection A317/A318, and north of the crossing – on Wheatash Road, within a residential area.

50.4 Features Local to the Crossing That Could Influence Flooding

- 50.4.1 There is a small pond upstream of the crossing (about 100m southwest), which is the source of flow for this watercourse. Also, the culvert beneath the railway line located approximately 40m downstream of the crossing could influence flooding, backing up the watercourse during extreme events, as indicated in the RoFSW.

50.5 Crossing Impact on Flood Risk

- 50.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect the golf course.
- 50.5.2 The likelihood of flooding is assessed as being **very low** given the crossing being at risk of flooding from a 1% AEP event.
- 50.5.3 Any increased flood extents would likely be held within the golf course and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 50.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



50.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	Flooding has been reported: south of the crossing - on the A317, east of the crossing – at the intersection of the A317 and A318, and north of the crossing – on Wheatash Road, within the residential area.
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Not defined
RoFSW Extent 1% Annual Chance	Yes - flood extent in vicinity of crossing, confined to the golf course.
RoFSW Extent 0.1% Annual Chance	Yes - flood extent in vicinity of crossing, confined to the golf course. The residential area located north of the crossing (downstream) is also affected.
RoFSW Depth 3.3% Annual Chance	Not defined
RoFSW Depth 1% Annual Chance	Yes - flood extent in vicinity of crossing, confined to the golf course. Depths less than 600mm at crossing location.
RoFSW Depth 0.1% Annual Chance	Yes - flood extent in vicinity of crossing, mostly confined to the golf course. The residential area located north of the crossing (downstream) is affected. Depths less than 900mm at crossing location.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 111 Crossing Review

Watercourse name	Unnamed Watercourse 87
Crossing ID	WCX 111
Grid reference	477014, 144153
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Medium
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Low
Risk of proposed crossing increasing flood risk with mitigation	Low



51 WCX 111 Crossing Review

51.1 Site details

- 51.1.1 Crossing WCX 111 is a small watercourse and tributary of the River Wey. The watercourse rises within Silvester's Farm, Lower Froyle and flows eastwards for approximately 525m through an agricultural drainage ditch before discharging in to a small lake or online reservoir. This eventually discharges into the River Wey. The intended crossing point is located at the discharge point of the watercourse into the lake.
- 51.1.2 The surrounding land is predominantly arable land, with woodland surrounding the lake/reservoir. Upstream, the closest alternate land use and potentially vulnerable receptors are the properties on Hussey's Lane approximately 430m upstream of the crossing. Downstream the closest vulnerable receptors are the properties on Coldrey Farm located 330m to the south.
- 51.1.3 Figure C93 defines the location of the crossing. All available flood related information can be found below.

51.2 Flood Risk

- 51.2.1 The fluvial floodplain for the watercourse is defined by the extent of Flood Zone 3 (1% or greater) Annual Exceedance Probability (AEP) and Flood Zone 2 (0.1% to 1% AEP). The crossing sits within Flood Zone which spans a width of approximately 60m. The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW map suggests the crossing is also at risk from surface water flooding with large expanses of ponding within the Order Limits present during the 3.3% AEP with depths of up to 0.6m. The 1% AEP event shows an almost continuous flow path up to 1.2m in depth. Such depths may be possible, however these are likely to be misrepresented in the mapping due to the dense vegetation in the area of the crossing and the close proximity to the lake/reservoir.
- 51.2.2 The crossing may also be at risk from groundwater as indicated by the Areas Susceptible to Groundwater Flood Map which suggests a potential for groundwater flooding at the surface (figure 603).

51.3 Flood History

- 51.3.1 No information regarding historic flooding in the vicinity of the crossing has been identified.



51.4 Features Local to the Crossing That Could Influence Flooding

- 51.4.1 Downstream, the proximity of the crossing to the lake/reservoir may increase flood risk if water levels back up to the crossing point. This may result in backing-up of water on the upstream side of the crossing as flow is restricted and unable to pass through. Downstream aerial imagery suggests the presence of an existing crossing and culvert which may also restrict the flow in the area.

51.5 Crossing Impact on Flood Risk

- 51.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to receptors in the area.
- 51.5.2 The likelihood of flooding is assessed as being **medium** given the crossing is within an area at risk of flooding from a 3.3% AEP event and being located in Flood Zone 3.
- 51.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 51.5.4 Therefore, this crossing is identified to be have a **low** risk of increasing flood risk in the area to receptors.



51.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	None defined
Flood Zone 2	Floodplain of watercourse defined by FZ2
Flood Zone 3	Floodplain of watercourse defined by FZ3
RoFSW Extent 3.3% Annual Chance	Localised ponding around watercourse and lake downstream. Likely to impact crossing
RoFSW Extent 1% Annual Chance	Considerable ponding indicating a potential flood route. Impacts crossing
RoFSW Extent 0.1% Annual Chance	Continuous flow route. Impacts crossing
RoFSW Depth 3.3% Annual Chance	Depths of up to 0.6m around haul road and crossing location (due to proximity to lake)
RoFSW Depth 1% Annual Chance	Depths of up to 1.2m around haul road and crossing (due to proximity to lake)
RoFSW Depth 0.1% Annual Chance	Depths greater than 1.2m around haul road and crossing (due to proximity to lake) and depths up to 0.3m along flow route.
Risk of Flooding from Reservoirs - Maximum Flood Depth	Not at risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	Not at risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	Not at risk
Recorded Flood Outlines	None defined
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 113 Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	WCX 113
Grid reference	505790,167910
Pipeline section	H
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low



52 WCX 113 Crossing Review

52.1 Site details

- 52.1.1 Crossing WCX 113 is over an unnamed watercourse (Ordinary Watercourse), which is located south of Shepperton Road, approximately 1km southeast of Laleham, Surrey and 1.3km southwest of the Queen Mary Reservoir.
- 52.1.2 The intended crossing point is over an agricultural drainage ditch which is positioned north-south and extends approximately 500m. Information from the FEH Webservice² is unclear, however the watercourse likely drains into one of the nearby gravel pits and then the River Thames which lies to the west and south of the area. The drainage ditch sits within a large, flat expanse of agricultural land and the Order Limits run generally north-south alongside the watercourse with the proposed crossing point at the southern (assumed to be downstream) end of the ditch.
- 52.1.3 There are no sensitive receptors within the immediate vicinity of the crossing. The closest residential receptors being Laleham Abbey approximately 500m to the west and Shepperton Green approximately 500m to the east. There is also an industrial area (skip hire, concrete works) adjacent to the gravel pits approximately 300m to the south.
- 52.1.4 Note that the crossing location sits between the River Thames to the west and River Ash to the northeast, located approximately 720m and 1km away respectively.
- 52.1.5 Figure C95 defines the location of the crossing. All available flood related information can be found below.

52.2 Flood Risk

- 52.2.1 The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The 1% annual exceedance probability (AEP) floodplain for the watercourse is defined by the RoFSW map. This identifies that surface water is contained within the drainage ditch during the 1% AEP event. This is also the case for the 0.1% event.
- 52.2.2 The crossing point is at risk from fluvial flooding, emanating from the River Thames and likely the River Ash. It is not possible to distinguish between the fluvial floodplains for the Thames or Ash, defined by Flood Zone 2 and Flood Zone 3, which completely inundate an area spanning over 3.5km in width. It is noted that a considerable portion of this section of the pipeline lies within Flood Zone 3 associated with the River Thames.

² <https://fehweb.ceh.ac.uk/>



52.3 Flood History

52.3.1 There is a clear history of flooding within the area characterised by a number of highway flood enquiries along Littleton Lane (approximately 370m east from the crossing location) and Laleham Road (approximately 760m east from the crossing location) which may have been impacted by the River Ash. Along Thames Side and Chertsey Bridge Road (located approximately 600m west and 1km south respectively from the proposed crossing location) there are recorded incidents of internal property flooding. The nature of the land use at the crossing location means that records are not available for the area, however a history of flooding to both the east and west suggests a probability that the crossing location may be impacted by fluvial flooding.

52.4 Features Local to the Crossing That Could Influence Flooding

52.4.1 Given the nature of the land use there are very few features upstream of the crossing that may influence flooding at the crossing location. The ability to convey water downstream however would depend on the ability of the lakes to receive water from the drainage ditch. Ultimately flood risk in the area would arise from the River Thames and River Ash.

52.5 Crossing Impact on Flood Risk

52.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area.

52.5.2 The likelihood of flooding is assessed as being **very low** given the crossing being at risk of flooding from a 0.1% AEP event.

52.5.3 Any increased flood extents would likely be held within the agricultural area either side of the channel that is crossed and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.

52.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



52.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	External property flooding present Internal property flooding present Highway flooding present on Littleton Lane, Laleham Road, Thames Side and Chertsey Bridge Road.
Hampshire Lead Local Flood Authority Data	N/A
Flood Zone 2	FZ2 for River Thames and River Ash inundates surrounding area.
Flood Zone 3	FZ3 for River Thames and River Ash inundates surrounding area.
RoFSW Extent 3.3% Annual Chance	No risk of flooding during 3.3% event.
RoFSW Extent 1% Annual Chance	No risk of flooding during 1% event. Water contained within drainage ditch
RoFSW Extent 0.1% Annual Chance	No risk of flooding during 0.1% event. Water contained within drainage ditch
RoFSW Depth 3.3% Annual Chance	No risk of flooding during 3.3% event.
RoFSW Depth 1% Annual Chance	No risk of flooding during 1% event. Water contained within drainage ditch
RoFSW Depth 0.1% Annual Chance	No risk of flooding during 0.1% event. Water contained within drainage ditch
Risk of Flooding from Reservoirs - Maximum Flood Depth	At risk of flooding, depth unknown
Risk of Flooding from Reservoirs - Maximum Flood Extent	Flood extent inundates crossing location, extends approximately 3.5km from Queen Mary Reservoir
Risk of Flooding from Reservoirs - Maximum Flood Speed	At risk of flooding, speed unknown
Recorded Flood Outlines	Within a recorded flood outline.
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined in vicinity of crossing
Flood Storage Areas	None defined in vicinity of crossing
Spatial Flood Defences	Flood defences present along River Thames and River Ash.



WCX 114 Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	WCX 114
Grid reference	473290, 137592
Pipeline section	C
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

53 WCX 114 Crossing Review

53.1 Site Details

- 53.1.1 Crossing WCX114 is over an unnamed watercourse (Ordinary Watercourse), which is located approximately 2.3km southeast of the centre of Alton, Hampshire.
- 53.1.2 The crossing point is located on agricultural land approximately 180m east of Hamble Pits Copse and 250m southwest of Water Lane. The 25k Ordnance Survey (OS) mapping suggests the watercourse may be an isolated agricultural drainage ditch; furthermore, the watercourse does not appear on the historic 1937 OS map. However, aerial imagery shows the watercourse may flow into a tributary of the Caker Stream.
- 53.1.3 There are no vulnerable receptors within a 600m radius of the proposed crossing. The closest alternate land use is Water Lane, located 250m northeast. Historic naming suggests regular flooding of this unmade road, which is confirmed by the Risk of Flooding from Surface Water map (RoFSW). There are a number of watercourses in the area that may contribute to flooding downstream.
- 53.1.4 Figure C96 defines the location of the crossing. All available flood related information can be found below.

53.2 Flood Risk

- 53.2.1 The fluvial floodplain for the watercourse can be inferred by the RoFSW as there are no areas of Flood Zone 2 or 3 associated with the watercourse at this location. The 1% annual exceedance probability (AEP) floodplain for the watercourse is defined by the RoFSW map. This identifies that flooding is not predicted at the watercourse crossing during the 1% event. Flooding up to 0.3m in depth is predicted in the adjacent watercourse into which this watercourse is thought to drain.
- 53.2.2 The Areas Susceptible to Groundwater Flooding map (Figure 603) suggests the crossing is also at risk of groundwater flooding with potential flooding close to the surface.

53.3 Flood History

- 53.3.1 No information regarding historical flooding in the area of the crossing has been identified.

53.4 Features Local to the Crossing That Could Influence Flooding

- 53.4.1 The immediate area around the proposed crossing location, as defined by the Order Limits, is within open field and lacks features which could influence flooding. However, approximately 100m downstream (north) of the proposed watercourse crossing, aerial photography suggests an existing crossing may be present to enable farm access. It is not clear whether the watercourse is culverted at this point.



53.5 Crossing Impact on Flood Risk

- 53.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect agricultural land.
- 53.5.2 The likelihood of flooding is assessed as being **very low** given the crossing being at risk of flooding from a 1% AEP event.
- 53.5.3 Any increase in flooding would likely be held within agricultural land and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 53.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.



53.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	N/A
Hampshire Lead Local Flood Authority Data	No records present
Flood Zone 2	N/A
Flood Zone 3	N/A
RoFSW Extent 3.3% Annual Chance	Not at risk during the 3.3% Annual Probability event
RoFSW Extent 1% Annual Chance	Not at risk during the 1% Annual Probability event. However, surface water flooding predicted on unnamed watercourse running parallel, approximately 70m east.
RoFSW Extent 0.1% Annual Chance	Not at risk during the 0.1% Annual Probability event. However continuous surface water flooding predicted on unnamed watercourse running parallel, approximately 70m east.
RoFSW Depth 3.3% Annual Chance	Not at risk during the 3.3% Annual Probability event
RoFSW Depth 1% Annual Chance	Not at risk during the 1% Annual Probability event. However, surface water flooding predicted approximately 150m downstream of the watercourse at the confluence with the adjacent watercourse. Depths of up to 0.3m out of bank.
RoFSW Depth 0.1% Annual Chance	Not at risk during the 0.1% Annual Probability event. However, surface water flooding predicted approximately 150m downstream of the watercourse at the confluence with the adjacent watercourse. Depths of up to 0.3m out of bank.
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 115 Crossing Review

Watercourse name	Unnamed Watercourse
Crossing ID	WCX 115
Grid reference	500256, 165274
Pipeline section	F
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

54 WCX 115 Crossing Review

54.1 Site Details

- 54.1.1 Crossing WCX 115 would facilitate a Haul Road to cross an Ordinary Watercourse (unnamed) situated at the northwest corner of Foxhills Golf Club & Resort. The watercourse is a 108m long drainage channel that runs from south to north parallel to a sparse woodland area in the golf course.
- 54.1.2 The watercourse rises 255m south of Longcross Road and runs north towards the road. The crossing location is approximately 160m south of Longcross Road and approximately 300m east of Accommodation Road. The closest residential property is Longcross Lodge, approximately 160m northeast of the crossing. The crossing is situated in a grassed area and is 43m east of a gravel path which allows golfers to move around the course.
- 54.1.3 Figure C97 defines the crossing location. All available flood related information can be found below.

54.2 Flood Risk

- 54.2.1 The extent of Flood Zones 2 and 3 are not defined at this watercourse. The closest Flood Zone to the watercourse is over 1km away. The fluvial floodplain for the watercourse can be inferred by the Risk of Flooding from Surface Water Map (RoFSW). The RoFSW indicates there to be very little flooding associated with the 3.33% annual exceedance probability event (AEP) at the crossing, with a predicted flood depth of between 150mm and 300mm. To the west of the crossing flooding is predicted for this event of a depth of up to 900mm.
- 54.2.2 The 1% AEP event identifies the extent of flooding to increase at the crossing location, but the depth at the crossing remains between 150mm and 300mm. To the west of the crossing the depth of flooding associated with the 1% AEP event is identified as reaching up to 1.2m.
- 54.2.3 The 0.1% AEP event predicts a considerable increase in flood extent at the crossing and east of the crossing. At the crossing location the flood water is predicted to reach a depth of up to 900mm and east of W079; over 1.2m. In all events this flooding is isolated ponding of surface water at a low point in the topography and not part of a wider surface water flow path associated with the watercourse.

54.3 Flood History

- 54.3.1 No information regarding flooding in the area of the crossing has been identified.

54.4 Features Local to the Crossing That Could Influence Flooding

- 54.4.1 There are no features local to the crossing that could influence flooding.

54.5 Crossing Impact on Flood Risk



- 54.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk to vulnerable receptors in the area. Any increase in flood extents would only affect the golf course.
- 54.5.2 The likelihood of flooding is assessed as being **very low** given the crossing being at risk of flooding from a 1% AEP event.
- 54.5.3 Any increased flood extents would likely be retained within the golf course and would not impact vulnerable receptors. The severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 54.5.4 Therefore, this crossing is identified to have a **very low** risk of increasing flood risk to receptors.



54.6 Data Sources

Data Source	Details at this Crossing?
Aerial imagery	Yes
Surrey Lead Local Flood Authority Data	No
Hampshire Lead Local Flood Authority Data	Not Applicable
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	Minimal flooding at crossing, flooding east of crossing.
RoFSW Extent 1% Annual Chance	Minimal flooding at crossing, flooding east of crossing.
RoFSW Extent 0.1% Annual Chance	Minimal flooding at crossing, flooding east of crossing.
RoFSW Depth 3.3% Annual Chance	Flooding at of the crossing (<300mm deep) and east of the crossing (<900mm deep)
RoFSW Depth 1% Annual Chance	Flooding at crossing (<300mm deep) and flooding east of the crossing (<1.2m deep)
RoFSW Depth 0.1% Annual Chance	Flooding at crossing (<900mm deep) and flooding east of the crossing (>1.2m deep)
Risk of Flooding from Reservoirs - Maximum Flood Depth	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No Risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No Risk
Recorded Flood Outlines	No Records at crossing
Surrey Heath BC – Flood Zone – 3a	Not Applicable
Surrey Heath BC – Flood Zone – 3b	Not Applicable
Rushmoor BC – Flood Zone – 3a	Not Applicable
Rushmoor BC – Flood Zone – 3b	Not Applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



WCX 030 Crossing Review

Watercourse name	Unnamed Watercourse 23
Crossing ID	WCX 030
Grid reference	480617, 149674
Pipeline section	D
Type	Ordinary Watercourse
Watercourse crossed by haul road?	Yes
Proposed crossing type	Open
Likelihood of flooding at crossing	Very low
Potential severity of impact on receptors without mitigation	Very low
Risk of proposed crossing increasing flood risk without mitigation	Very low
Risk of proposed crossing increasing flood risk with mitigation	Very low

55 WCX 030 Crossing Review

55.1 Site Details

- 55.1.1 Crossing WCX 030 is required to convey a haul road over Unnamed Watercourse 23 (an Ordinary Watercourse), which flows east to west through Ewshot Wood. The crossing point is located on the western edge of Ewshot Wood.
- 55.1.2 The A287 is the largest road in the vicinity, located approximately 250m northeast (upstream) of the crossing.
- 55.1.3 The vicinity of the crossing comprises primarily agricultural land. Residential properties are located approximately 100m northwest (downstream), 130m southwest (downstream) and 200m southeast (upstream) of the crossing.
- 55.1.4 Figure C27 identifies the location of the crossing. Pertinent flood risk information is included below.

55.2 Flood Risk

- 55.2.1 The fluvial floodplain can be inferred from the extent of flooding defined by the Risk of Flooding from Surface Water (RoFSW) map. The crossing point is not predicted to flood during the 3.33% or 1% Annual Exceedance Probability (AEP) events. However it is during the 0.1% AEP event which identifies a clear flow path along the watercourse with flood depths of up to 300mm within the proximity of the crossing.

55.3 Flood History

- 55.3.1 No historic information regarding flooding in the area of the crossing has been identified.

55.4 Features Local to the Crossing That Could Influence Flooding

- 55.4.1 The estimated catchment area is less than 0.5km² formed by the A287, draining Ewshot Wood, and receiving water from a small pond, approximately 180m upstream of the crossing. There appear to be two culverted sections between the pond and the crossing. The crossing point is 10m below the level of the A287 at the closest point.

55.5 Crossing Impact on Flood Risk

- 55.5.1 After reviewing the data provided and assessing the vulnerability of the area surrounding the watercourse and proposed crossing, it appears that the temporary crossing is unlikely to have an impact on flood risk. There are no vulnerable receptors identified in the area that would be impacted by increased flooding. Any increased flood extents would only affect agricultural land.
- 55.5.2 The likelihood of flooding is assessed as **very low** given the crossing is only identified to be at risk in the 0.1% AEP event.



- 55.5.3 Any increased flooding would occur both upstream and immediately downstream of the crossing, flooding agricultural land. Therefore, the severity of any increase in flood risk as a result of the proposed crossing is **very low**.
- 55.5.4 Therefore, this crossing is identified to be have a **very low** risk of increasing flood risk to receptors.

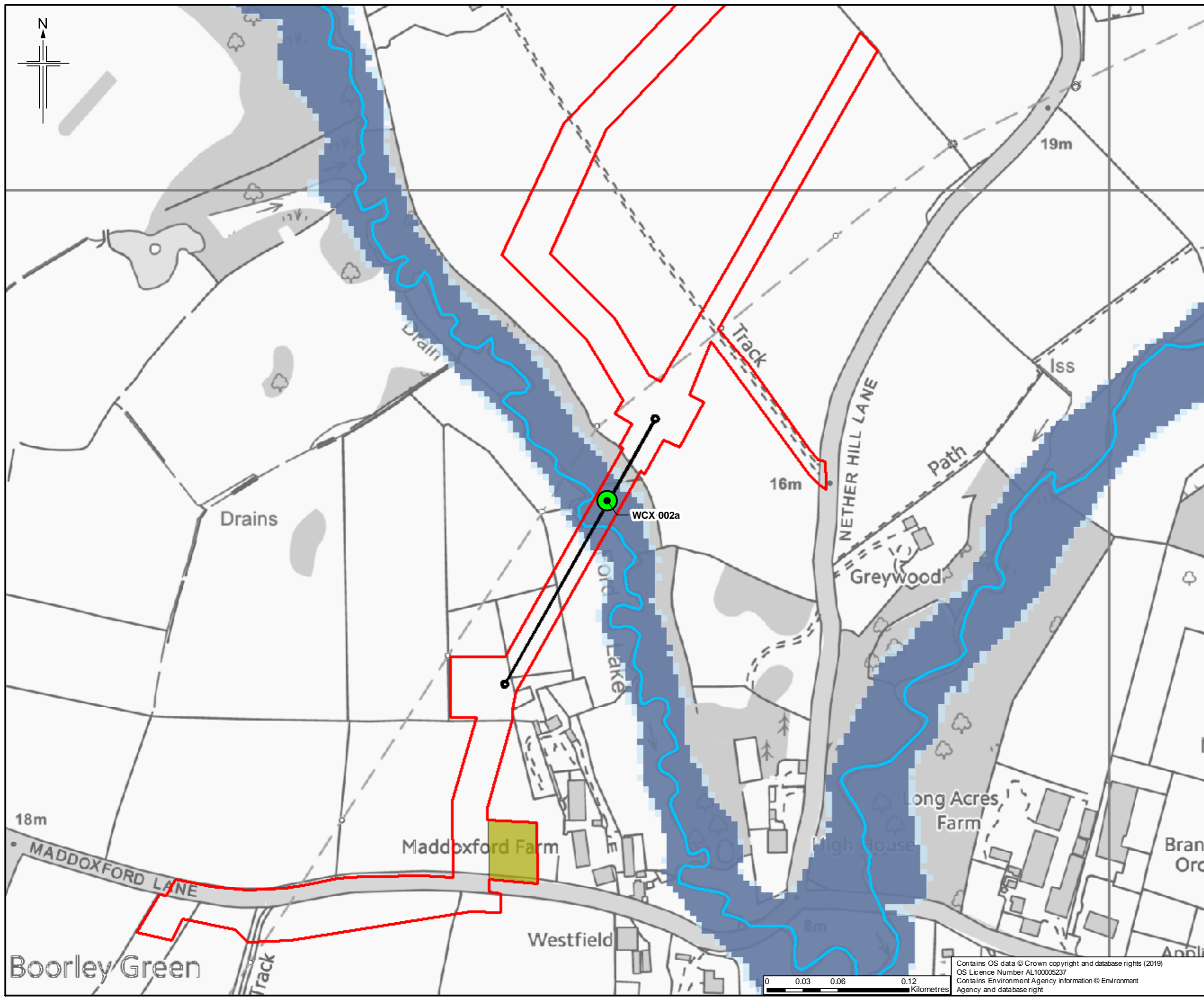


55.6 Data Sources

Data Source	Details at this Crossing?
Aerial Imagery	Yes
Surrey Lead Local Flood Authority Data	Not applicable
Hampshire Lead Local Flood Authority Data	No
Flood Zone 2	Not defined
Flood Zone 3	Not defined
RoFSW Extent 3.3% Annual Chance	No flooding shown within Order Limits near this crossing.
RoFSW Extent 1% Annual Chance	No flooding shown within Order Limits near this crossing
RoFSW Extent 0.1% Annual Chance	Yes – flooding arable land, with continuous flooding connecting to other water courses and around the nearby farm
RoFSW Depth 3.3% Annual Chance	No flooding shown within Order Limits near this crossing. Closest flooding shown approximately 200m downstream of crossing with depths less than 300mm
RoFSW Depth 1% Annual Chance	No flooding shown within Order Limits near this crossing. Closest flooding shown approximately 200m downstream of crossing with depths less than 300mm
RoFSW Depth 0.1% Annual Chance	Yes - flood extent in vicinity of crossing, confined to arable and wood land. Depths less than 150mm within Order Limits
Risk of Flooding from Reservoirs - Maximum Flood Depth	No risk
Risk of Flooding from Reservoirs - Maximum Flood Extent	No risk
Risk of Flooding from Reservoirs - Maximum Flood Speed	No risk
Recorded Flood Outlines	No records
Surrey Heath BC – Flood Zone – 3a	Not applicable
Surrey Heath BC – Flood Zone – 3b	Not applicable
Rushmoor BC – Flood Zone – 3a	Not applicable
Rushmoor BC – Flood Zone – 3b	Not applicable
Areas benefitting from Flood Defences	None defined
Flood Storage Areas	None defined
Spatial Flood Defences	None defined



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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section A

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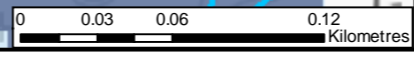
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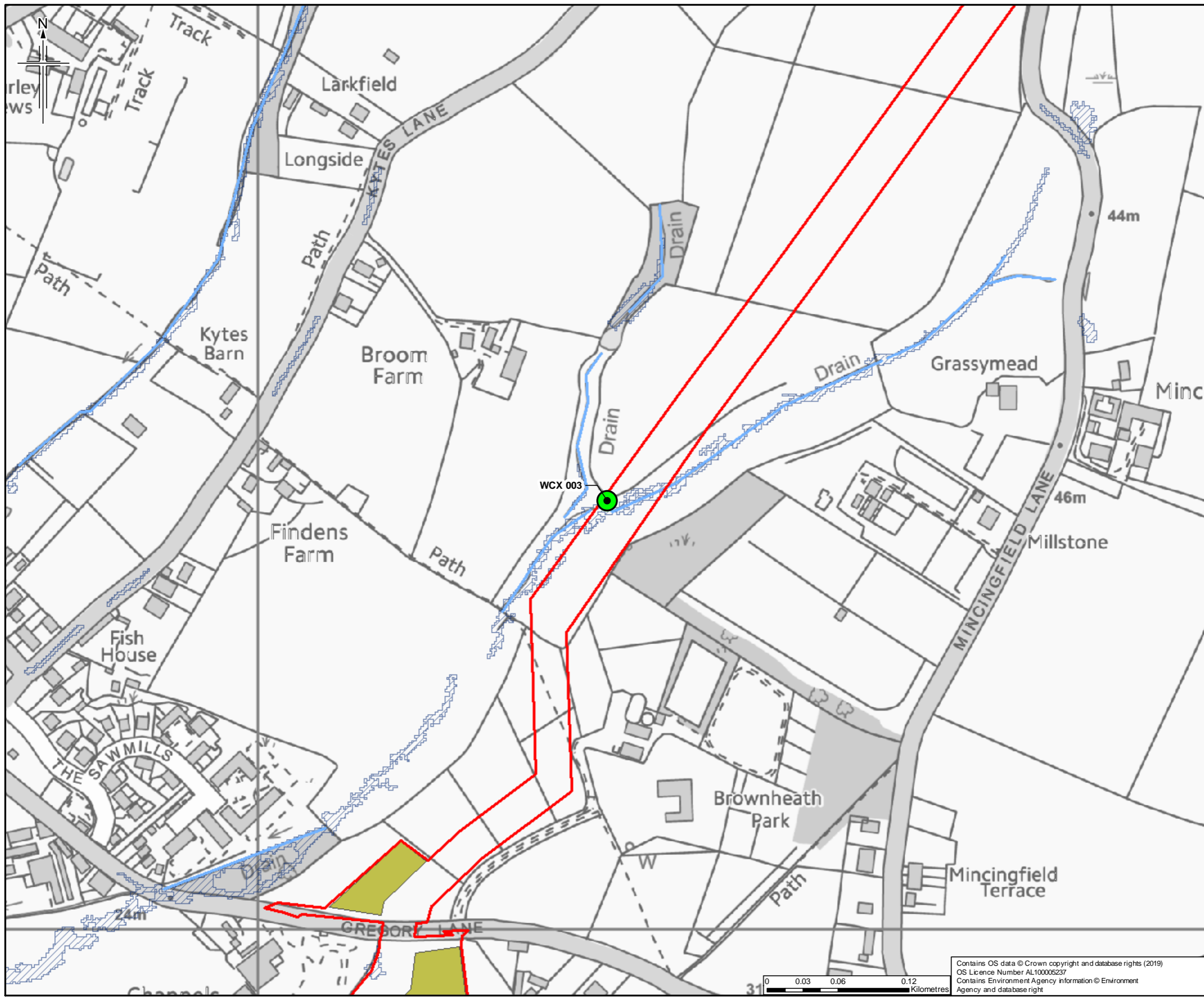
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 FORD LAKE STREAM CROSSING
 (WCX 002a) FLOOD RISK DATA
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Legend

- Order Limits
- Construction compound
- Ordinary Watercourse
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Crossing identification number

Sheet displays parts of Section A

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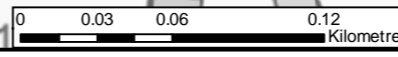
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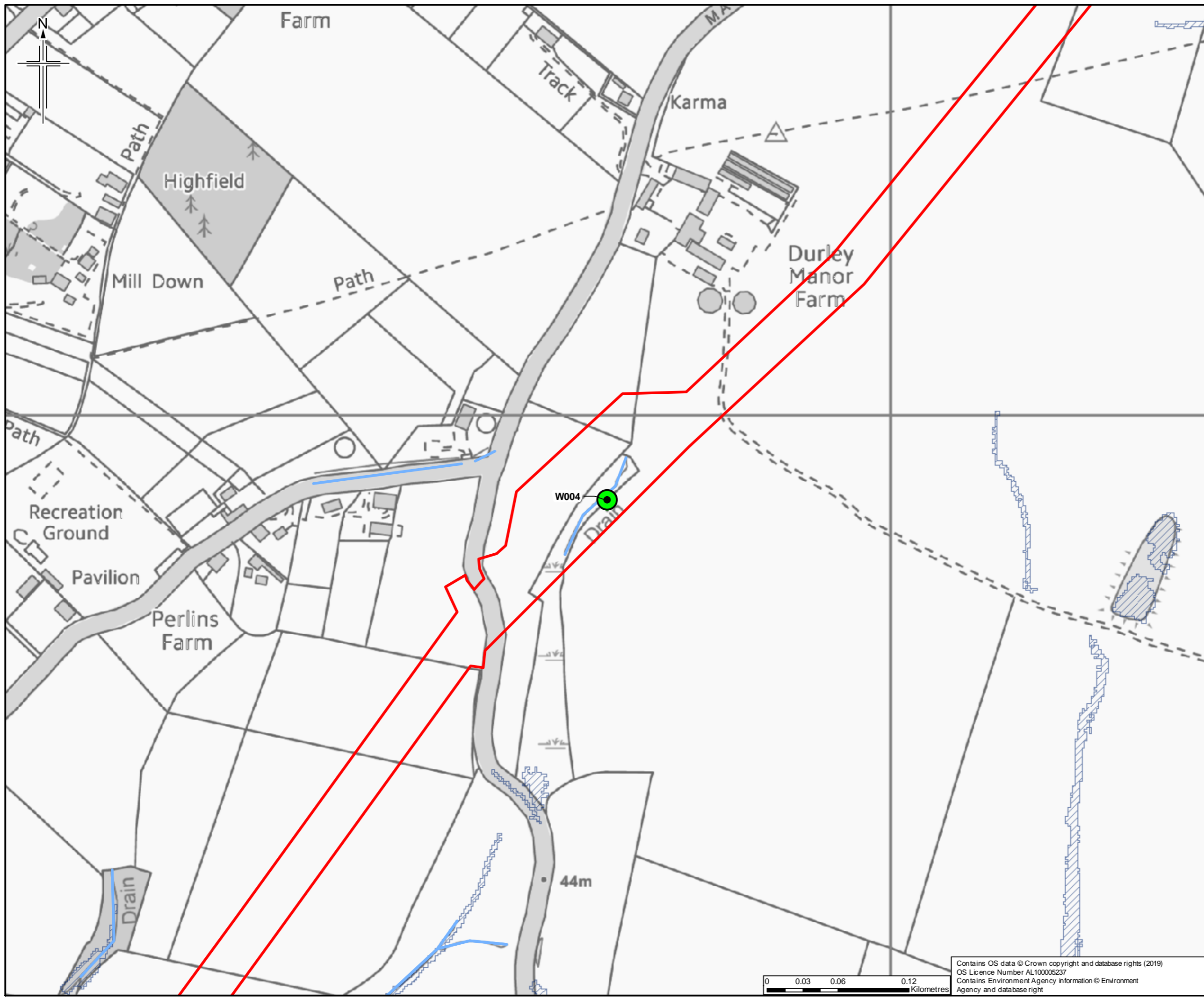
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- Legend**
- Order Limits
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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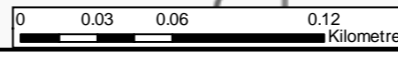
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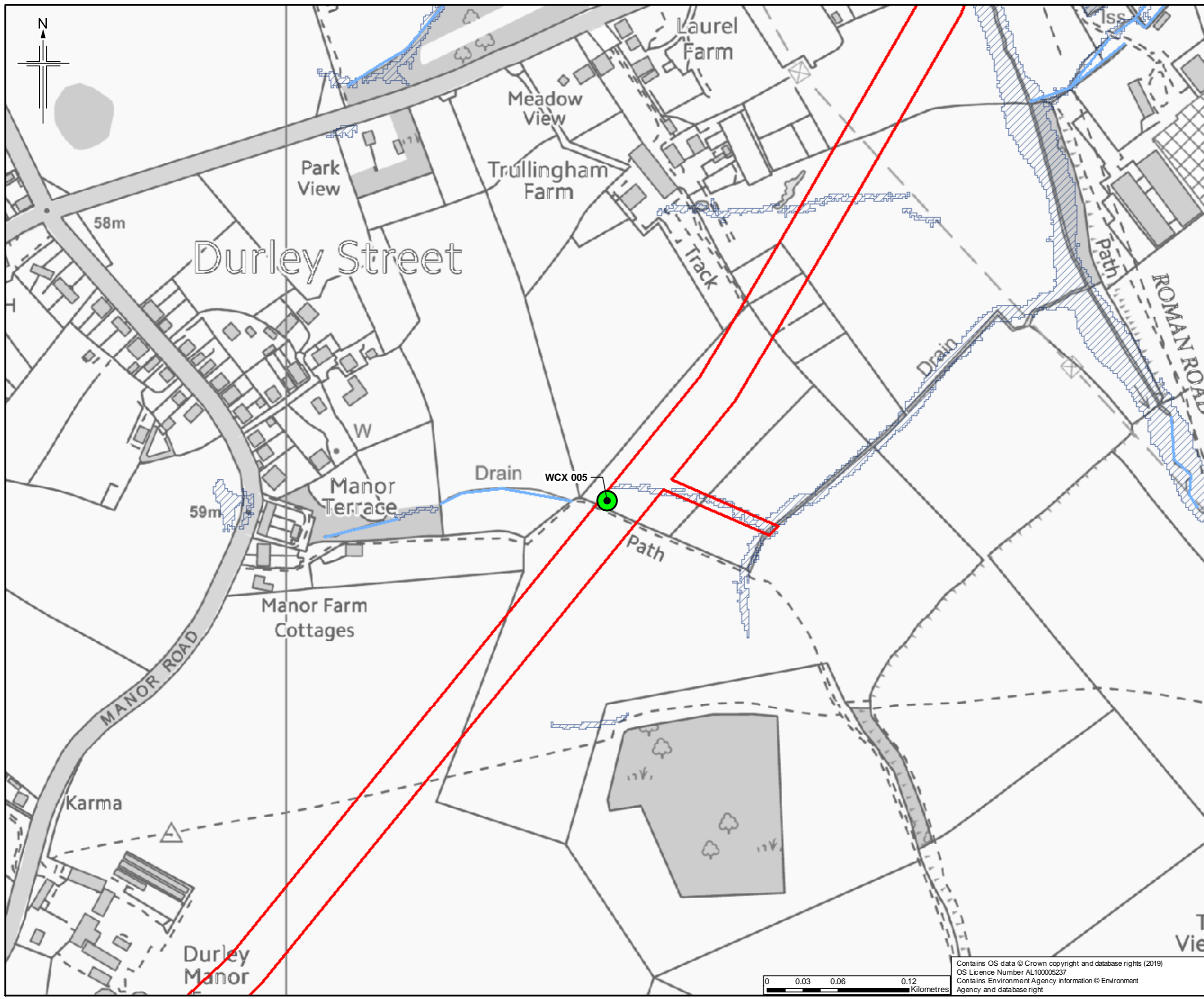
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- Legend**
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 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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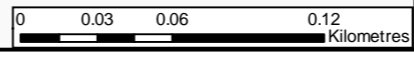


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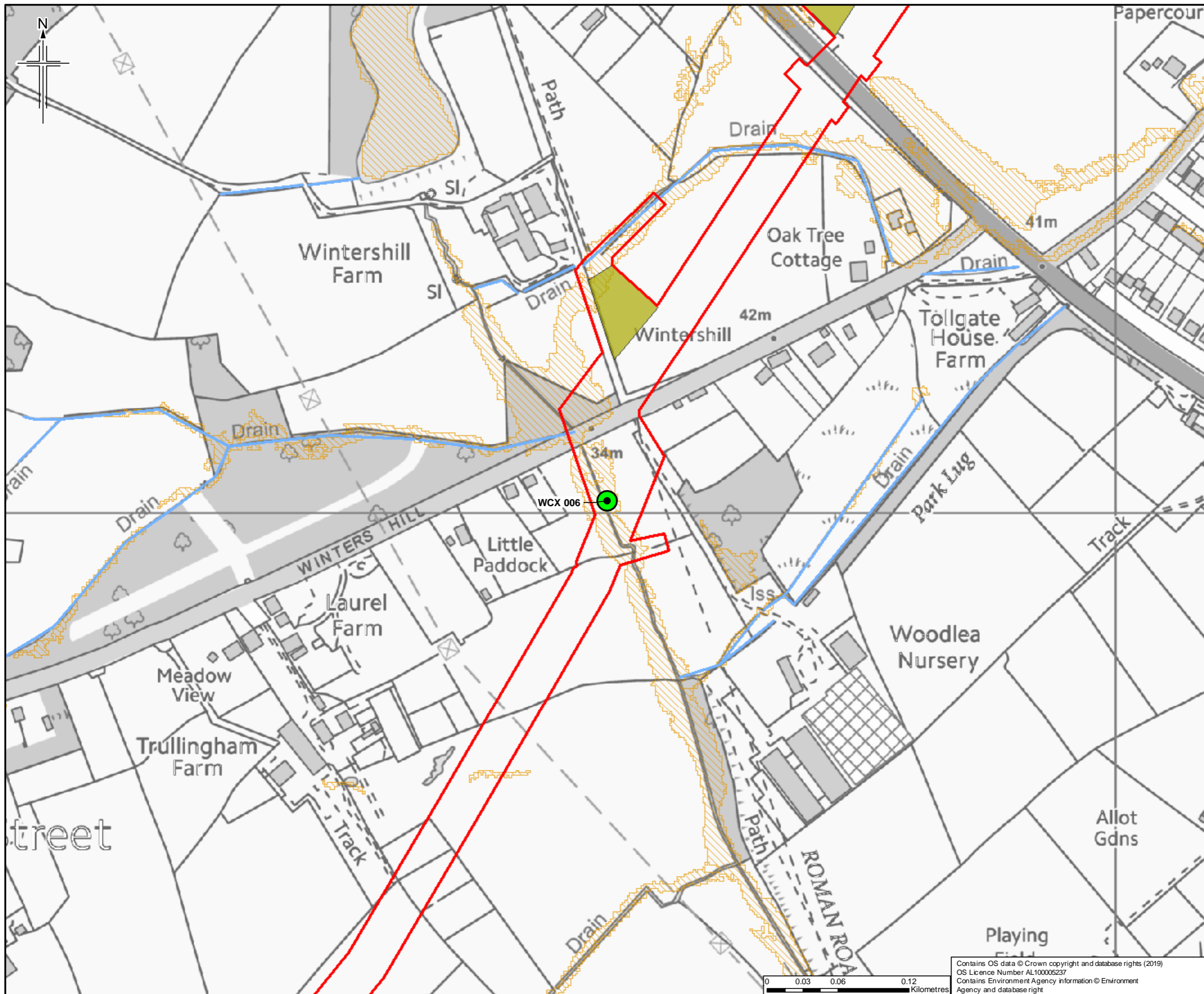
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- Legend**
- ▭ Order Limits
 - Construction compound
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section A

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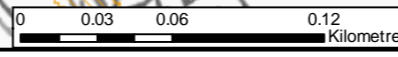
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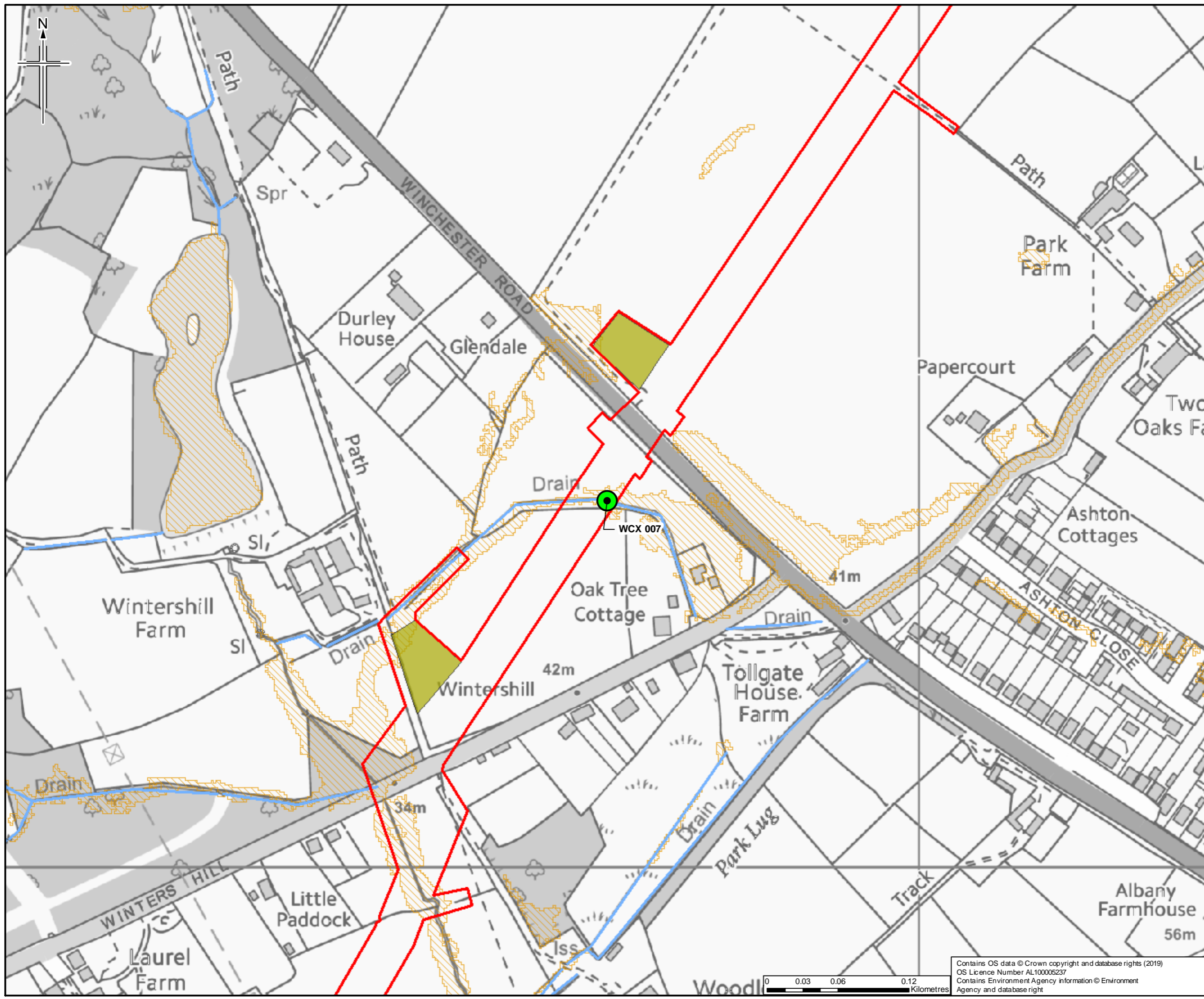
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Legend

- ▭ Order Limits
- ▭ Construction compound
- Ordinary Watercourse
- ▭ Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Crossing identification number

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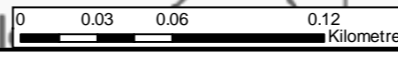
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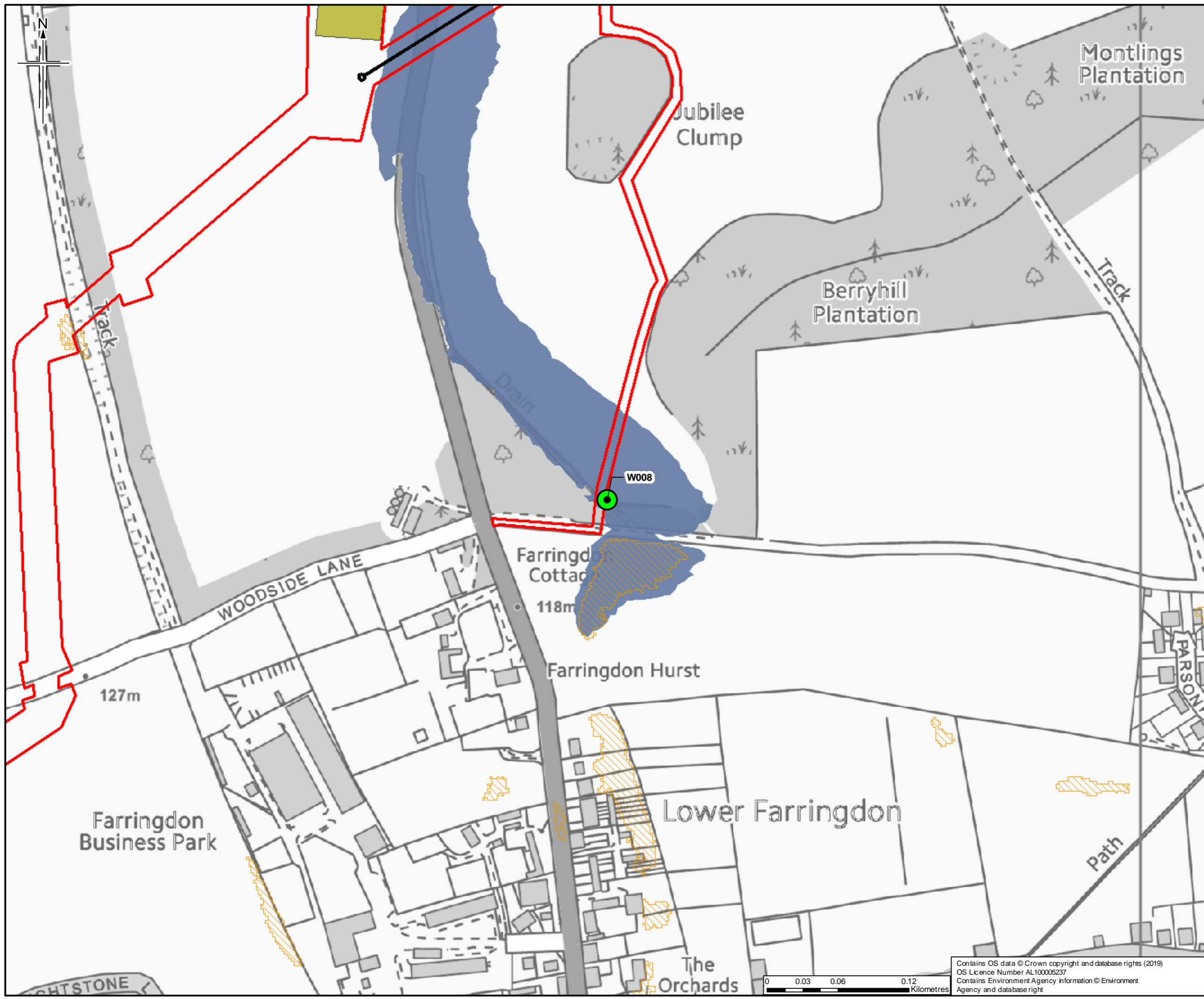
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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

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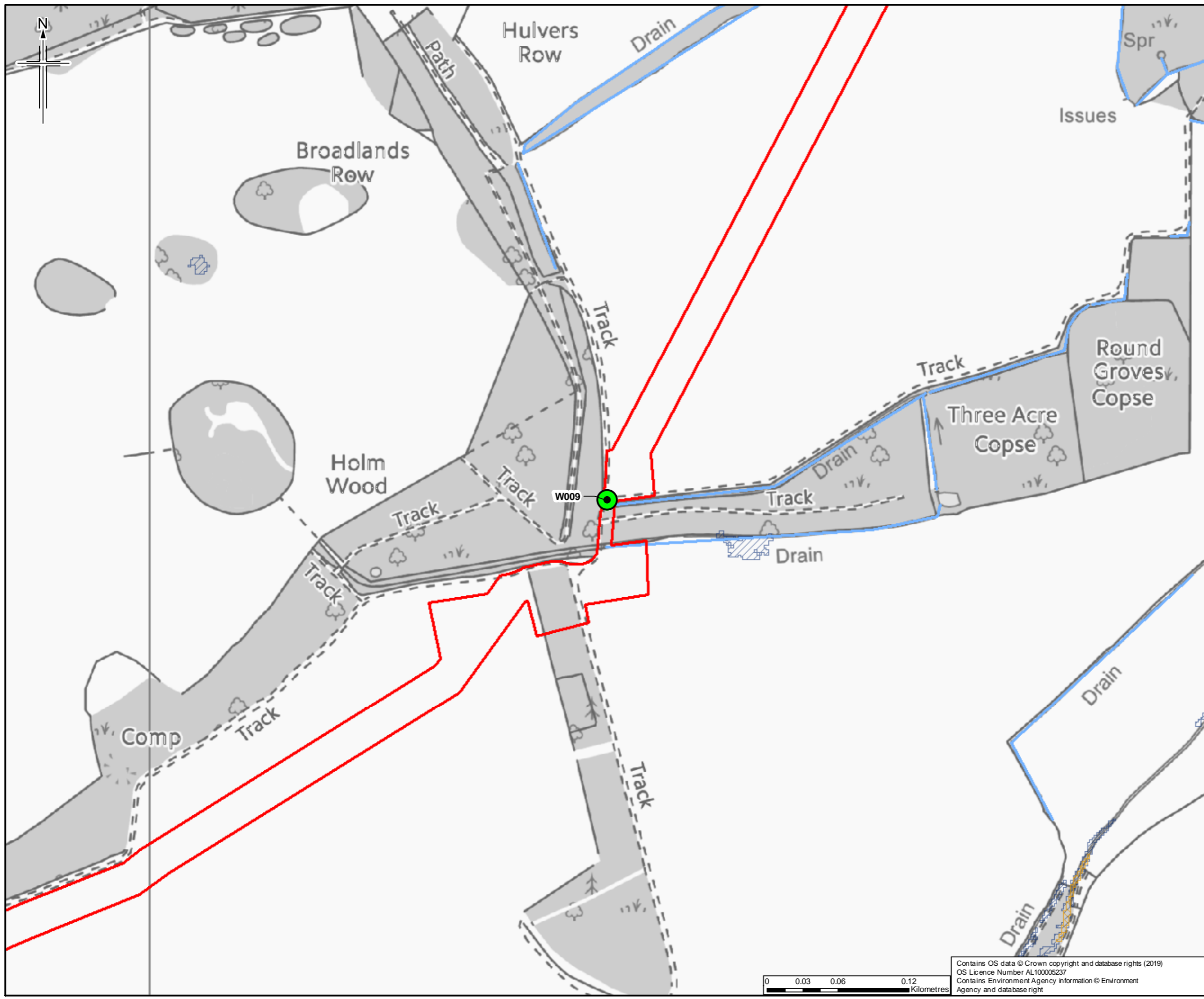
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Legend

- Order Limits
- Ordinary Watercourse
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Crossing identification number

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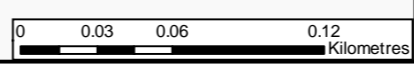
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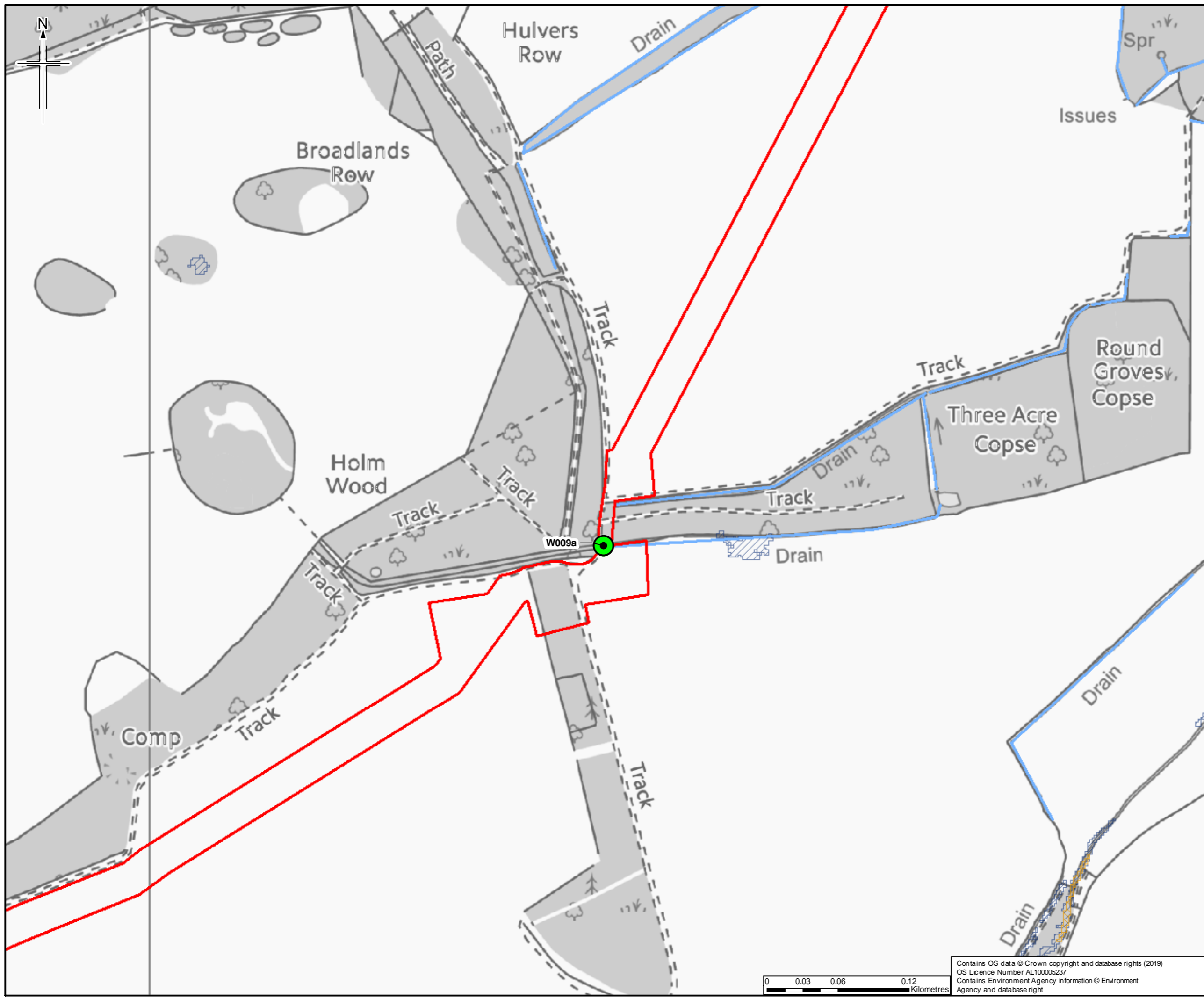
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Legend

- Order Limits
- Ordinary Watercourse
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Crossing identification number

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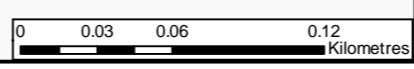
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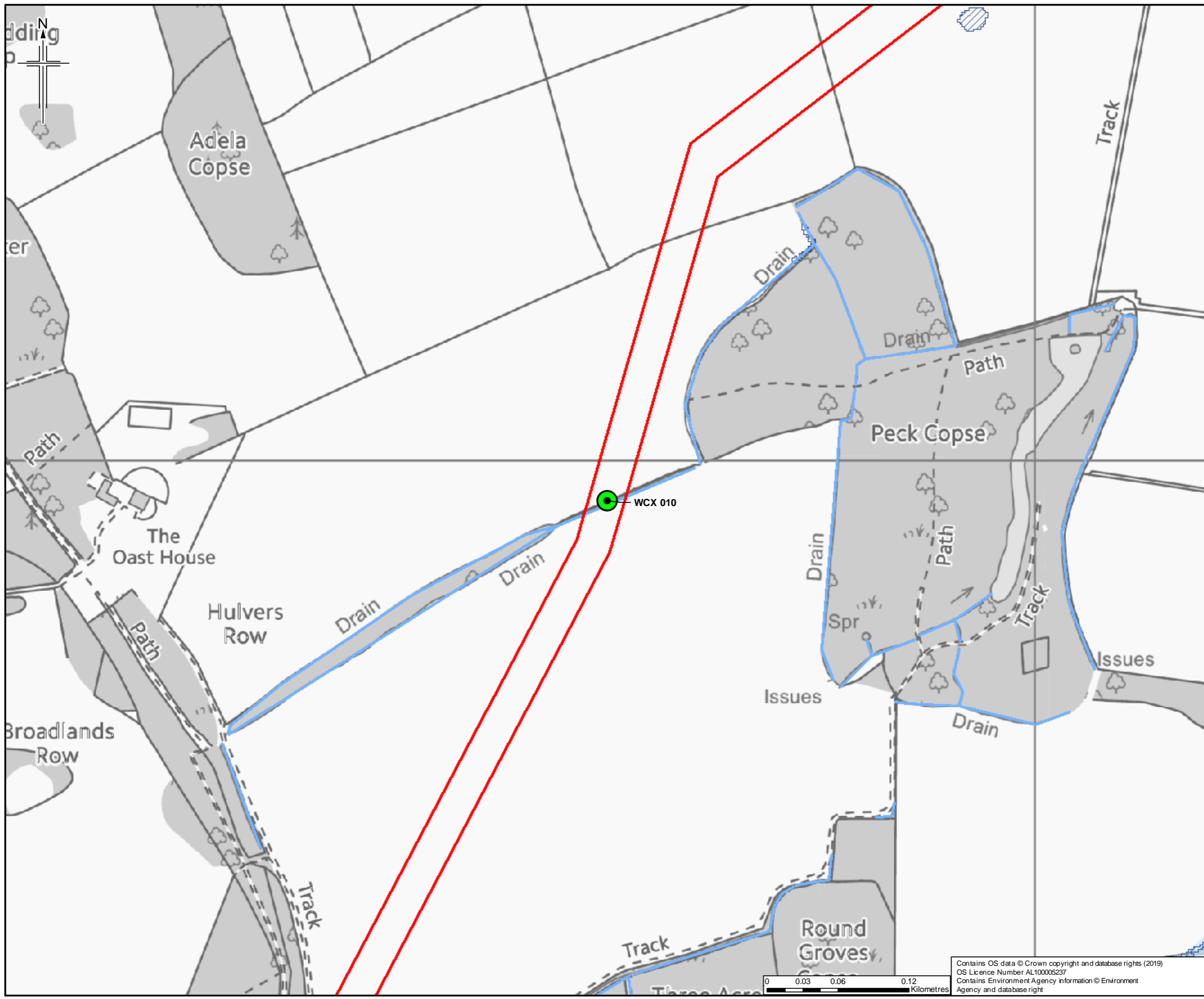
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- Legend**
- Order Limits
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Crossing identification number

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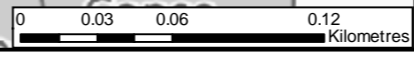
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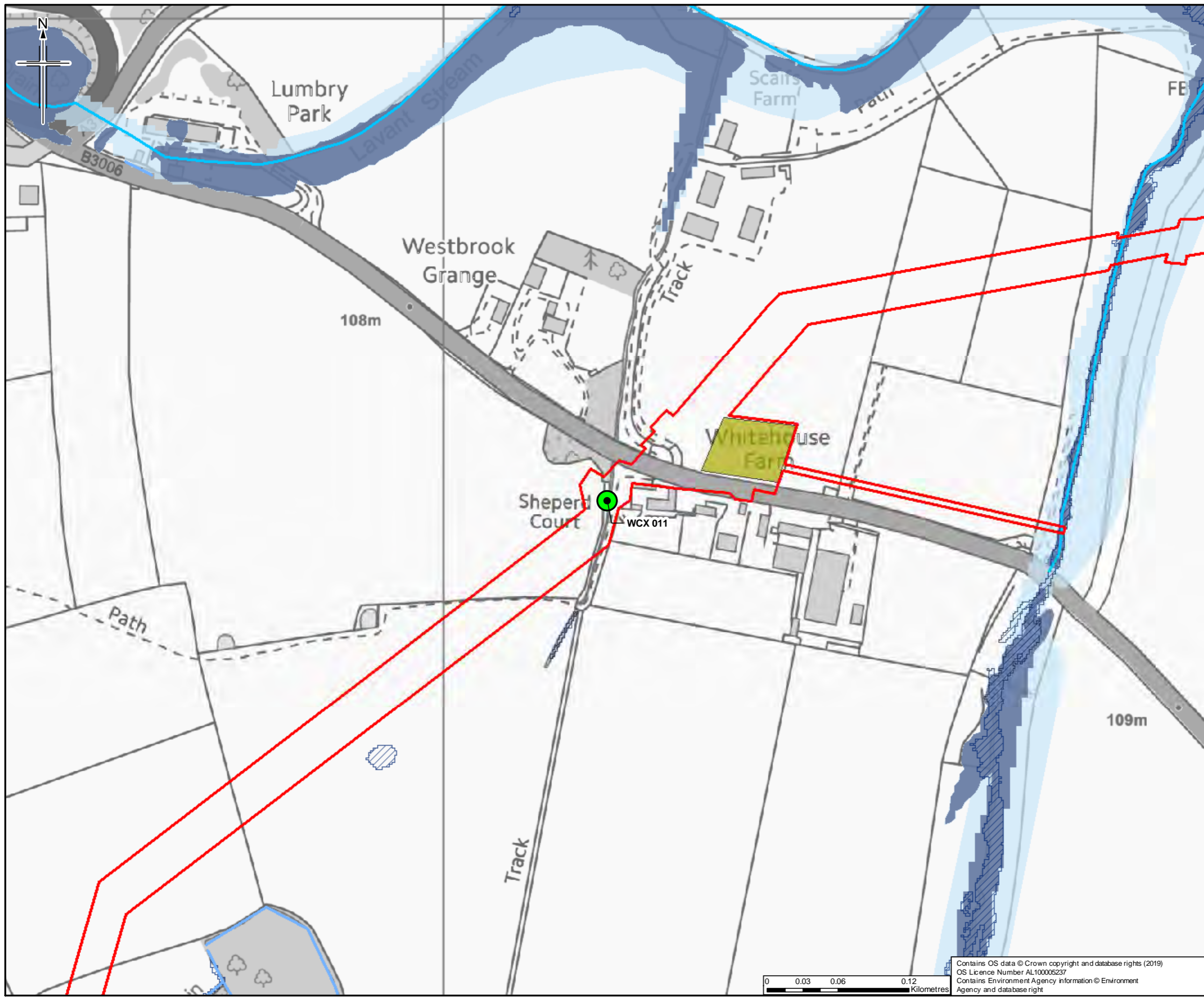
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Legend

- Order Limits
- Construction compound
- Main River
- Ordinary Watercourse
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3
- Crossing identification number

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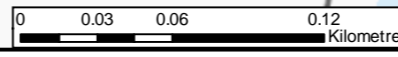
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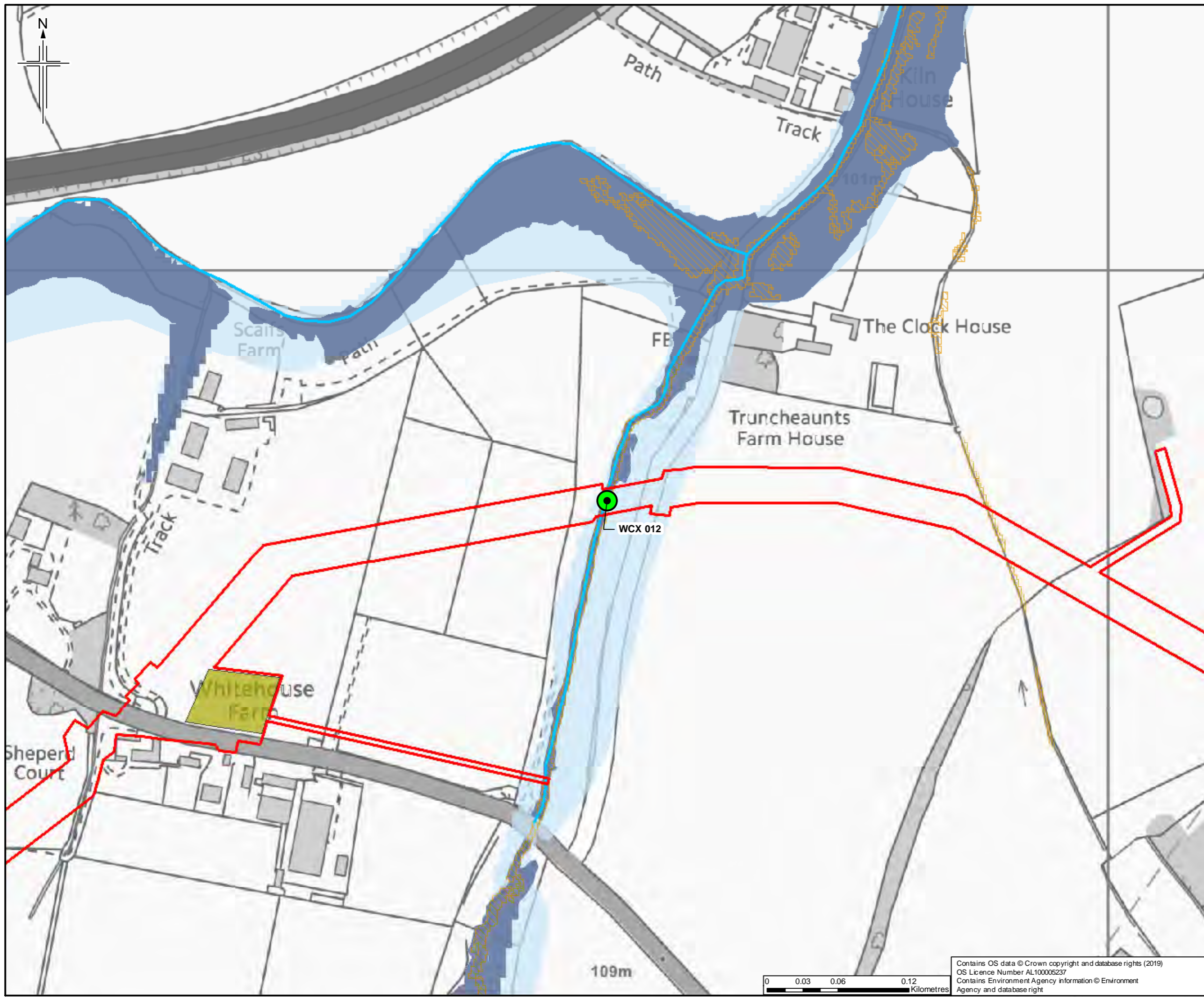
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- Legend**
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 - Construction compound
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

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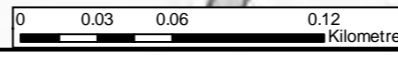
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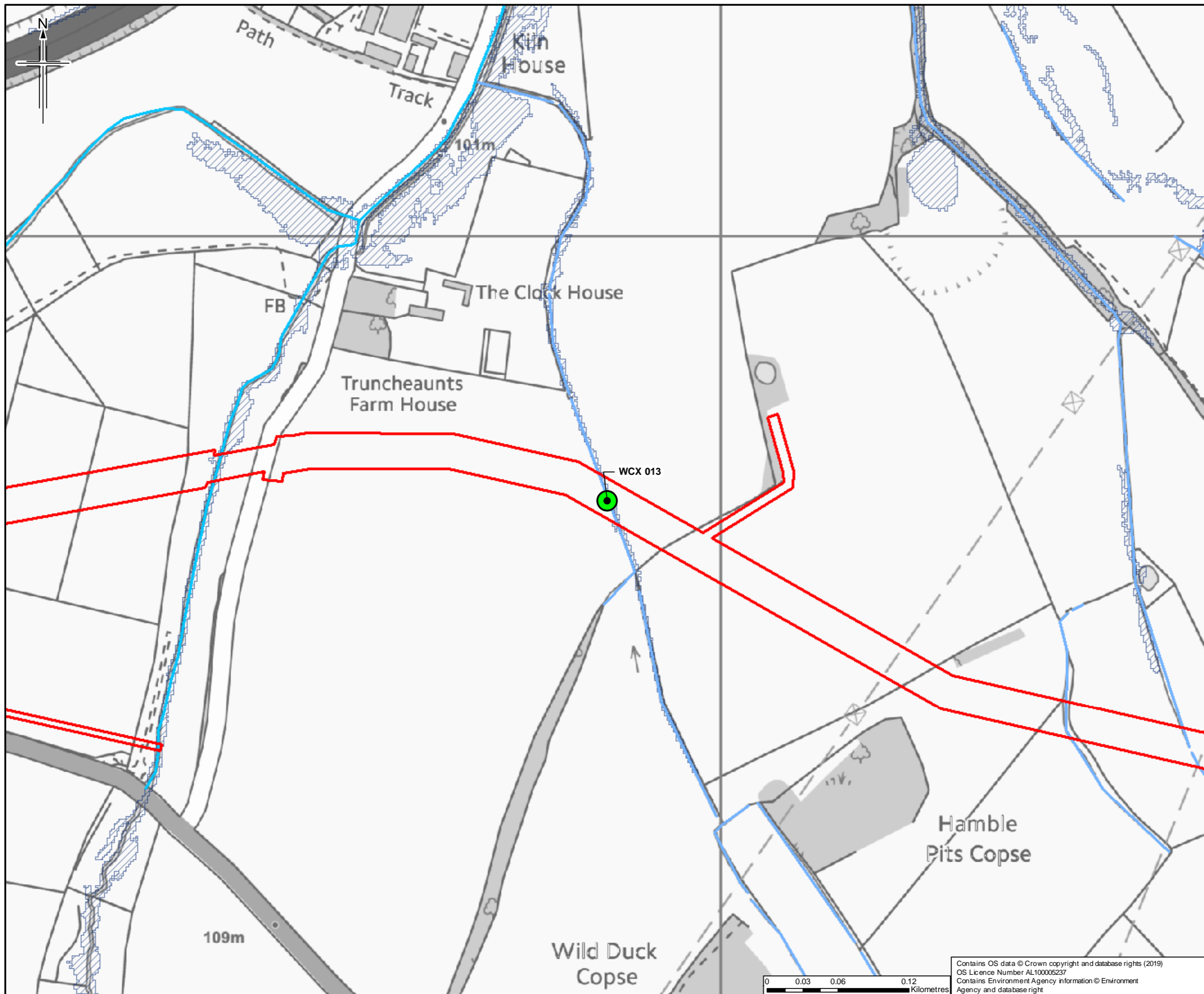


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Drawing number	Figure C12 Sheet 1 of 1
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- Legend**
- Order Limits
 - Main River
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section C

Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Checkd	Rev'd	Apprv'd
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Project

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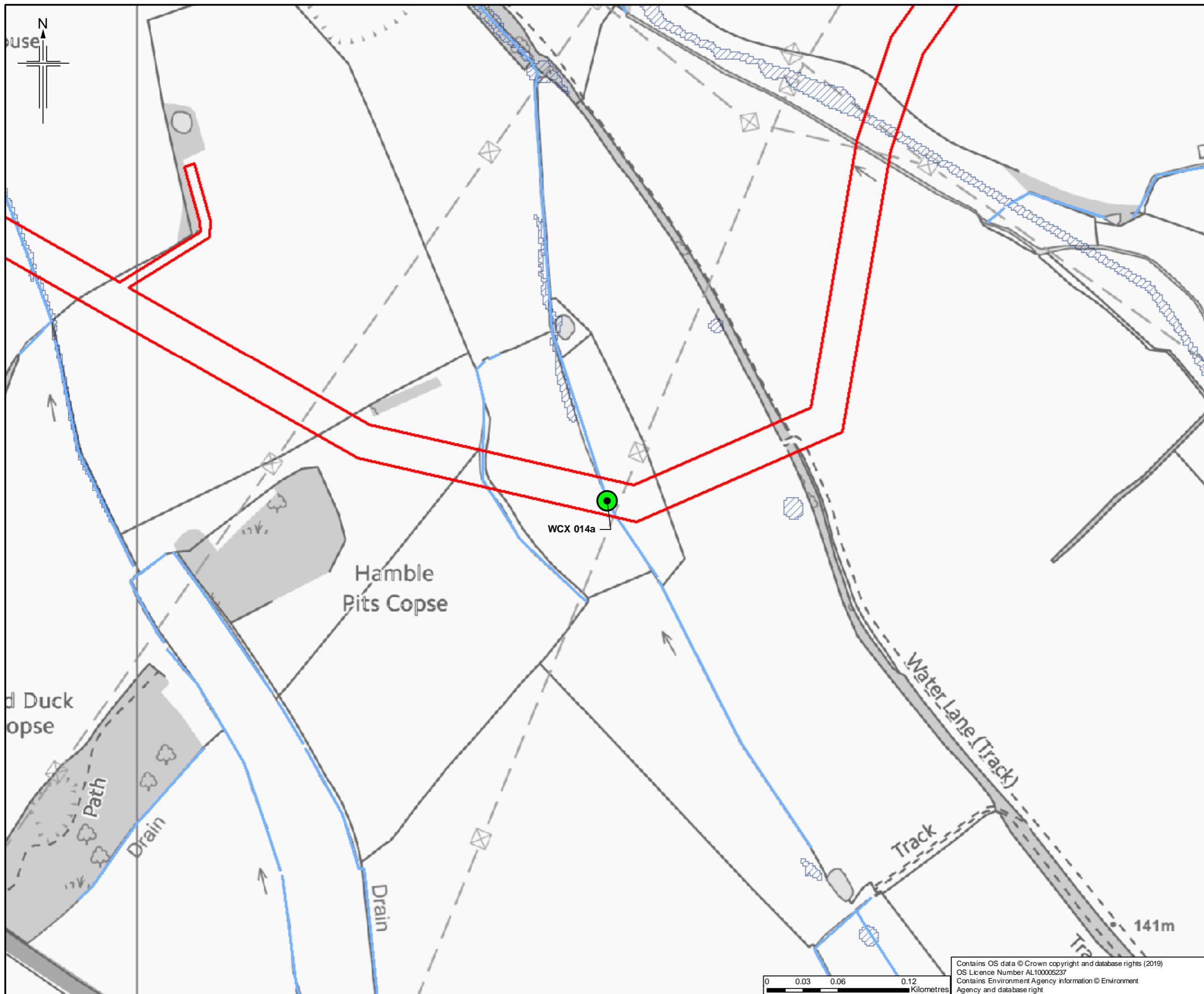
Drawing title

**FLOOD RISK ASSESSMENT
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 CROSSING (WCX 013) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
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- Legend**
- ▭ Order Limits
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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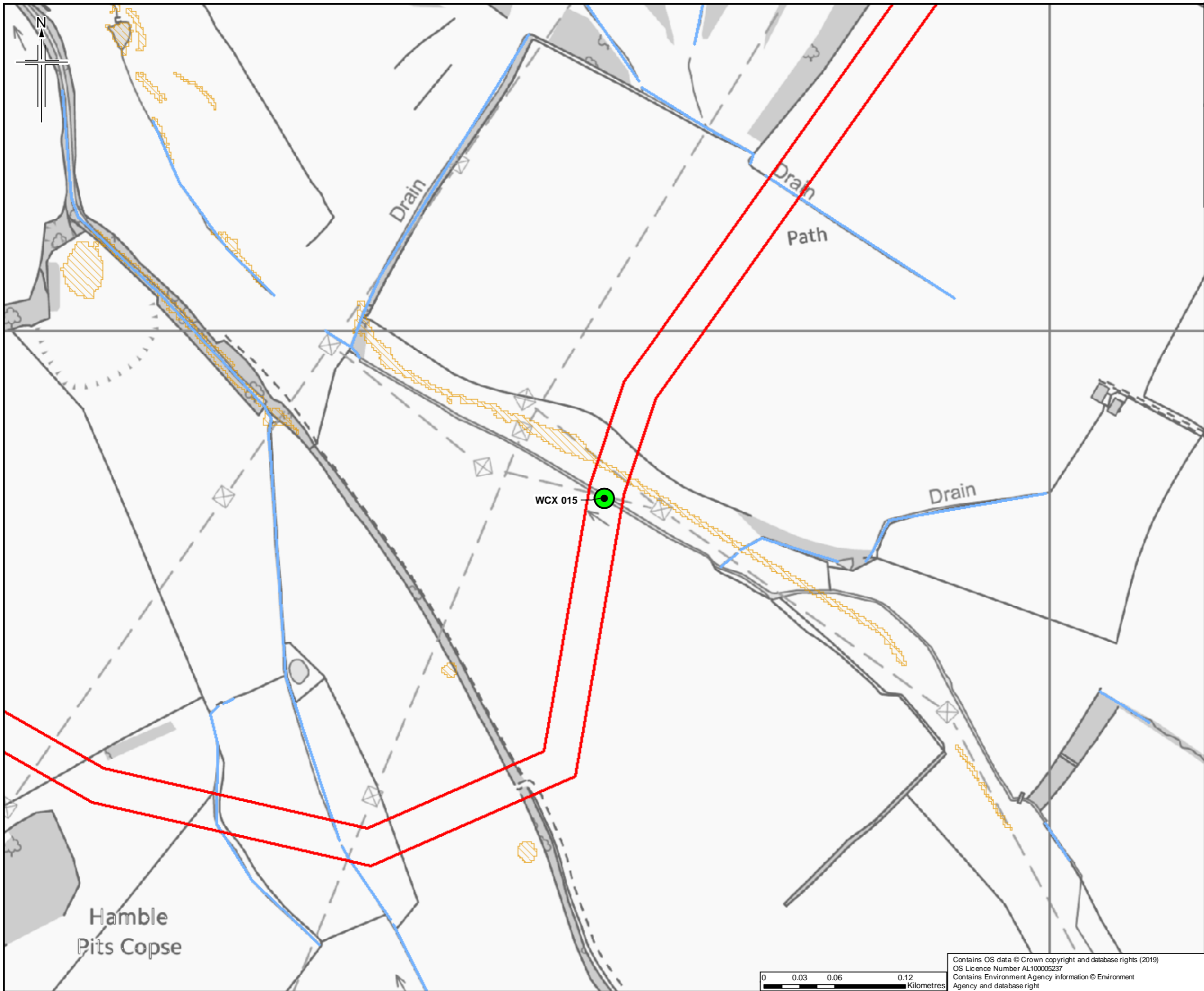
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FLOOD RISK ASSESSMENT
 WATER LANE CROSSING
 (WCX 014a) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

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Drawing number	Figure C14 Sheet 1 of 1	Rev 0

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- Legend**
- ▭ Order Limits
 - Ordinary Watercourse
 - ▨ Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Crossing identification number

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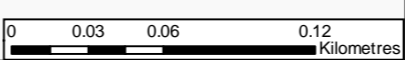
Project

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Drawing title

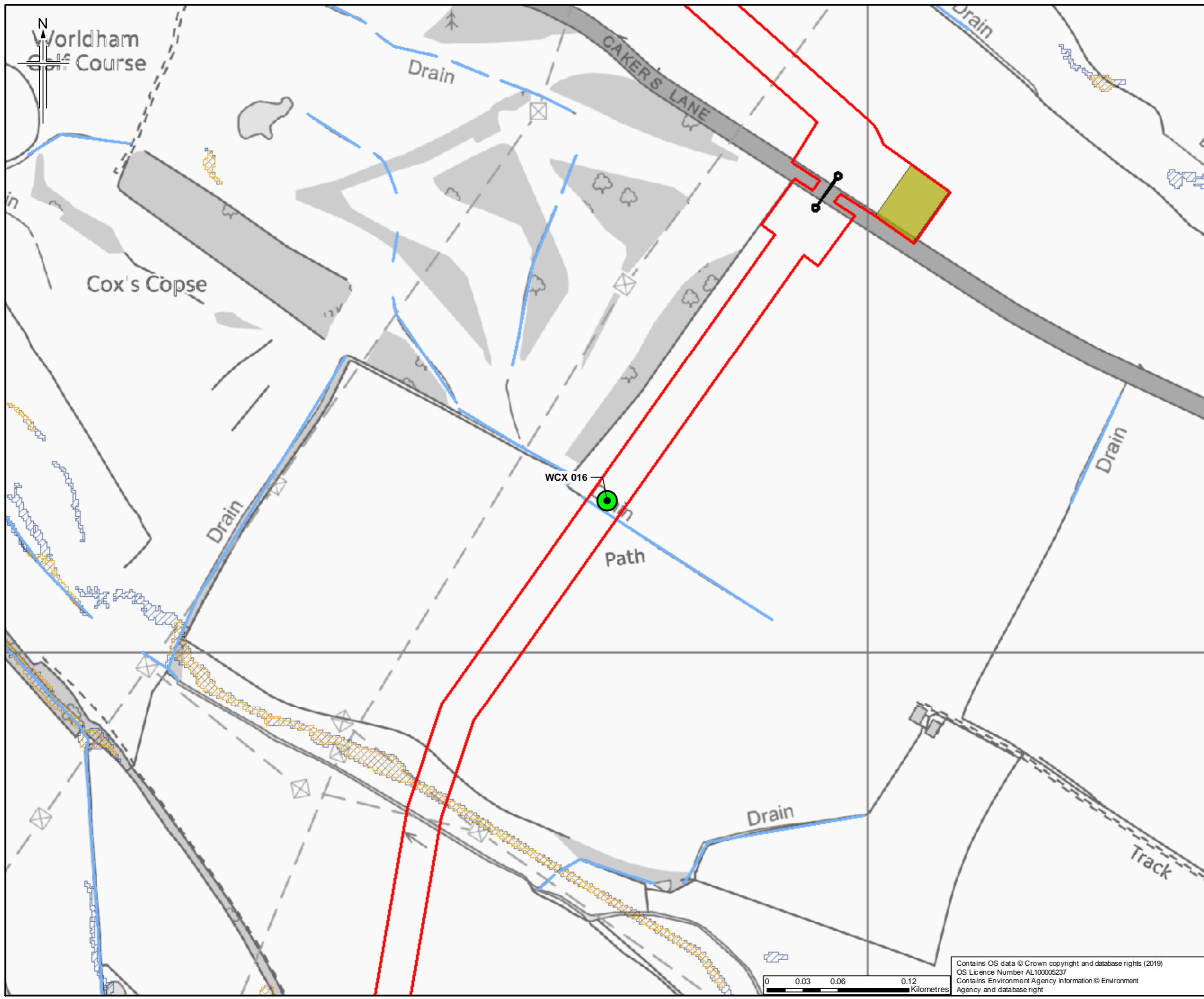
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 UNNAMED WATERCOURSE
 CROSSING (WCX 015) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

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Jacobs No.	B2325300	
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Drawing number	Figure C15 Sheet 1 of 1	Rev 0



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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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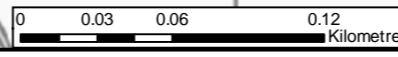
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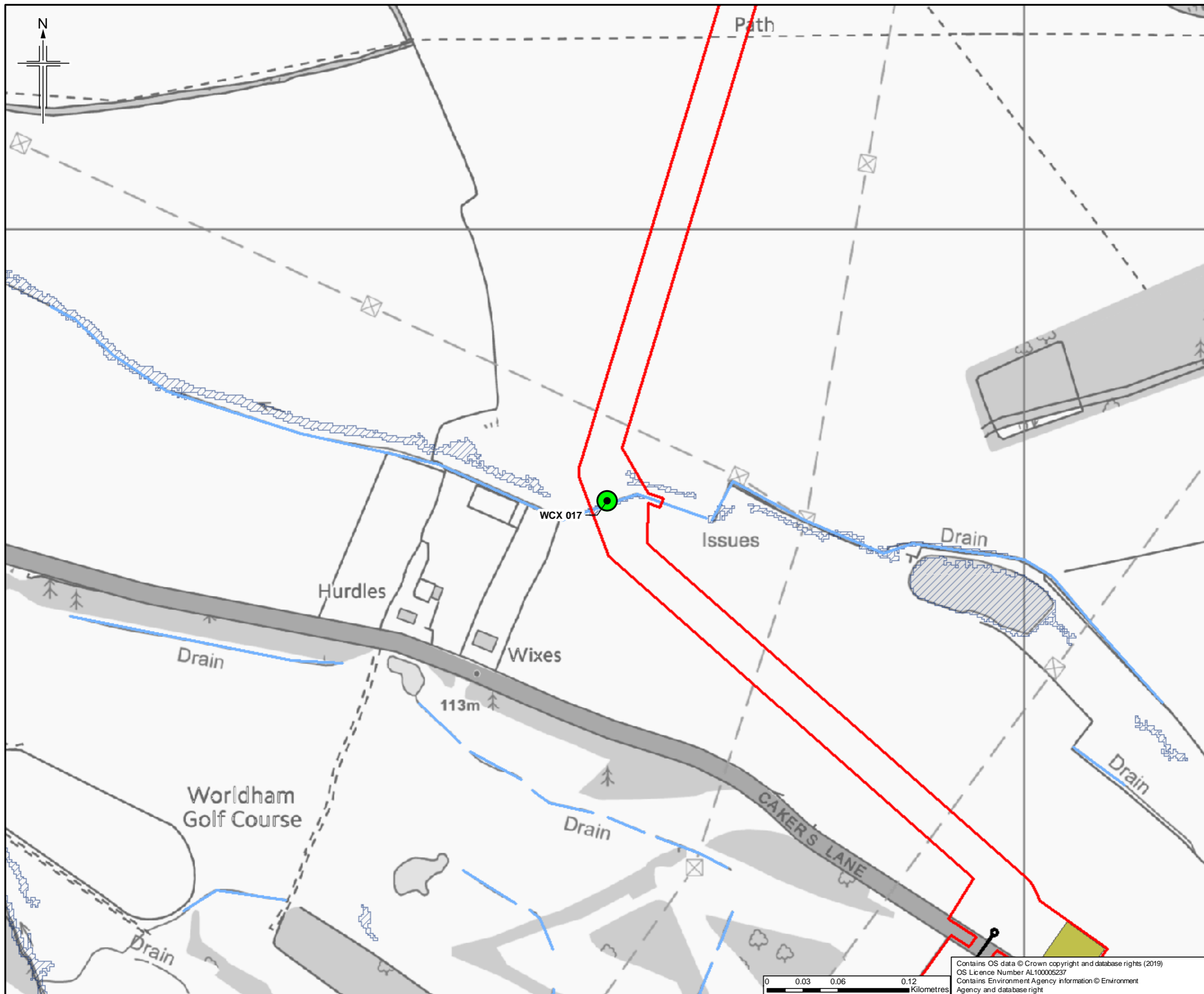
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 CROSSING (WCX 016) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

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Drawing number	Figure C16 Sheet 1 of 1	Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW)
 - extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Checkd	Rev'd	Apprv'd
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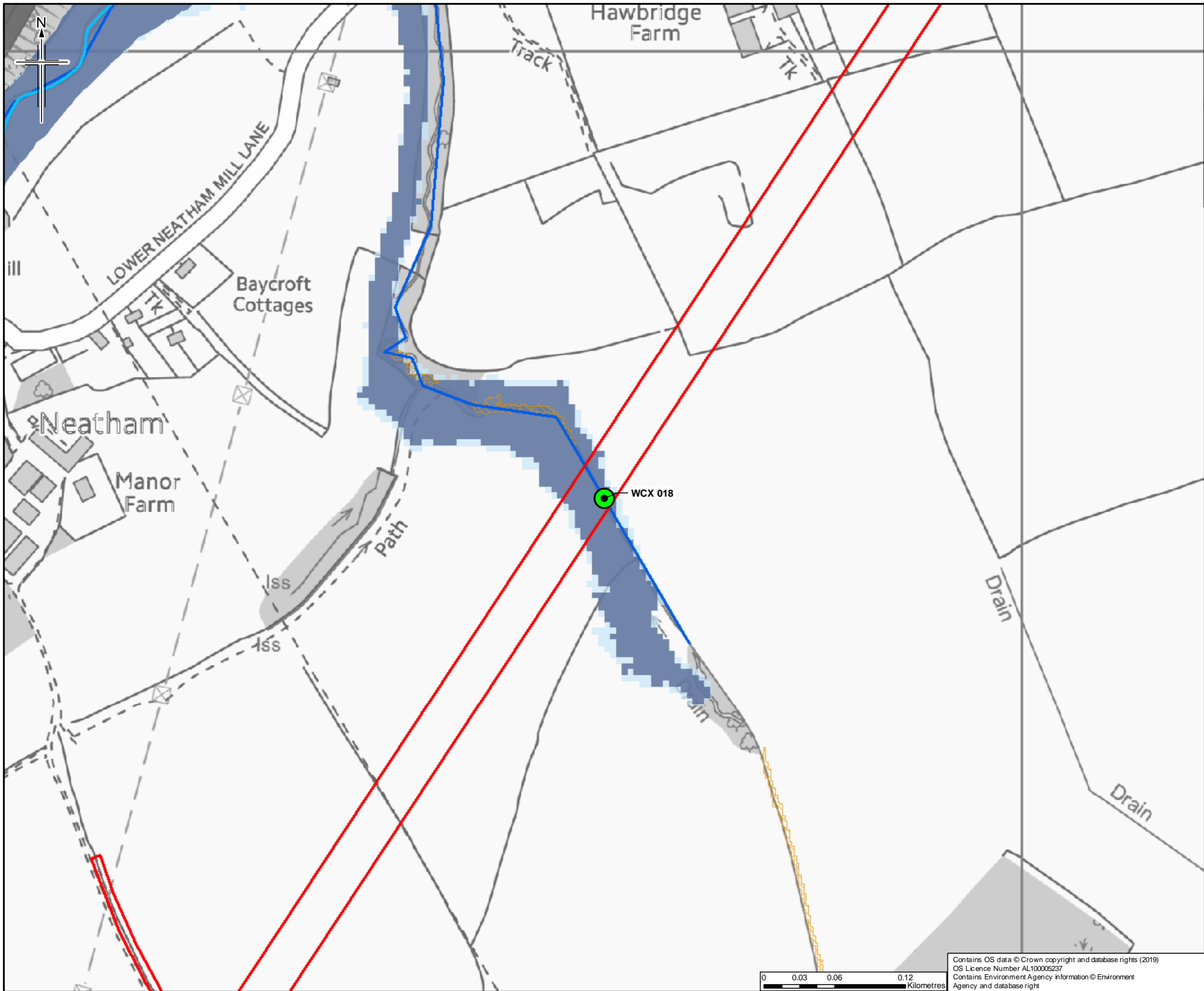
Project
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 UNNAMED WATERCOURSE
 CROSSING (WCX 017) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
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Drawing number	Figure C17 Sheet 1 of 1
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- Legend**
- Order Limits
 - Main River
 - OS River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section C

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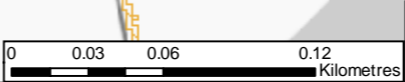
Project

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Drawing title

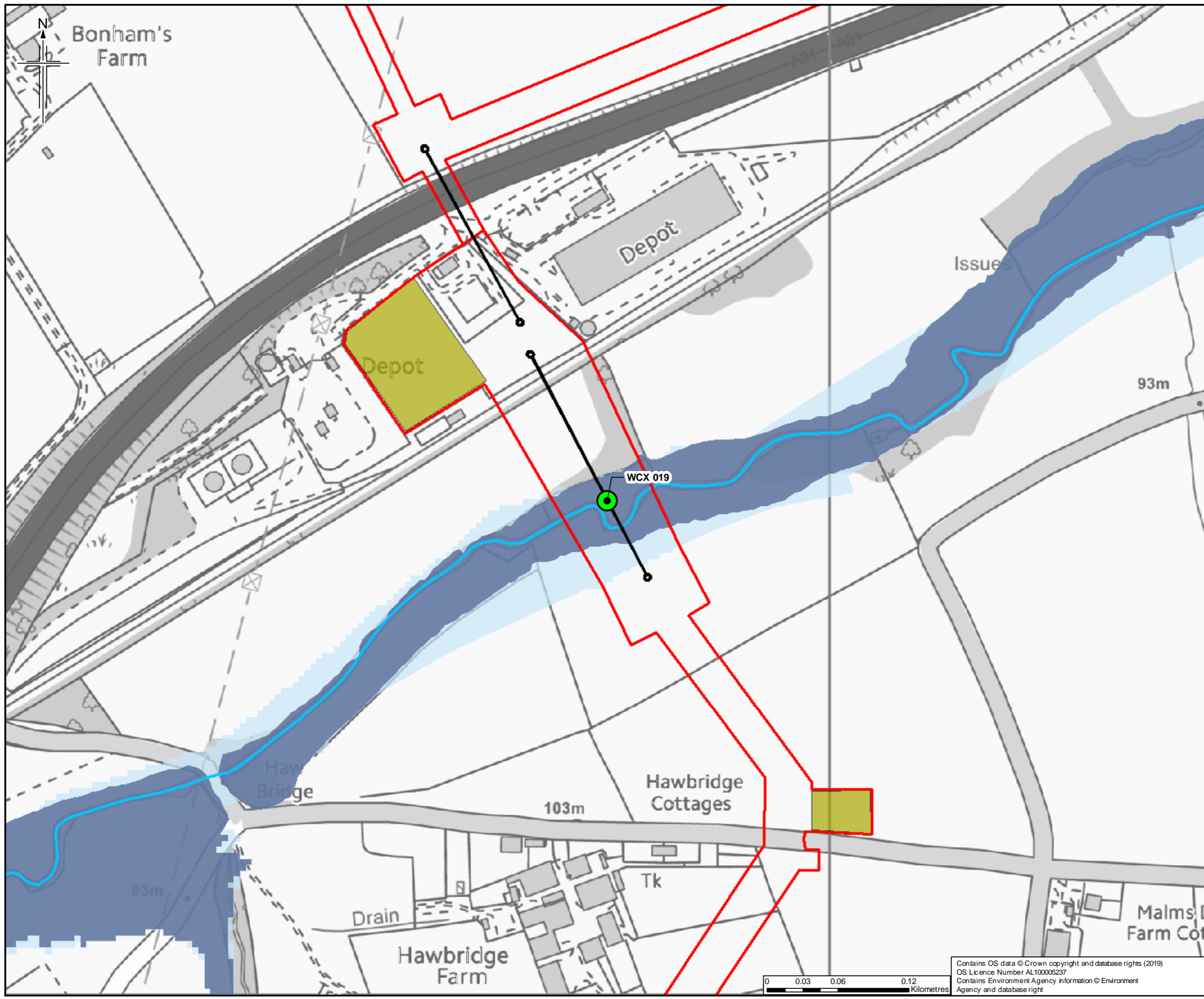
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 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section C

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Appr'd
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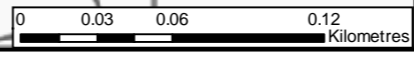
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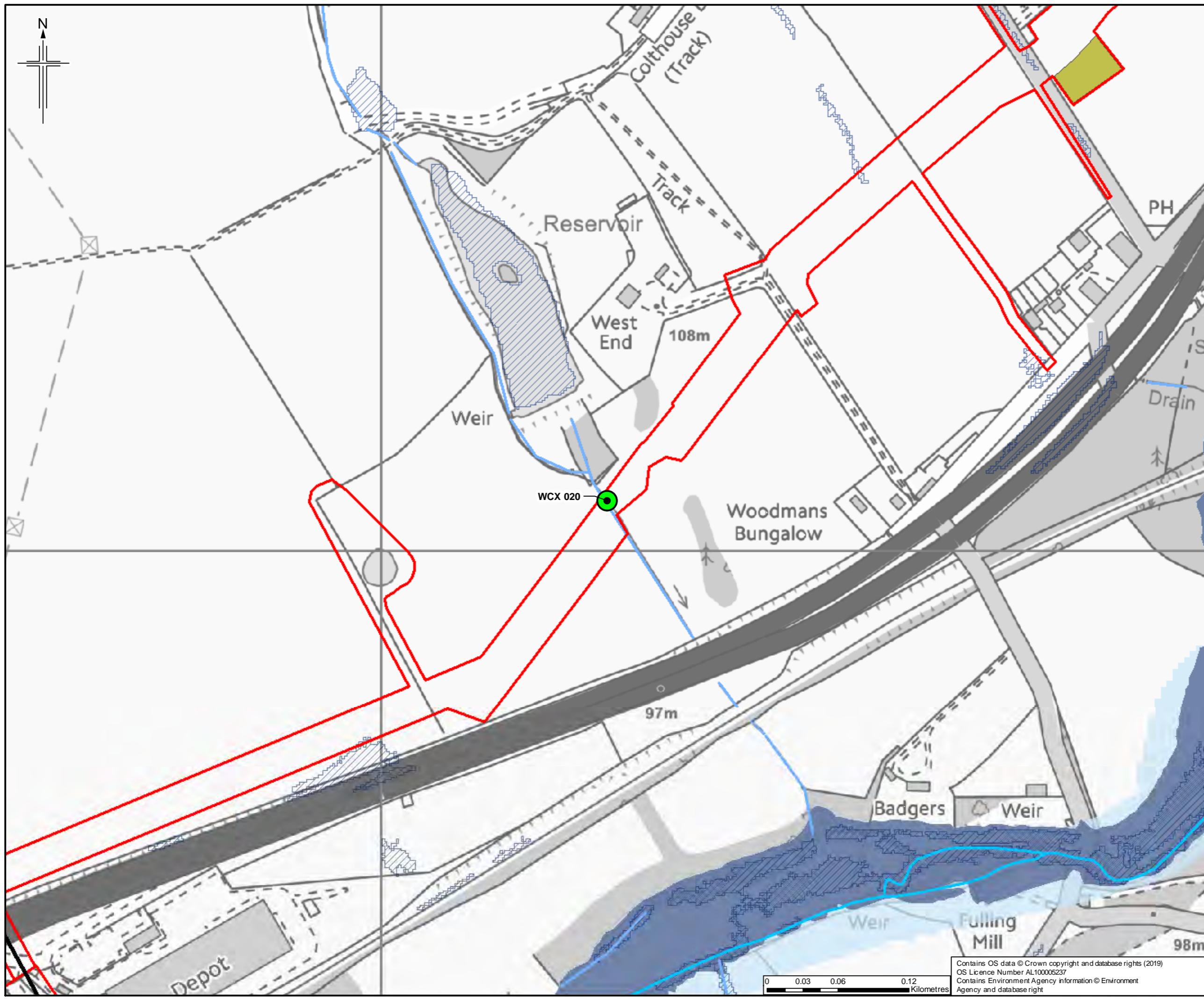
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Drawing title
**FLOOD RISK ASSESSMENT
 RIVER WEY CROSSING
 (WCX 019) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
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Drawing number	Figure C19 Sheet 1 of 1
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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

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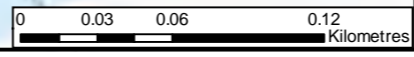
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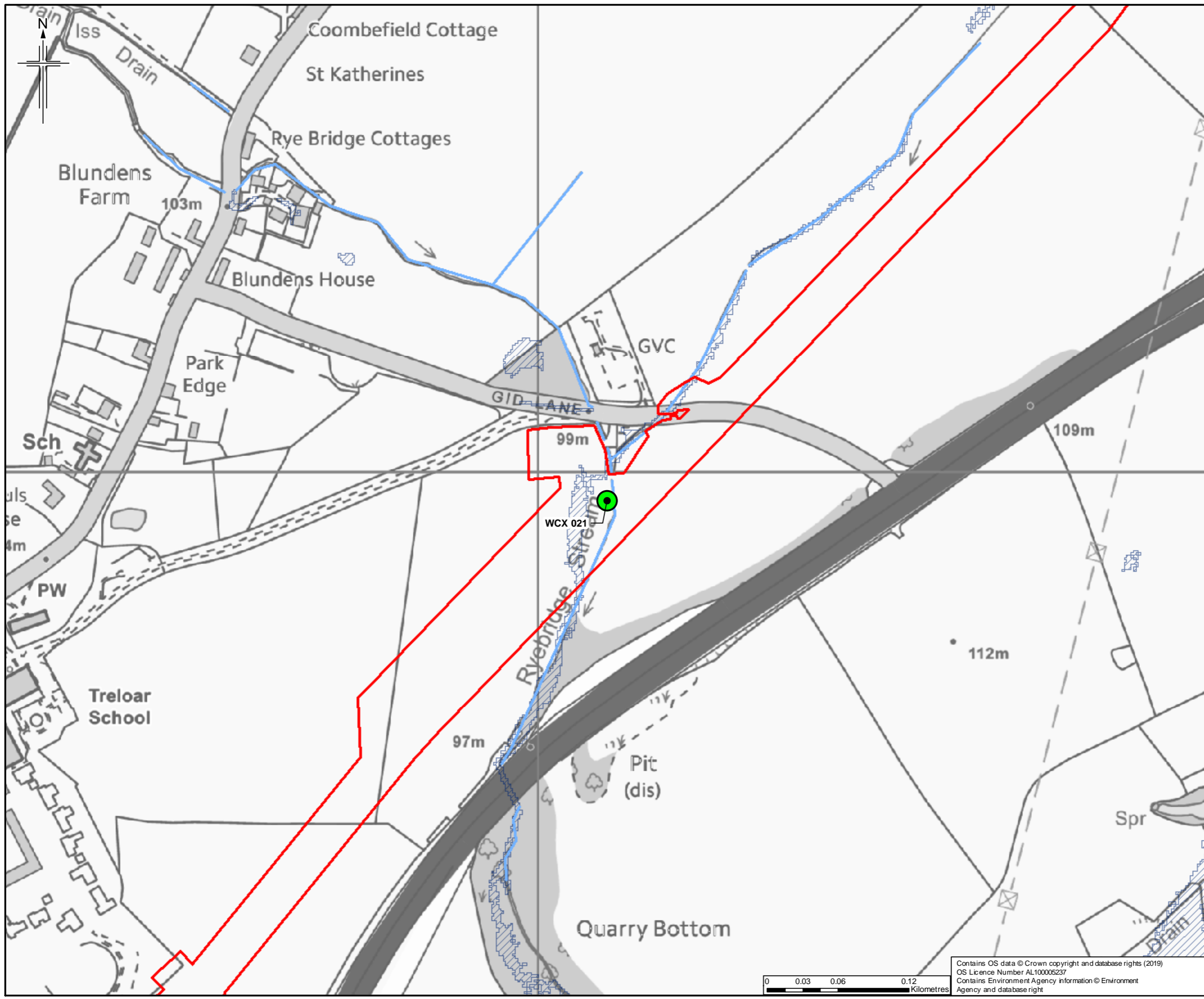
FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 CROSSING (WCX 020) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
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Drawing number	Figure C20 Sheet 1 of 1	Rev 0

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- Legend**
- Order Limits
 - Main River
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section C

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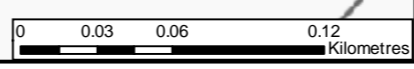
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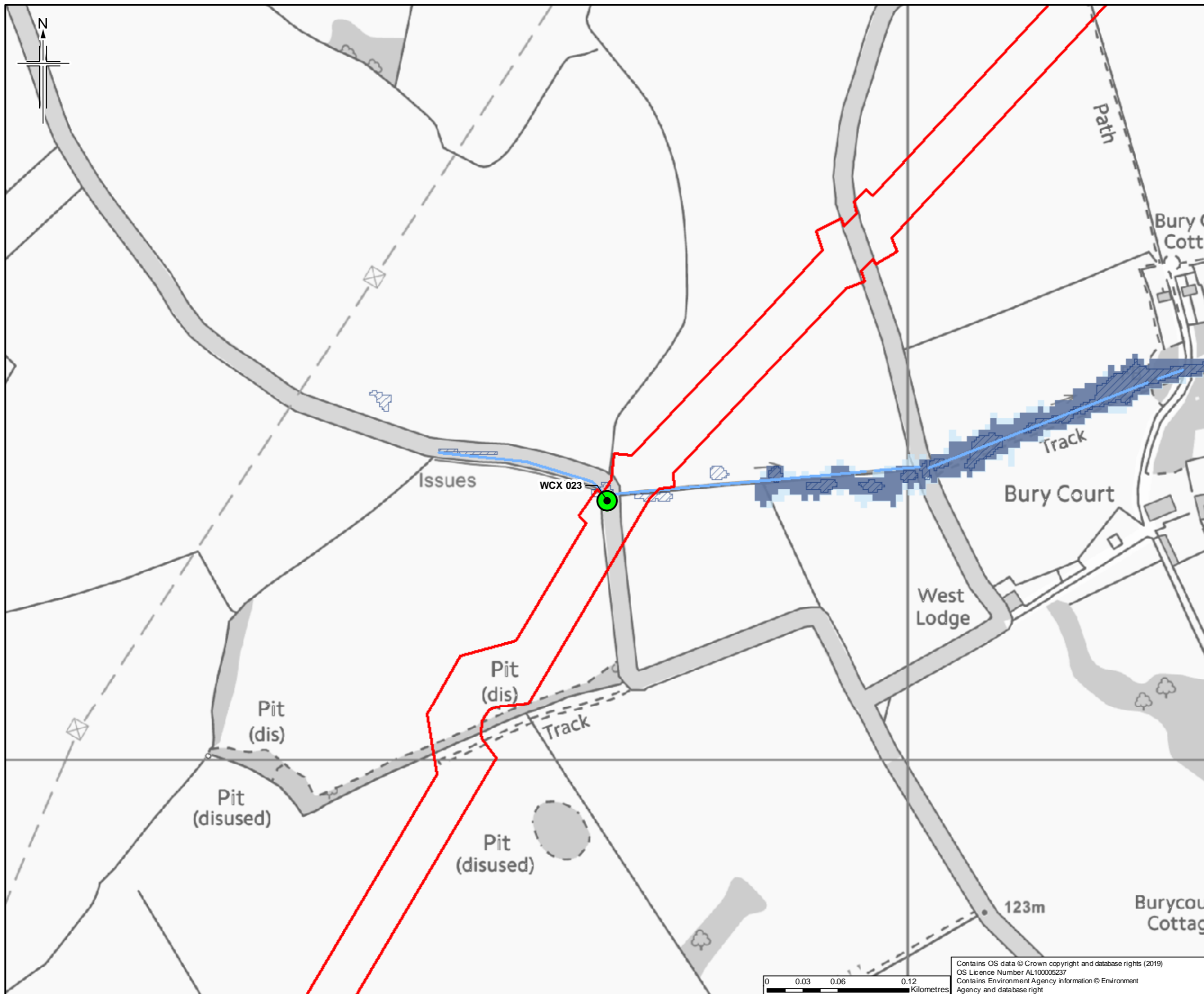
Drawing title
 FLOOD RISK ASSESSMENT
 RYEBRIDGE STREAM CROSSING
 (WCX 021) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
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Drawing number	Figure C21 Sheet 1 of 1
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- Legend**
- Order Limits
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

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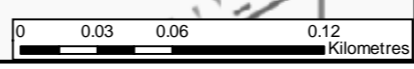
Project

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Drawing title

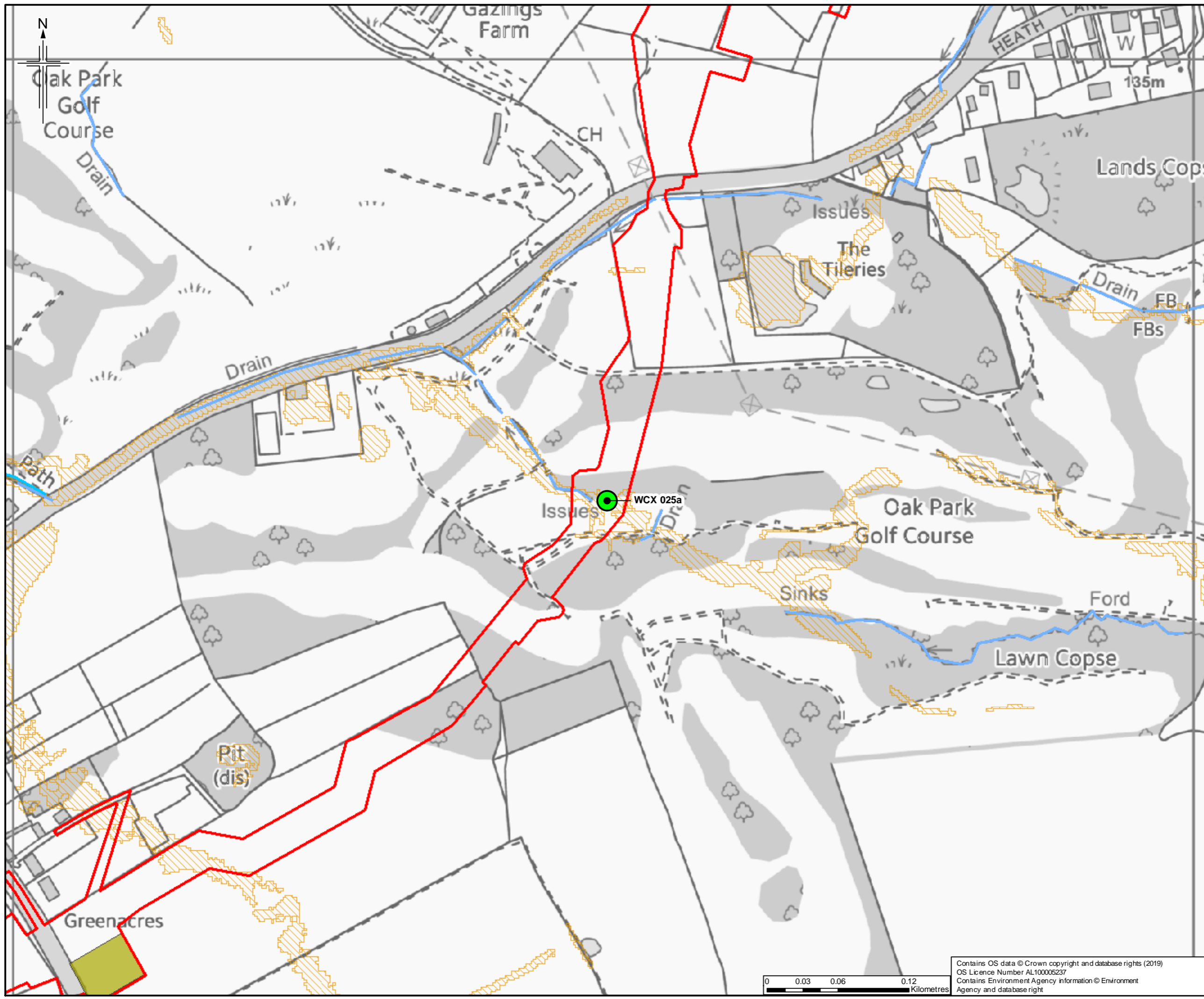
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 APFP Reg. (2009) 5(2)(l)

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Scale	1:3,000 @ A3 DO NOT SCALE
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- Legend**
- █ Order Limits
 - Construction compound
 - Main River
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section E

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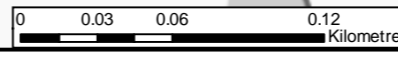
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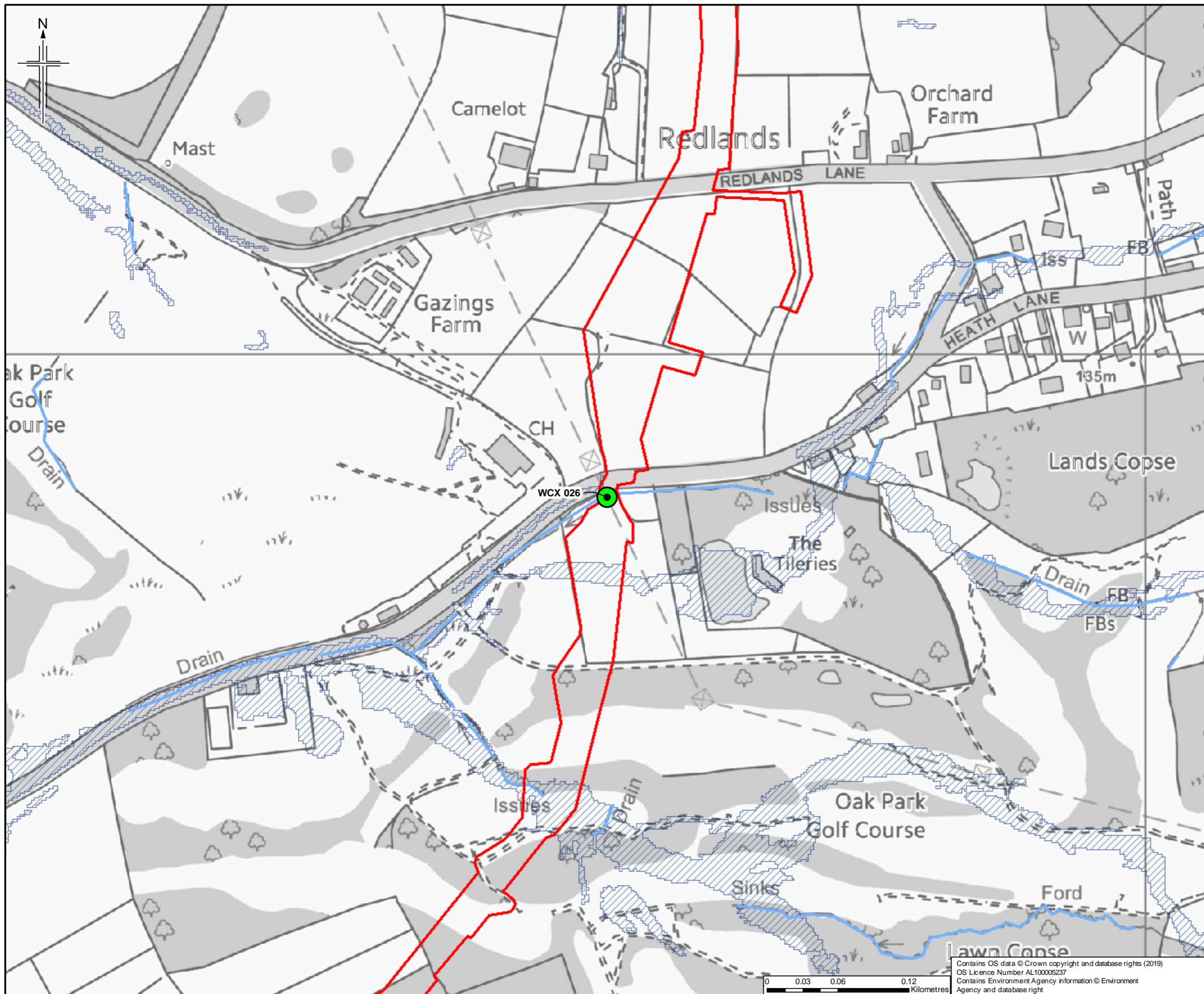
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 CROSSING (WCX 025a) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

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Legend

- ▭ Order Limits
- Ordinary Watercourse
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Crossing identification number

Sheet displays parts of Section E

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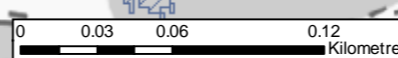
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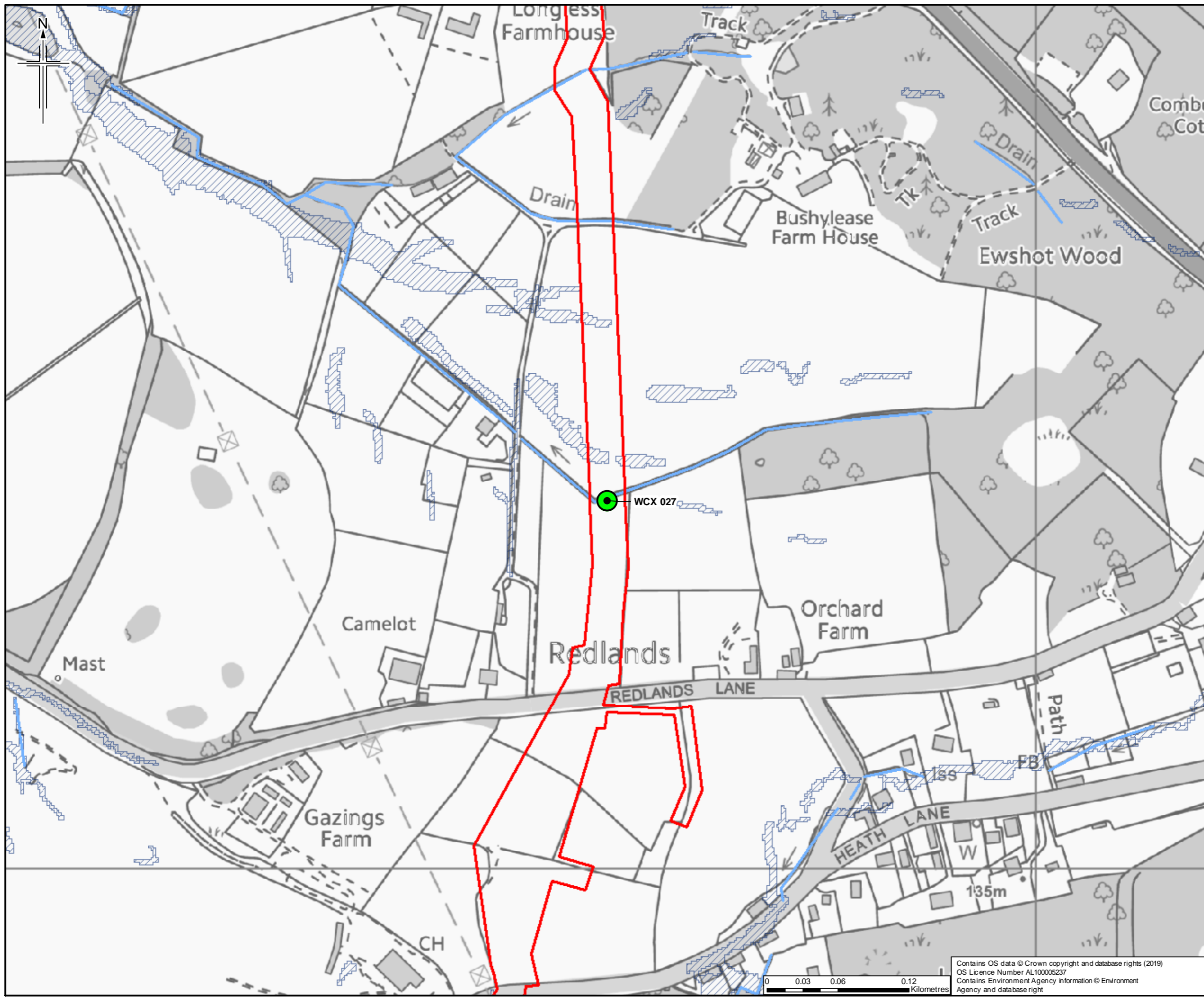
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 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3 000 @ A3 DO NOT SCALE
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Drawing number	Figure C24 Sheet 1 of 1
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- Legend**
- ▭ Order Limits
 - Ordinary Watercourse
 - ▨ Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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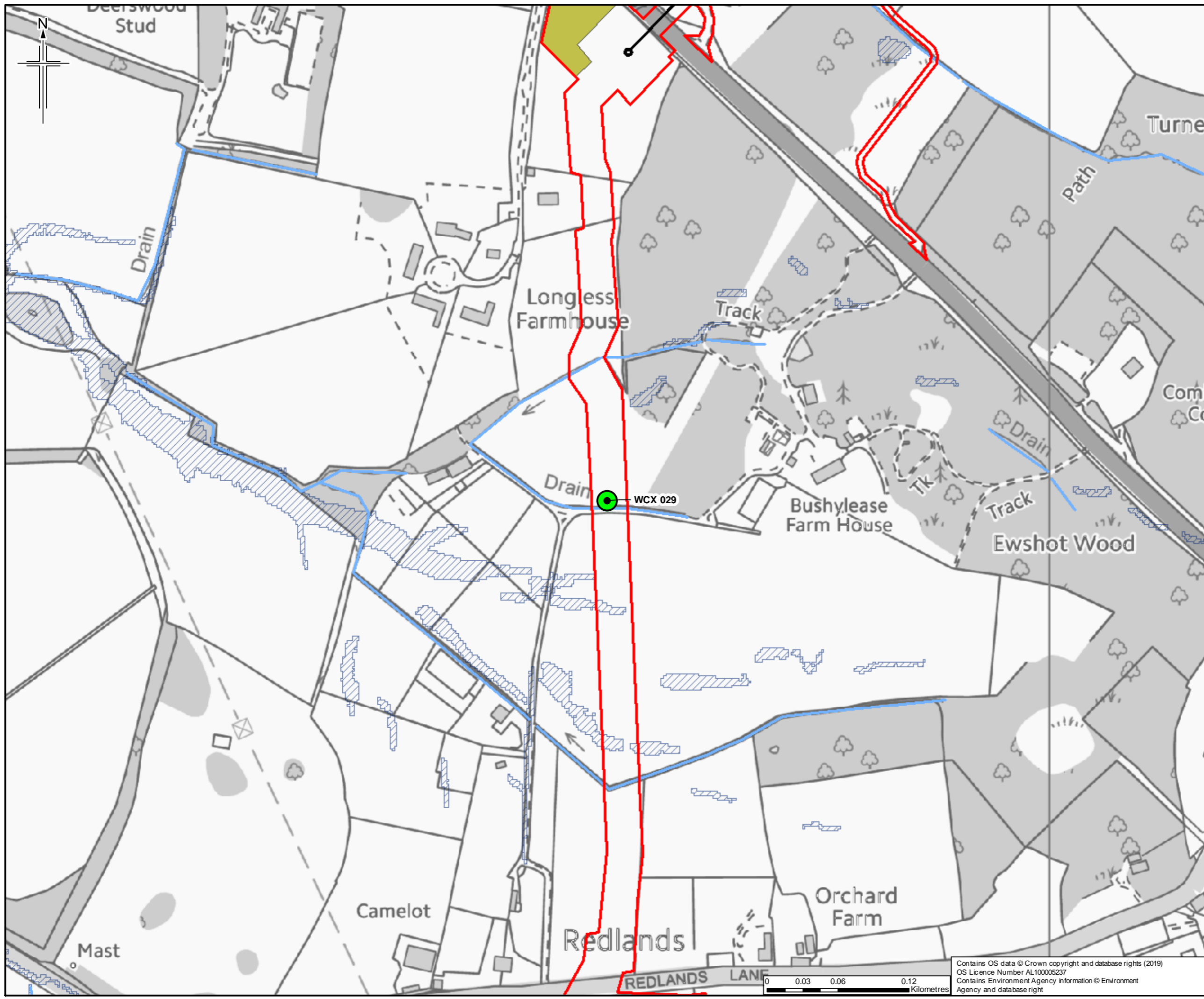


Drawing title
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CROSSING (WCX 027) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
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Drawing number	Figure C25 Sheet 1 of 1
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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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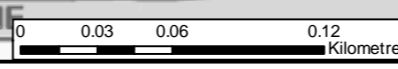
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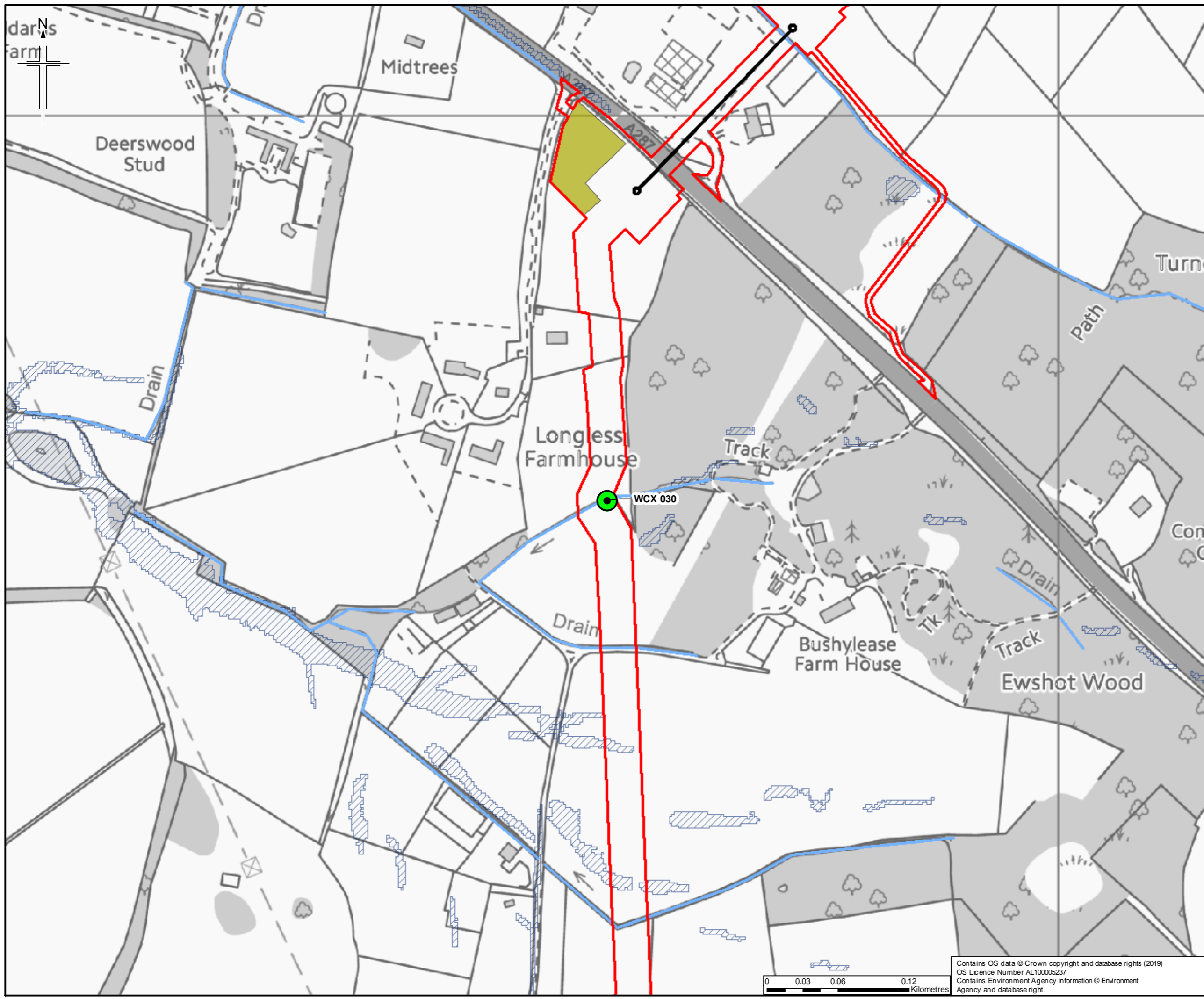
Project
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Drawing title
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 CROSSING (WCX 029) FLOODING RISK DATA
 APFP Reg. (2009) 5(2)(l)**

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

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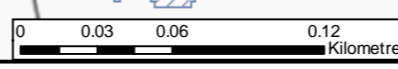
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
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 KT22 8UX

Project
 Southampton to London Pipeline Project

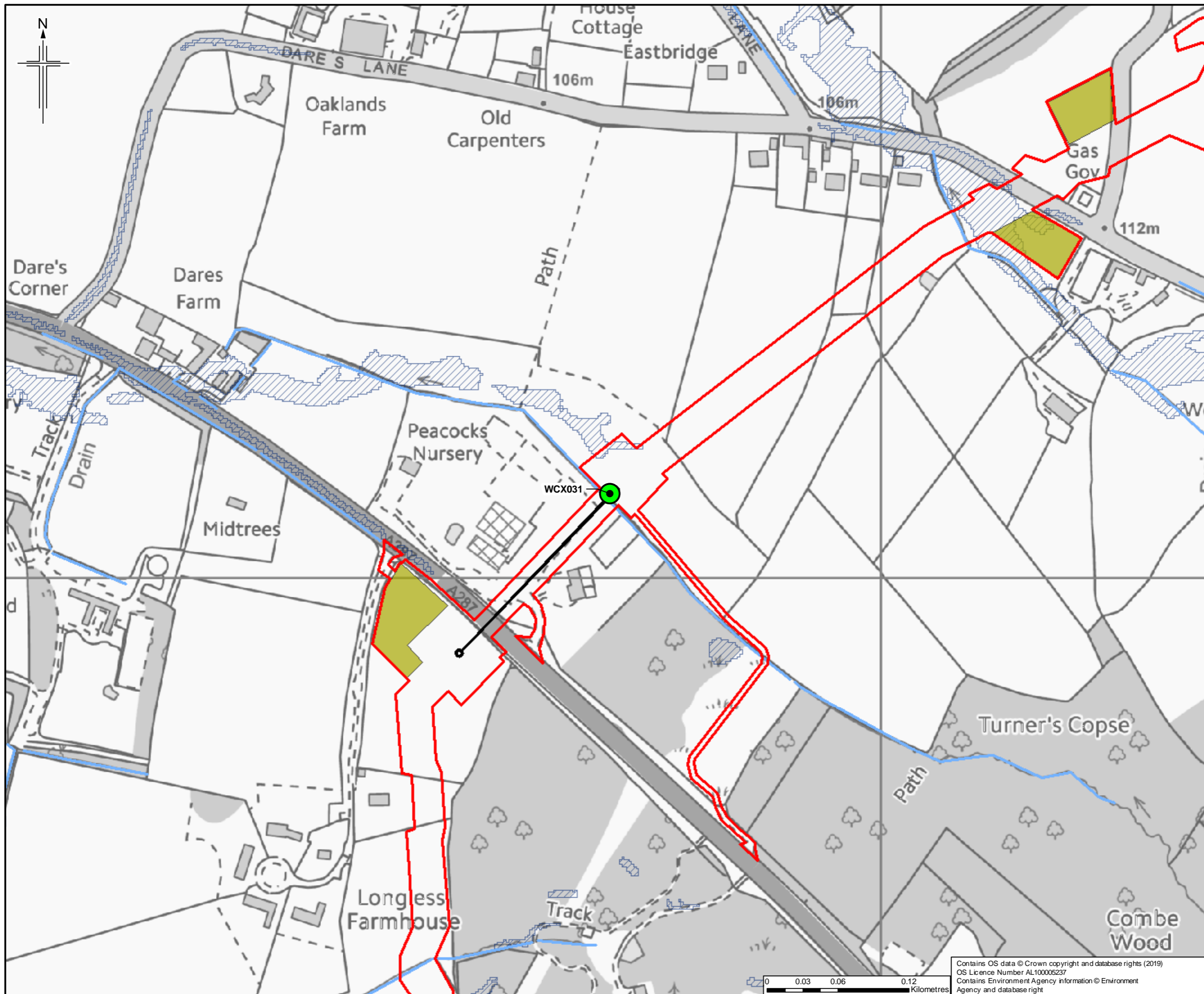
Drawing title
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 UNNAMED WATERCOURSE
 CROSSING (WCX 030) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project Wise No.	B2325300-JAC-000-ENV-DRG-001189
Drawing number	Figure C27 Sheet 1 of 1
	Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Appr'd
0	09/04/2019	For Issue				



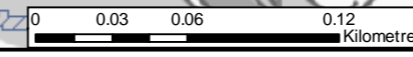
Client
Esso Petroleum Company, Limited
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Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

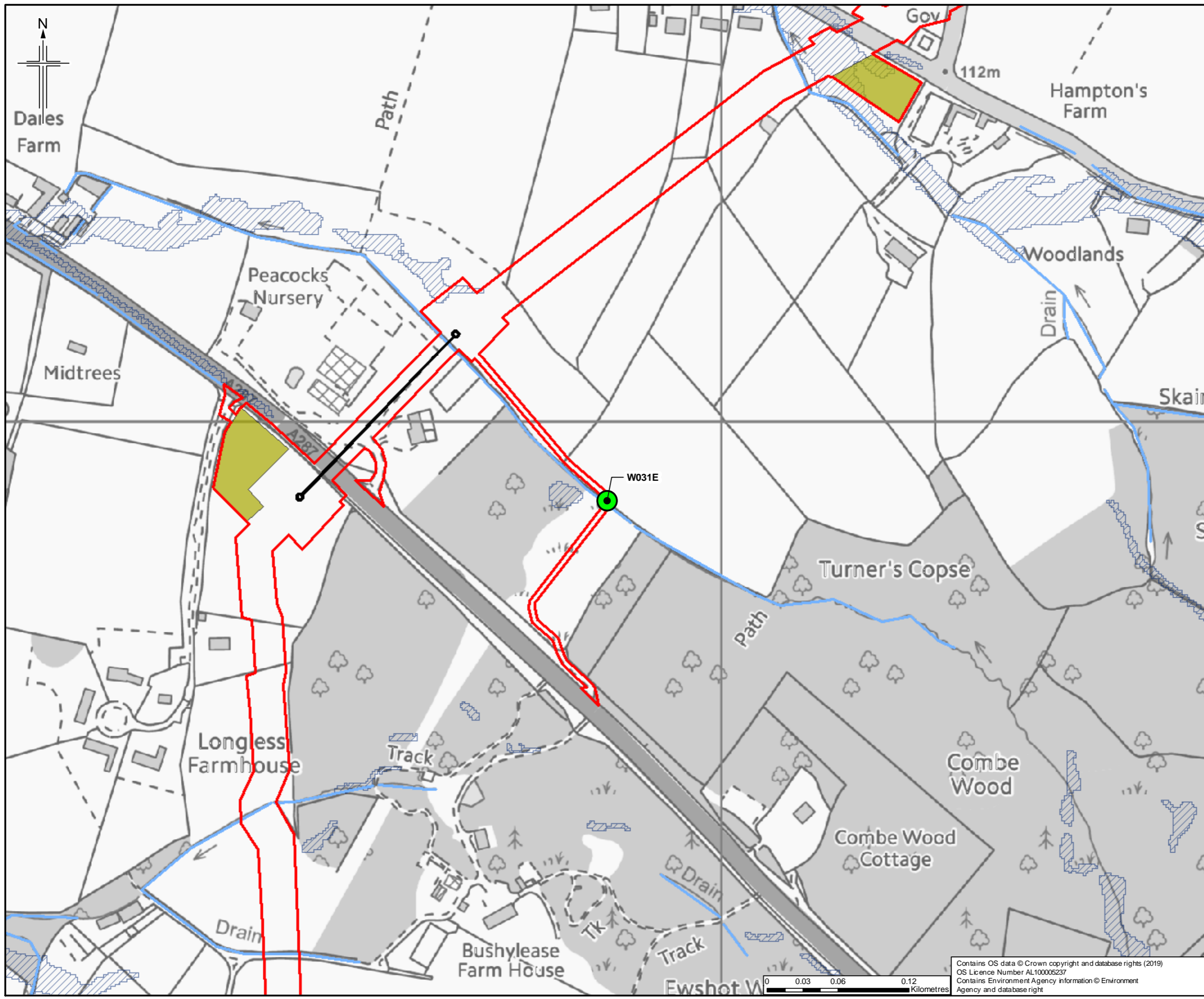


Drawing title
**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 031) FLOODING RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	Scale
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ProjectWise No.	B2325300-JAC-000-ENV-DRG-001190	
Drawing number	Figure C28 Sheet 1 of 1	Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue				



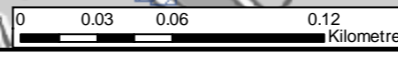
Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
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KT22 8UX

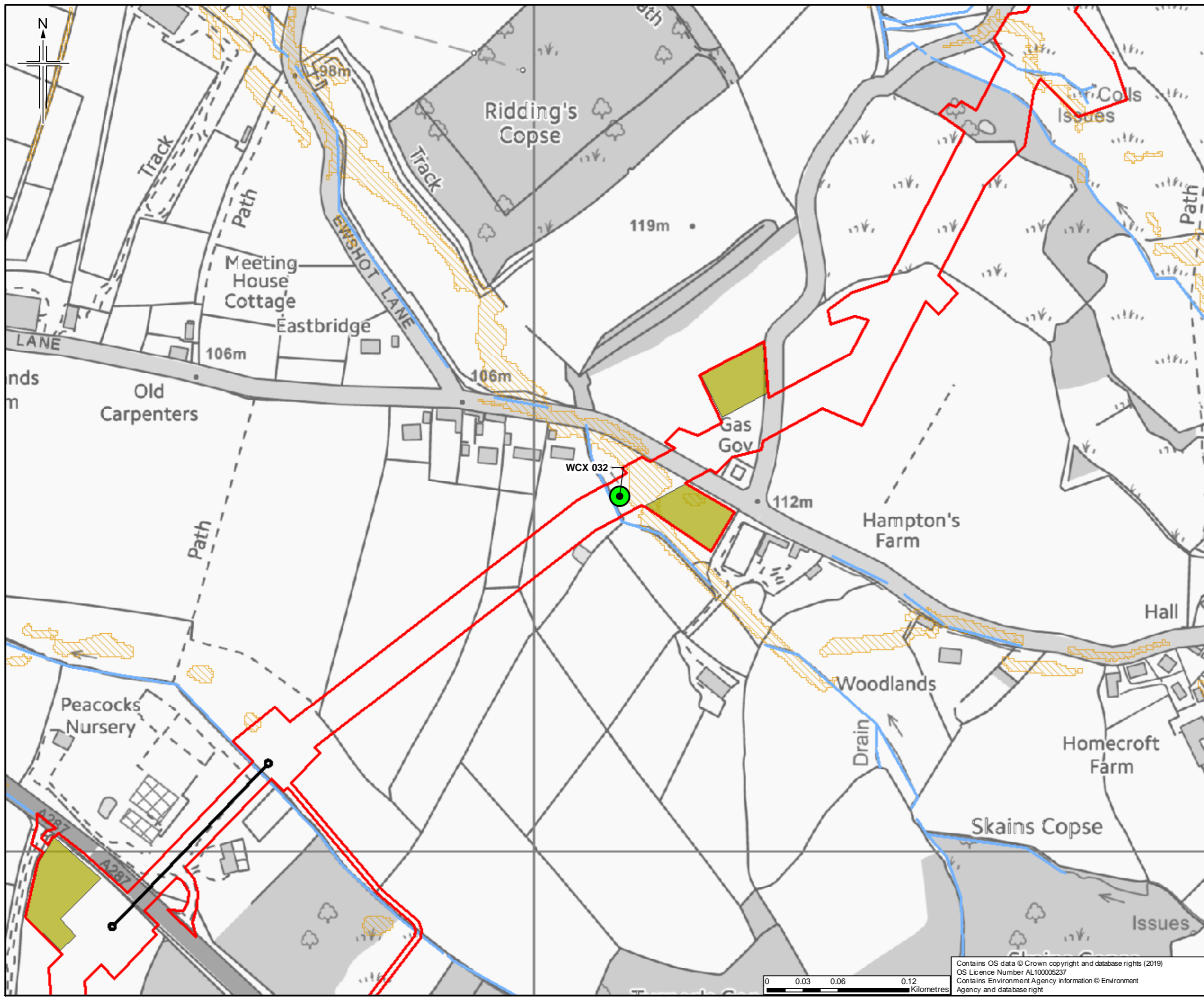


Drawing title
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UNNAMED WATERCOURSE
(W031 EAST ACCESS) CROSSING
FLOOD RISK DATA
APFP Reg. (2009) 5(2)(f)

Drawing Status	For Issue	Scale
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Jacobs No.	B2325300	
Project/Work No.	B2325300-JAC-000-ENV-DRG-001231	
Drawing number	Figure C29 Sheet 1 of 1	Rev 0

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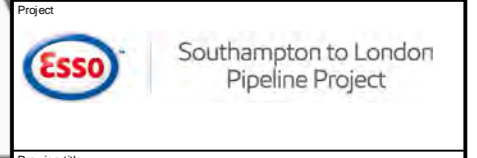
- Legend**
- ▭ Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Check'd	Rev'd	Apprv'd
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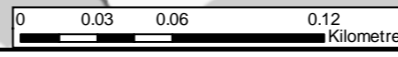
Client
Esso Petroleum Company, Limited
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Leatherhead,
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KT22 8UX

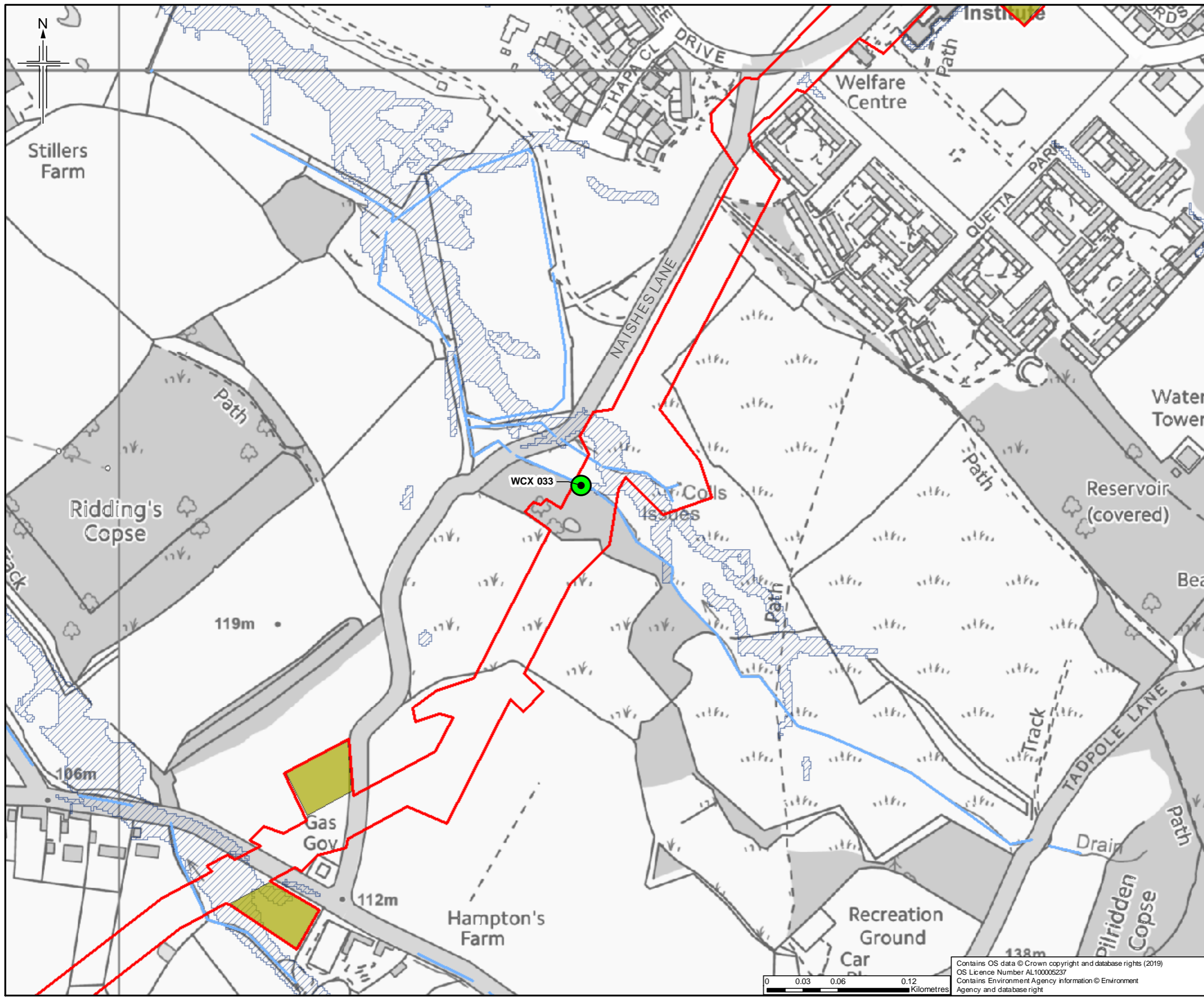


Drawing title
**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 032) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
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Project Wise No.	B 2325300-JAC-000-ENV-DRG-001191
Drawing number	Figure C30 Sheet 1 of 1
Rev	0

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- Legend**
- Order Limits
 - Construction compound
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue	SY	FW	SM	SH

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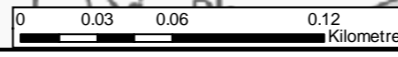
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

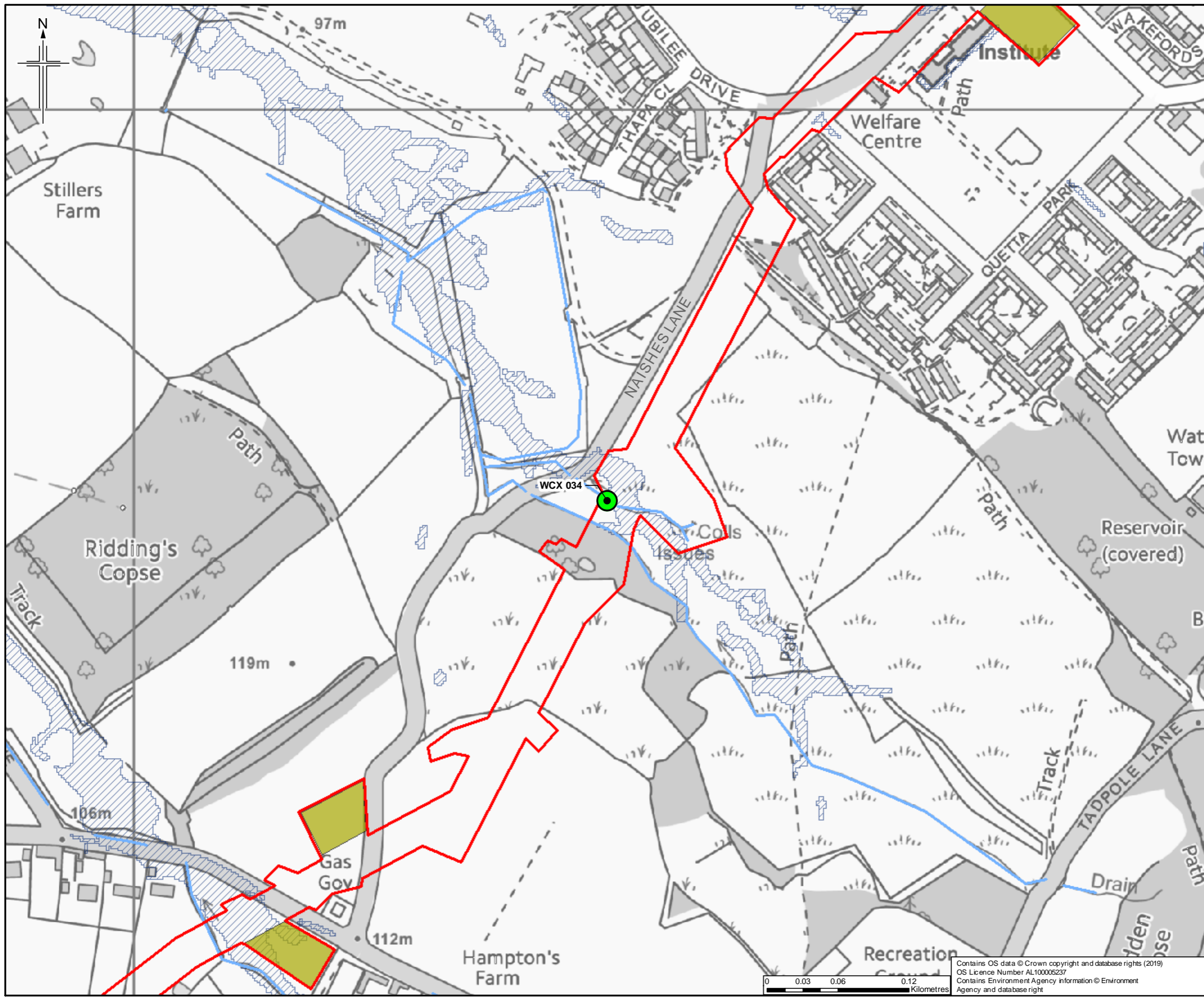
Project
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Drawing title
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 UNNAMED WATERCOURSE
 CROSSING (WCX 033) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
Project/Work No.	B2325300-JAC-000-ENV-DRG-001192	
Drawing number	Figure C31 Sheet 1 of 1	Rev 0

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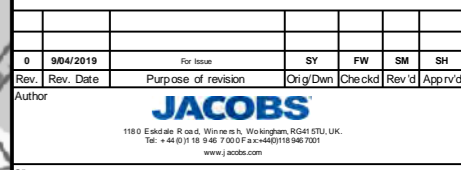


- Legend**
- Order Limits
 - Construction compound
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
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Author



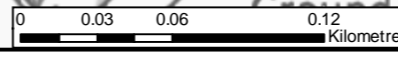
Client
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Leatherhead,
Surrey,
KT22 8UX

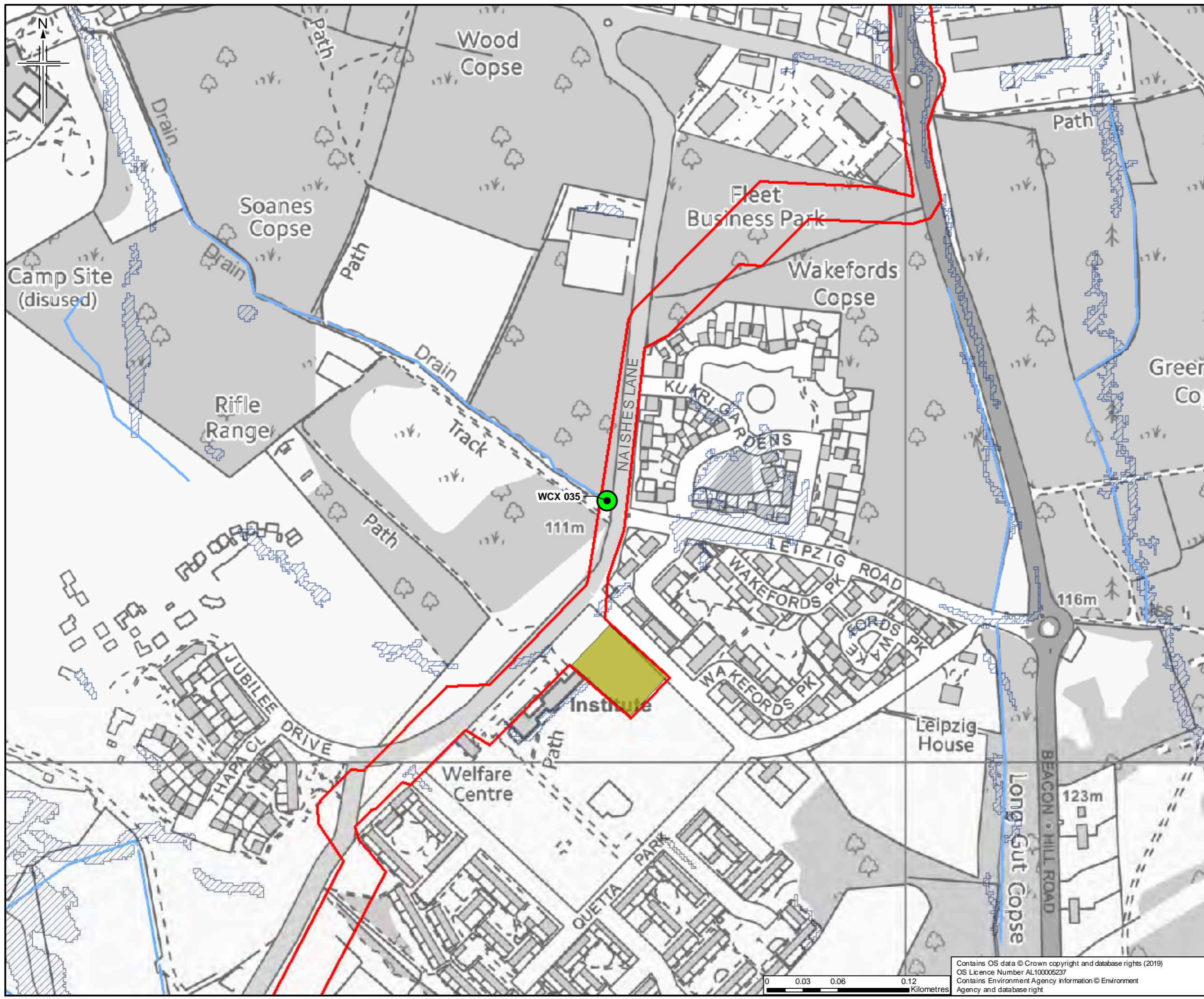


Drawing title
**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 034) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status: For Issue
Scale: 1:3,000 @ A3 DO NOT SCALE
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Project Wise No.: B2325300-JAC-000-ENV-DRG-001193
Drawing number: Figure C32 Sheet 1 of 1 Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Ordinary Watercourse
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section E

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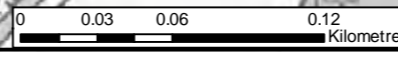
Client
 Esso Petroleum Company, Limited
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 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

Project
 Southampton to London Pipeline Project

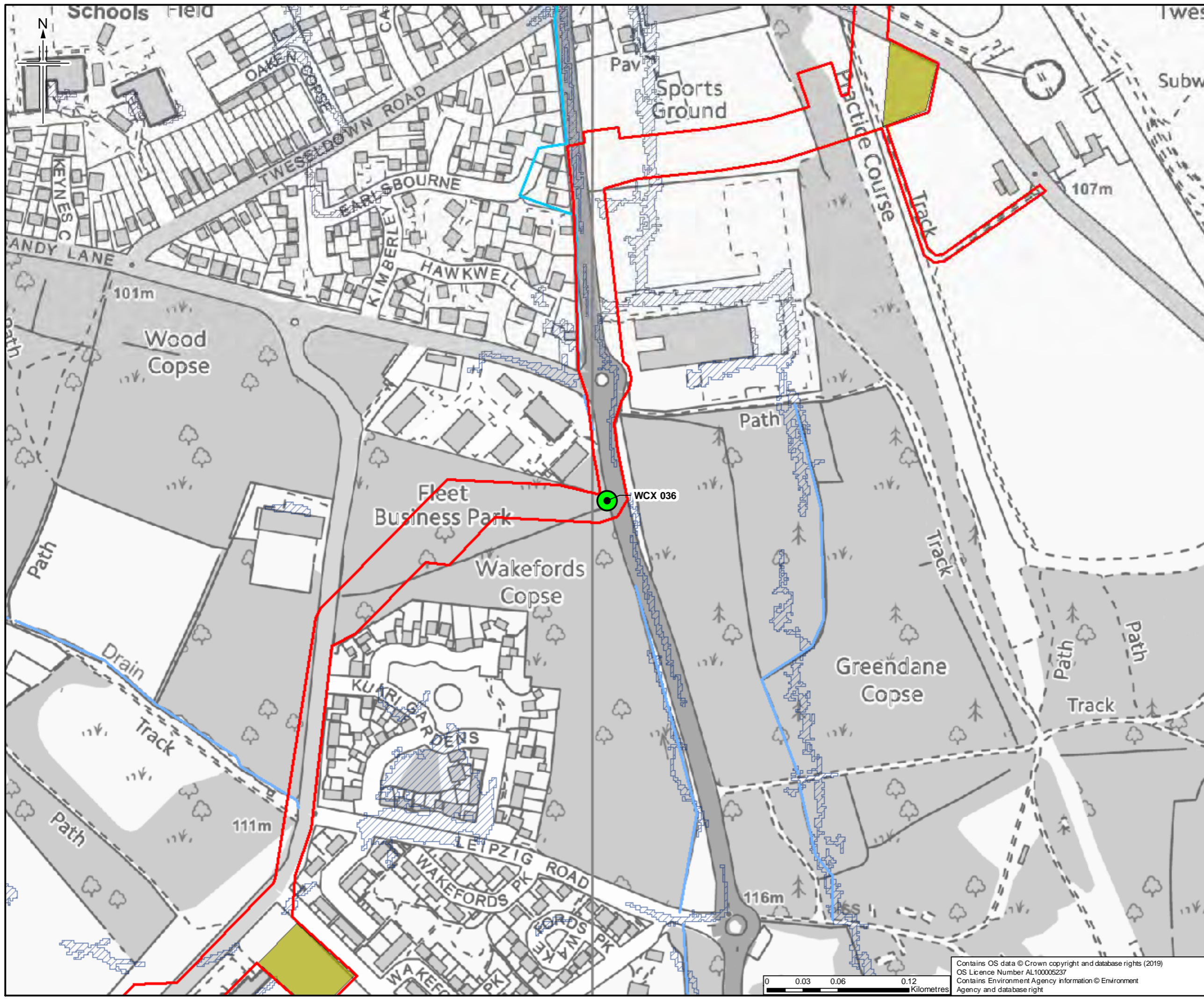
Drawing title
**FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 CROSSING (WCX 035) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project Wise No.	B2325300-JAC-000-ENV-DRG-001194
Drawing number	Figure C33 Sheet 1 of 1
Rev	0

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- Legend**
- Order Limits
 - Construction compound
 - Main River
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue	SY	FW	SM	SH

Author: **JACOBS**
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 www.jacobs.com

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 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

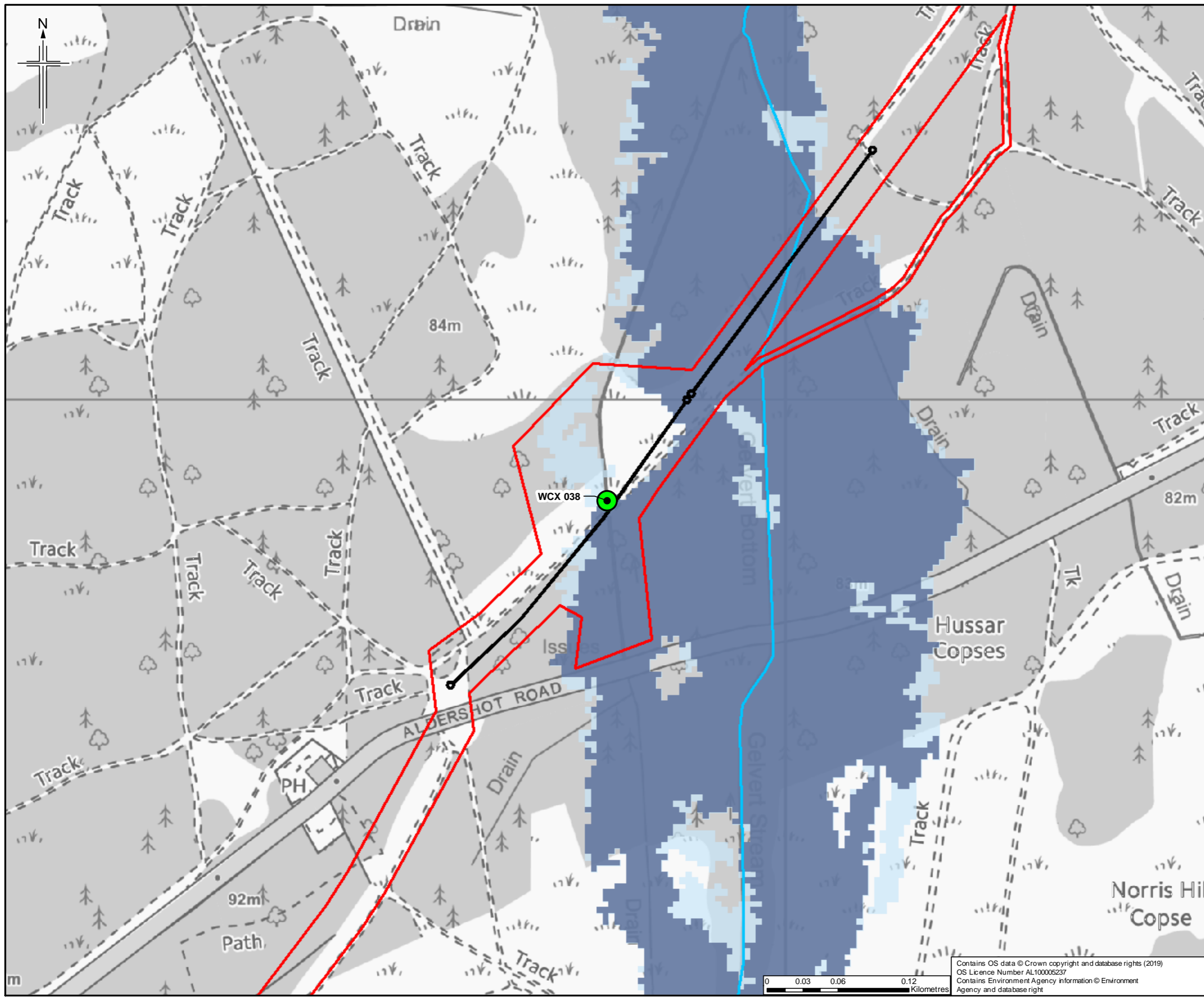
Project: Southampton to London Pipeline Project

Drawing title: **FLOOD RISK ASSESSMENT UNNAMED WATERCOURSE CROSSING (WCX 036) FLOOD RISK DATA APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
Project Wise No.	B2325300-JAC-000-ENV-DRG-001195	
Drawing number	Figure C34 Sheet 1 of 1	Rev 0

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- Legend**
- Order Limits
 - Trenchless crossing
 - Main River
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

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Client
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 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

Project

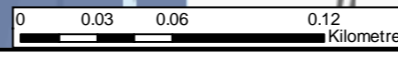
Southampton to London Pipeline Project

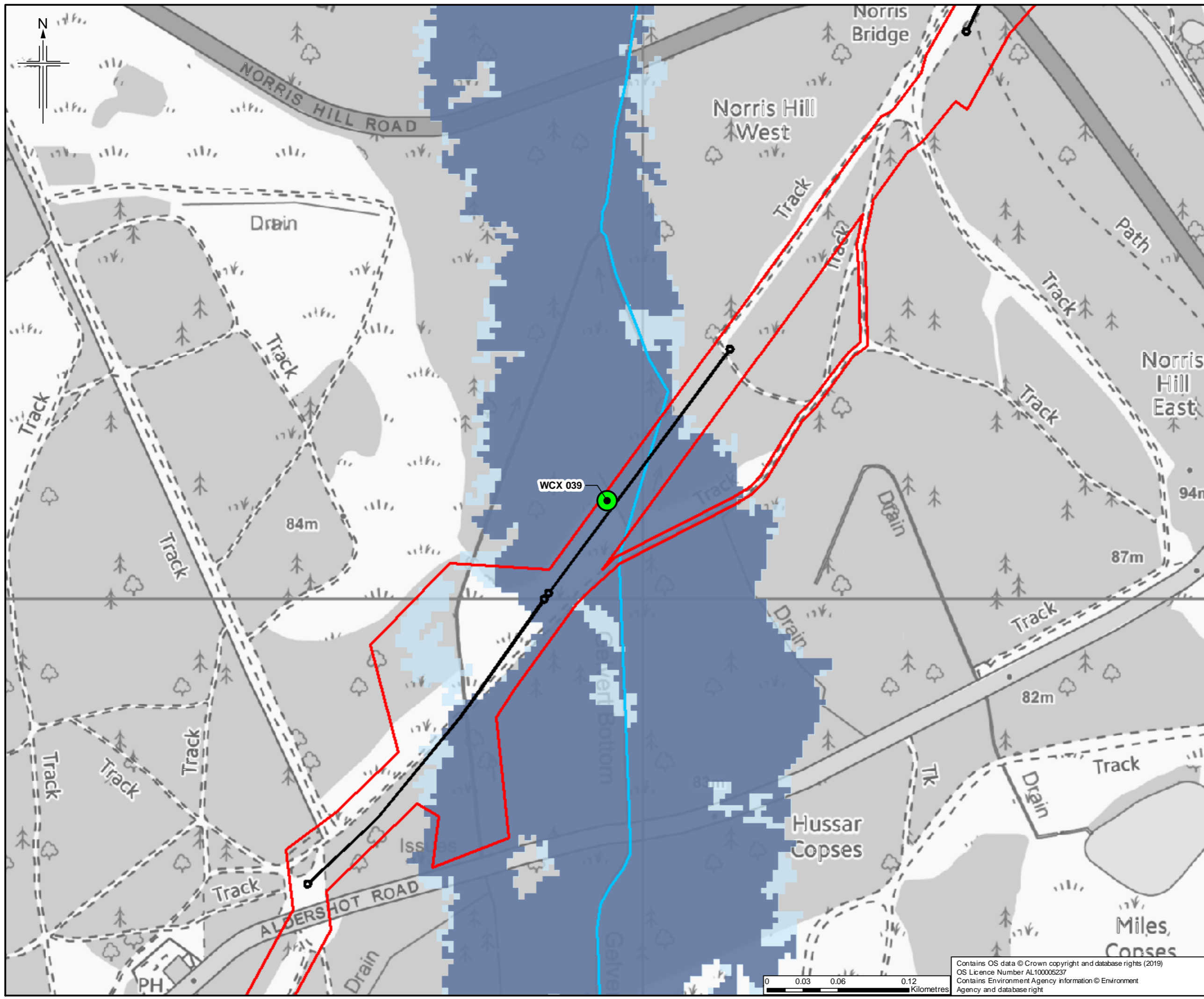
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FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 CROSSING (WCX 038) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project/Revision No.	B2325300-JAC-000-ENV-DRG-001146
Drawing number	Figure C35 Sheet 1 of 1
	Rev 0

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- Legend**
- ▭ Order Limits
 - Trenchless crossing
 - Main River
 - ▭ Flood Zone 2
 - ▭ Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section E

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Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

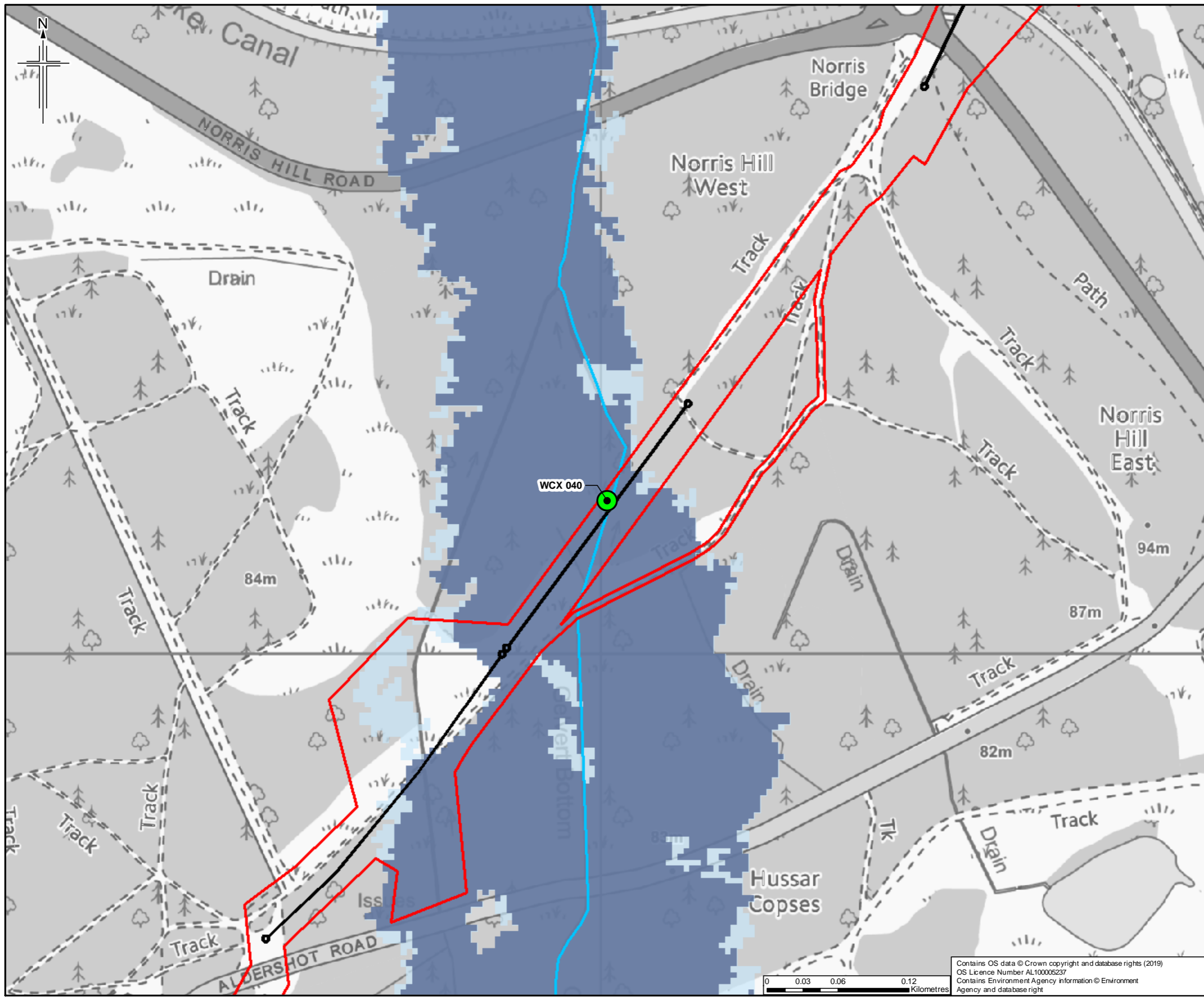


Drawing title
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UNNAMED WATERCOURSE
CROSSING (WCX 039) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project Wise No.	B2325300-JAC-000-ENV-DRG-001147
Drawing number	Figure C36 Sheet 1 of 1
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Legend

- ▭ Order Limits
- Trenchless crossing
- Main River
- Flood Zone 2
- Flood Zone 3
- Crossing identification number

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Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Check'd	Rev'd	Apprv'd
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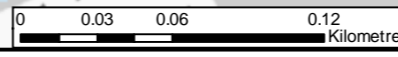
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

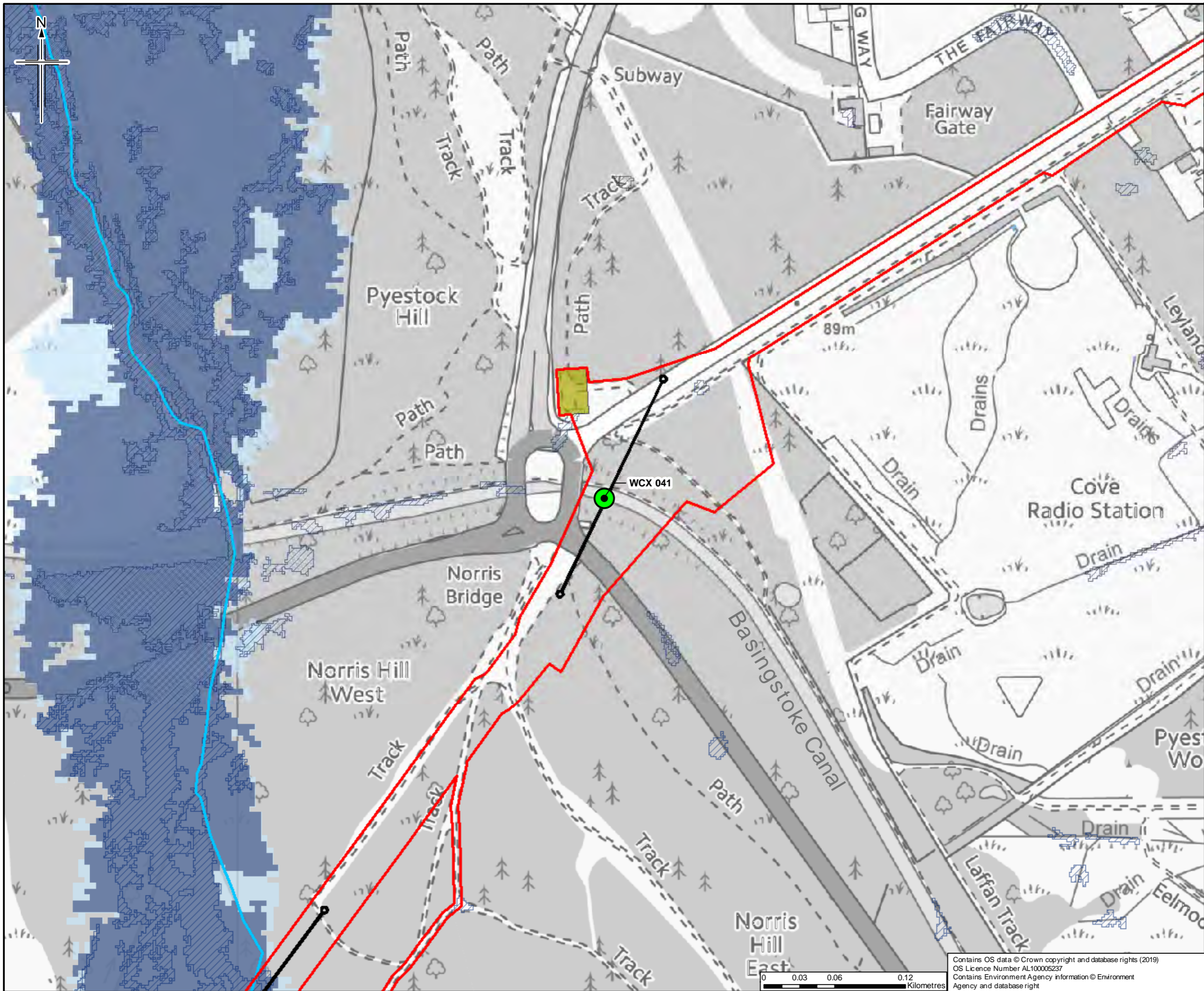
Project
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Drawing title
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 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
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Project Wise No.	B2325300-JAC-000-ENV-DRG-001148
Drawing number	Figure C37 Sheet 1 of 1
Rev	0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section E

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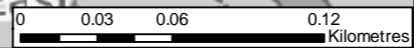
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

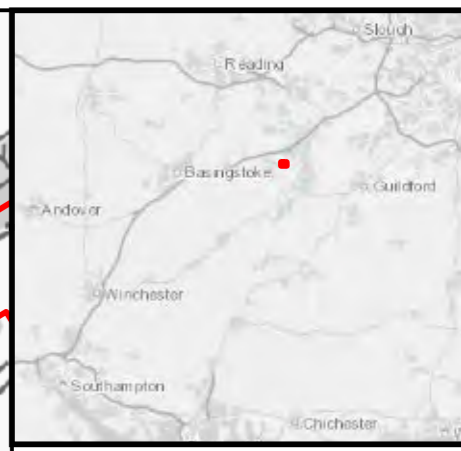
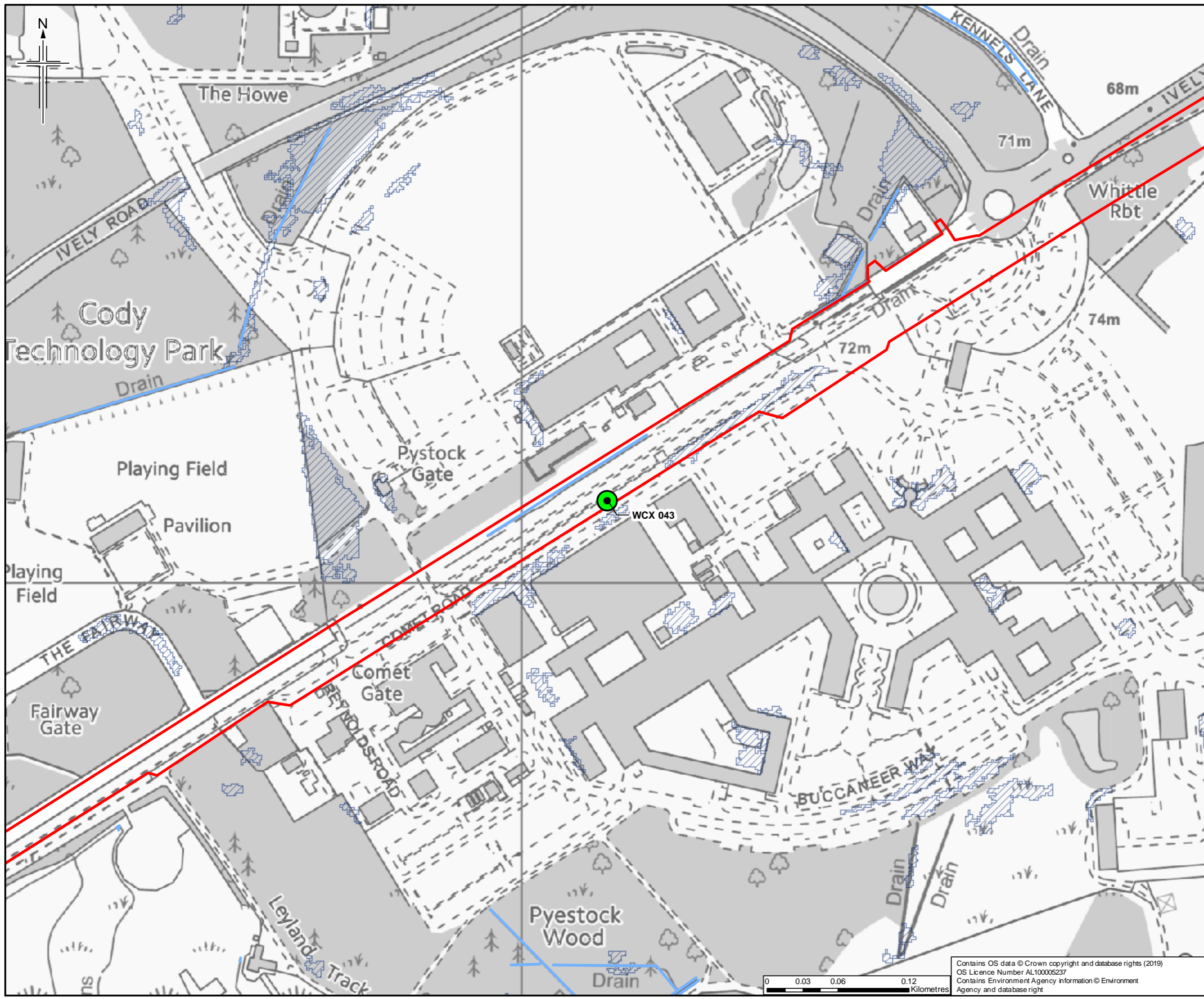
Project
 Southampton to London Pipeline Project

Drawing title
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 BASINGSTOKE CANAL CROSSING
 (WCX 041) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
Project/Work No.	B2325300-JAC-000-ENV-DRG-001221	
Drawing number	Figure C38 Sheet 1 of 1	Rev 0

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- Legend**
- ▬ Order Limits
 - ▬ Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue				



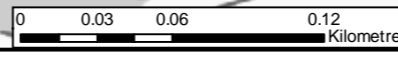
Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX



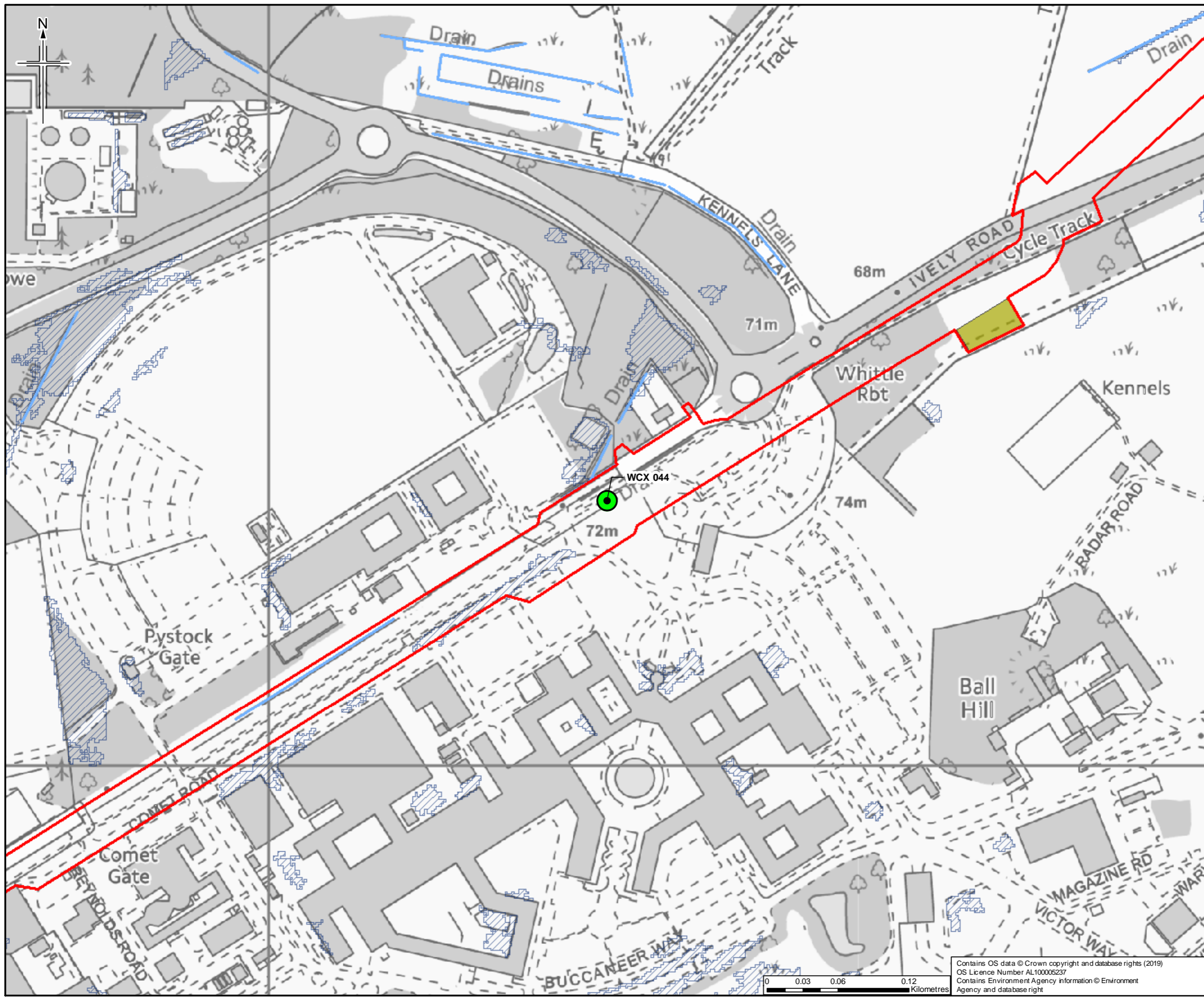
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UNNAMED WATERCOURSE
CROSSING (WCX 043) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001196
Drawing number	Figure C39 Sheet 1 of 1
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- Legend**
- ▬ Order Limits
 - Construction compound
 - ▬ Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue	SY	FW	SM	SH

Author

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Client
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 Ermyn Way,
 Leatherhead,
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 KT22 8UX

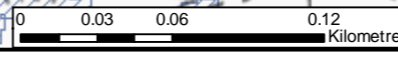
Project
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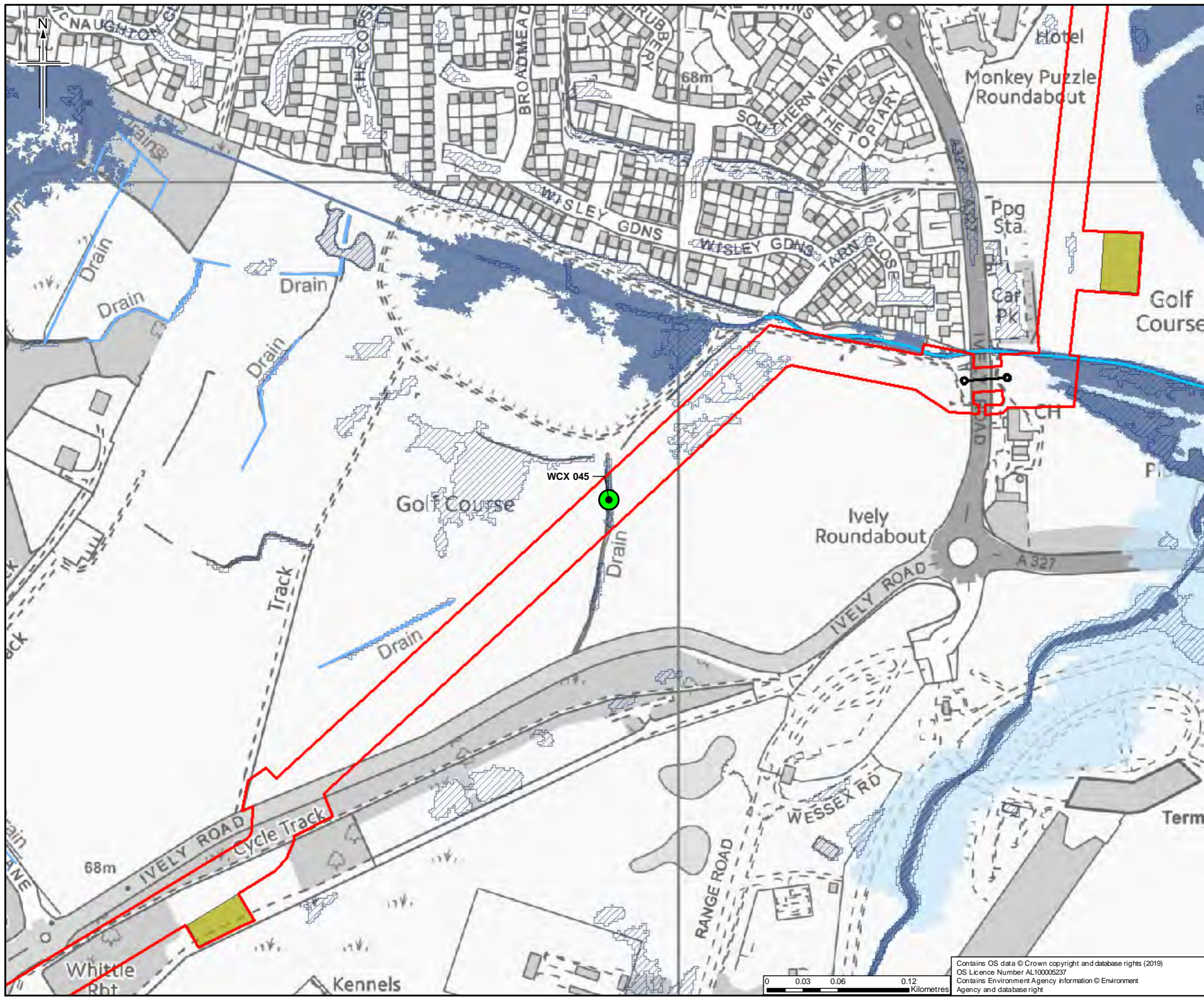
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 CROSSING (WCX 044) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001197
Drawing number	Figure C40 Sheet 1 of 1
Rev	0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue				

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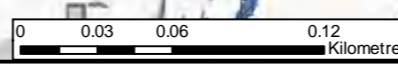
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

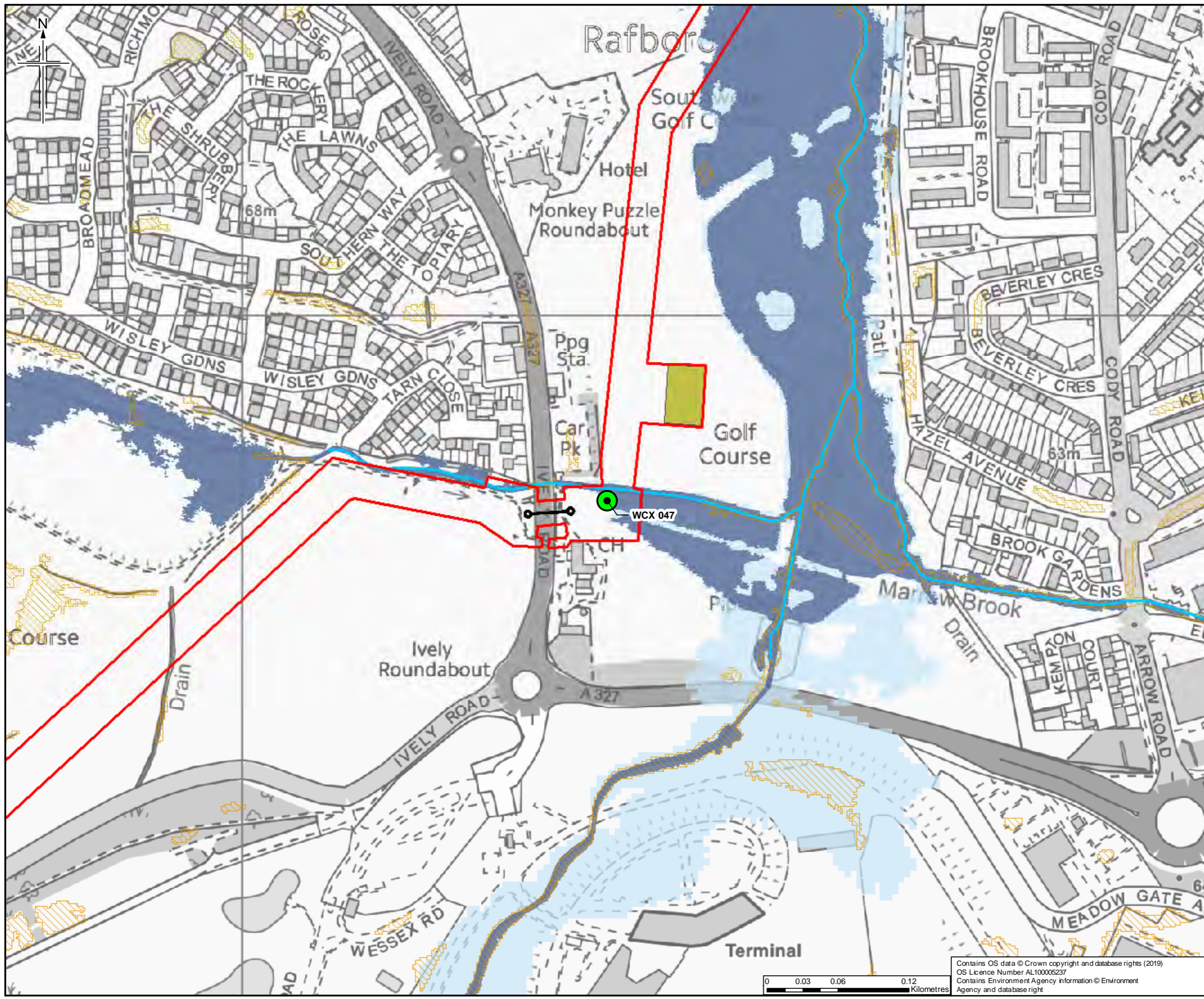
Project
 Southampton to London Pipeline Project

Drawing title
**FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 CROSSING (WCX 045) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project/Work No.	B2325300-JAC-000-ENV-DRG-001198
Drawing number	Figure C41 Sheet 1 of 1
	Rev 0

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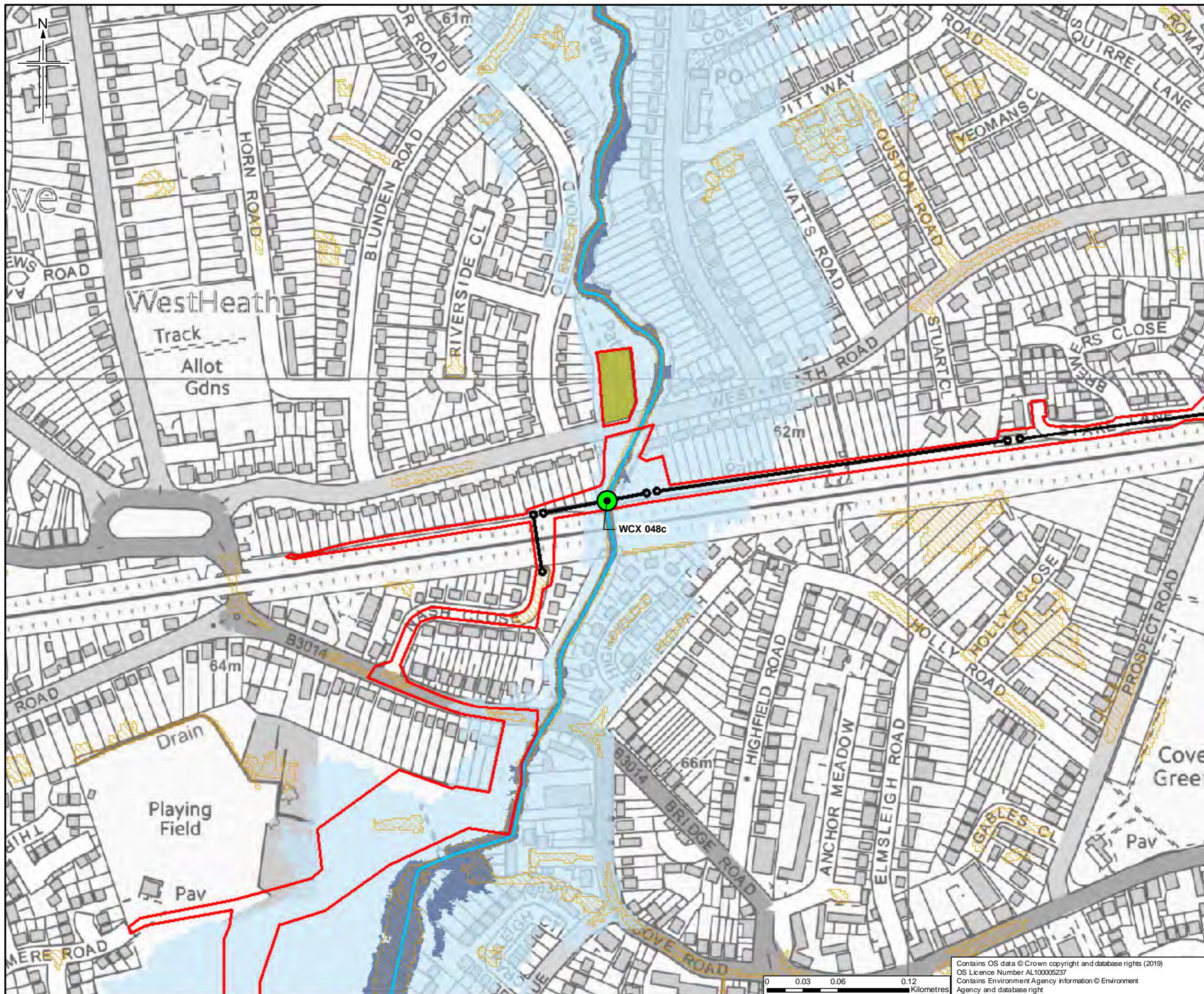
Legend

- ▭ Order Limits
- ▭ Construction compound
- Trenchless crossing
- Main River
- ▨ Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- ▭ Flood Zone 2
- ▭ Flood Zone 3
- Crossing identification number

Sheet displays parts of Section D and Section E

Rev.	0	09/04/2019	For Issue	SY	FW	SM	SH
Rev.			Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
Author	<p align="center">JACOBS <small>1180 Epsom Road, Wokingham, Wokingham, RG40 3TU, UK Tel: +44 (0) 135 945 7000 Fax: +44(0)135 945 7001 www.jacobs.com</small></p>						
Client	<p>Esso Petroleum Company, Limited Ermyn House, Ermyn Way, Leatherhead, Surrey, KT22 8UX</p>						
Project	<p align="center">Esso Southampton to London Pipeline Project</p>						
Drawing title	<p align="center">FLOOD RISK ASSESSMENT IVELEY BROOK (FORMERLY NAMED UNNAMED WATERCOURSE 37) CROSSING (WCX 047) FLOOD RISK DATA APFP Reg. (2009) 5(2)(l)</p>						
Drawing Status	For Issue						
Scale	1:3,000			@ A3		DO NOT SCALE	
Jacobs No.	B2325300						
Project/Work No.	B2325300-JAC-000-ENV-DRG-001149						
Drawing number	Figure C42 Sheet 1 of 1						Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

JACOBS
 1180 Eastlake Road, Wokingham, Wokingham, RG40 3DU, UK
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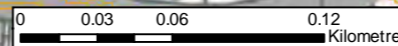
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

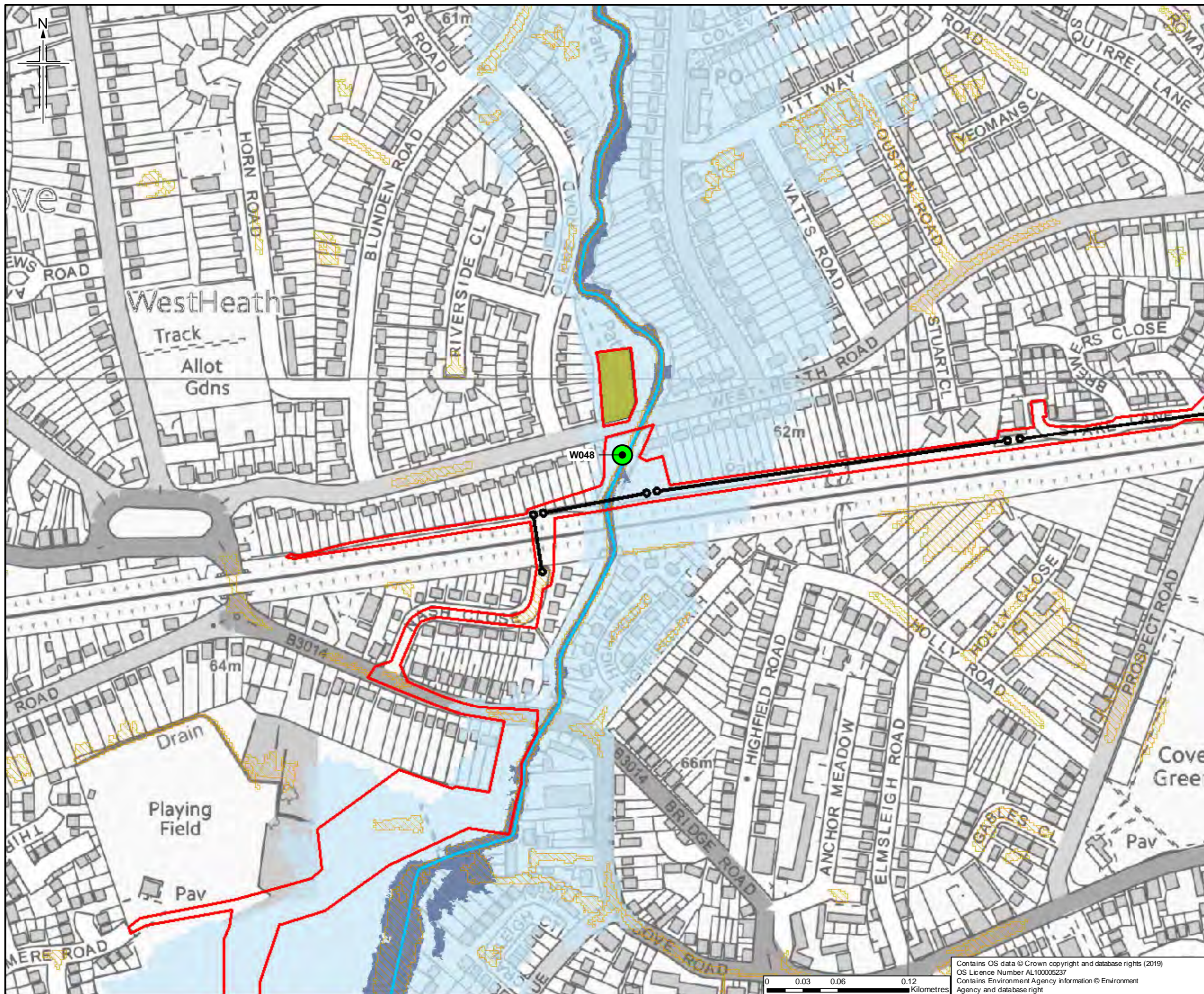
Project
 Southampton to London Pipeline Project

Drawing title
 FLOOD RISK ASSESSMENT
 COVE BROOK CROSSING
 (WCX 048c) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project/Work No.	B2325300-JAC-000-ENV-DRG-001151
Drawing number	Figure C43 Sheet 1 of 1
Rev	0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

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Client
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 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

Project

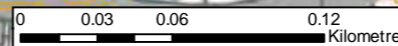
Southampton to London Pipeline Project

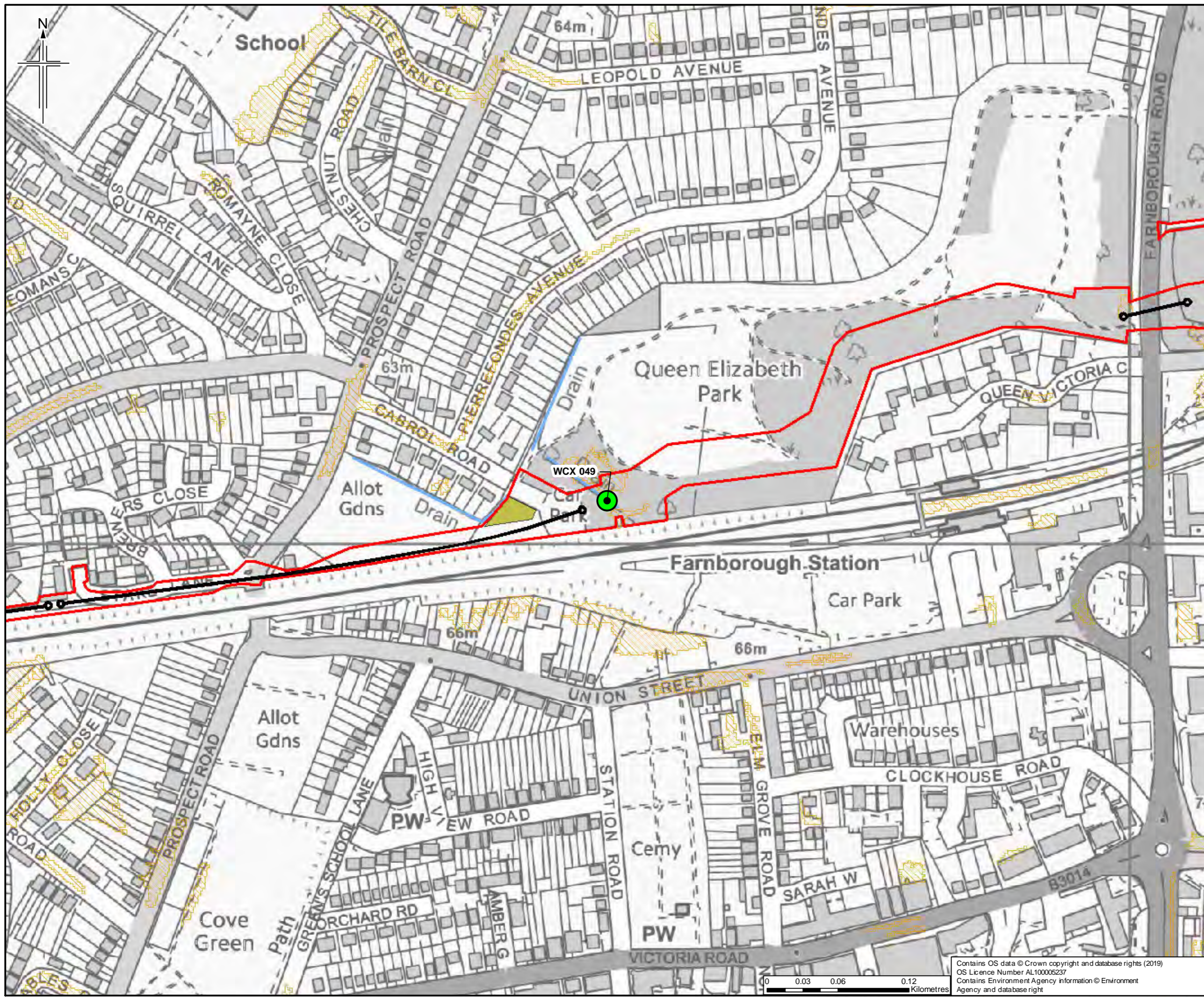
Drawing title

FLOOD RISK ASSESSMENT
 COVE BROOK CROSSING
 (W048) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3 000 @ A3 DO NOT SCALE
Jacobs No.	B 2325300
Project/Work No.	B 2325300-JAC-000-ENV-DRG-001150
Drawing number	Figure C44 Sheet 1 of 1
Rev	0

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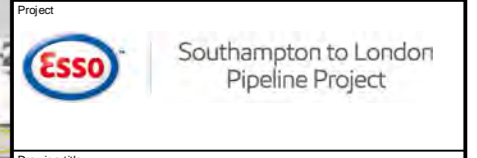
- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue	SY	FW	SM	SH



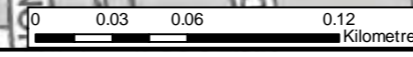
Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

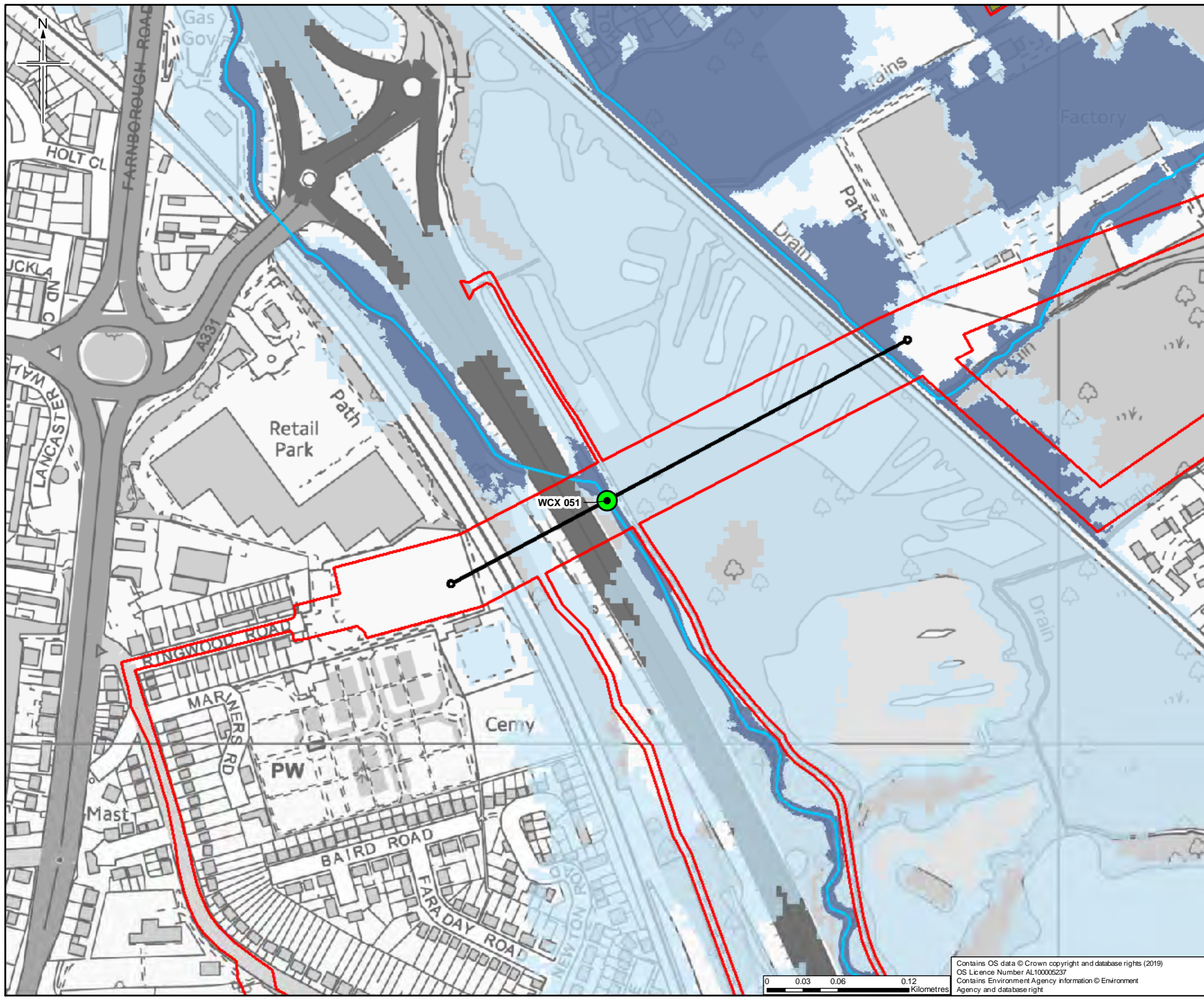


Drawing title
**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 049) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3 000 @ A3 DO NOT SCALE
Jacobs No.	B 232 5300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001199
Drawing number	Figure C45 Sheet 1 of 1
Rev	0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Appr'd
0	09/04/2019	For Issue				



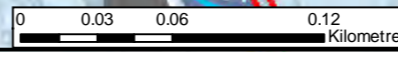
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

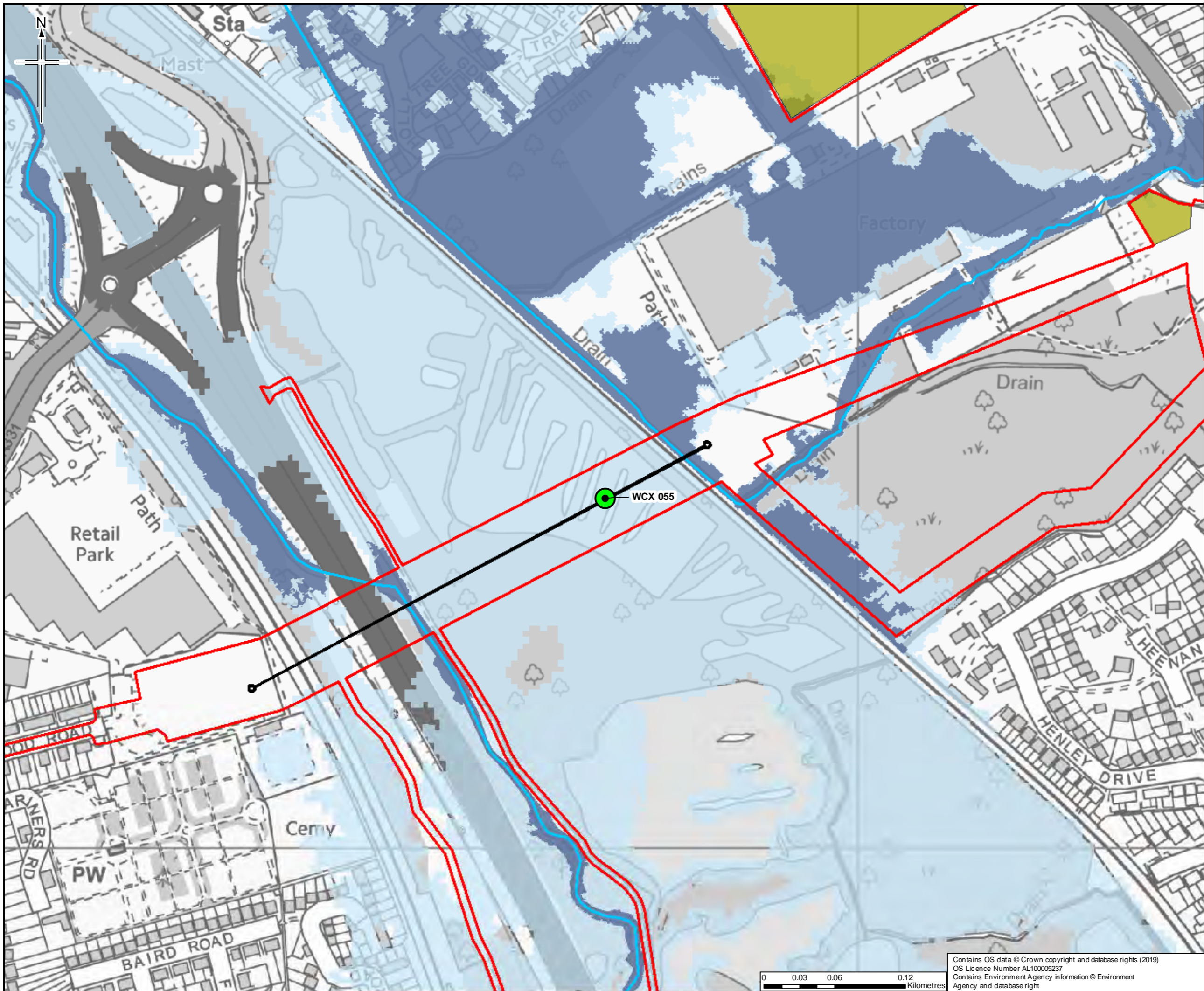


Drawing title
**FLOOD RISK ASSESSMENT
 RIVER BLACKWATER
 CROSSING (WCX 051)
 FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(I)**

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001156	
Drawing number	Figure C46 Sheet 1 of 1	Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

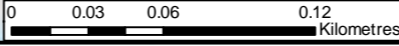
Author: **JACOBS**
 1180 Eddlewell Road, Wokingham, Wokingham, RG40 3DU, UK
 Tel: +44 (0) 118 946 7000 Fax: +44(0)118 946 7001
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Client: Esso Petroleum Company, Limited
 Ermyn House,
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 Leatherhead,
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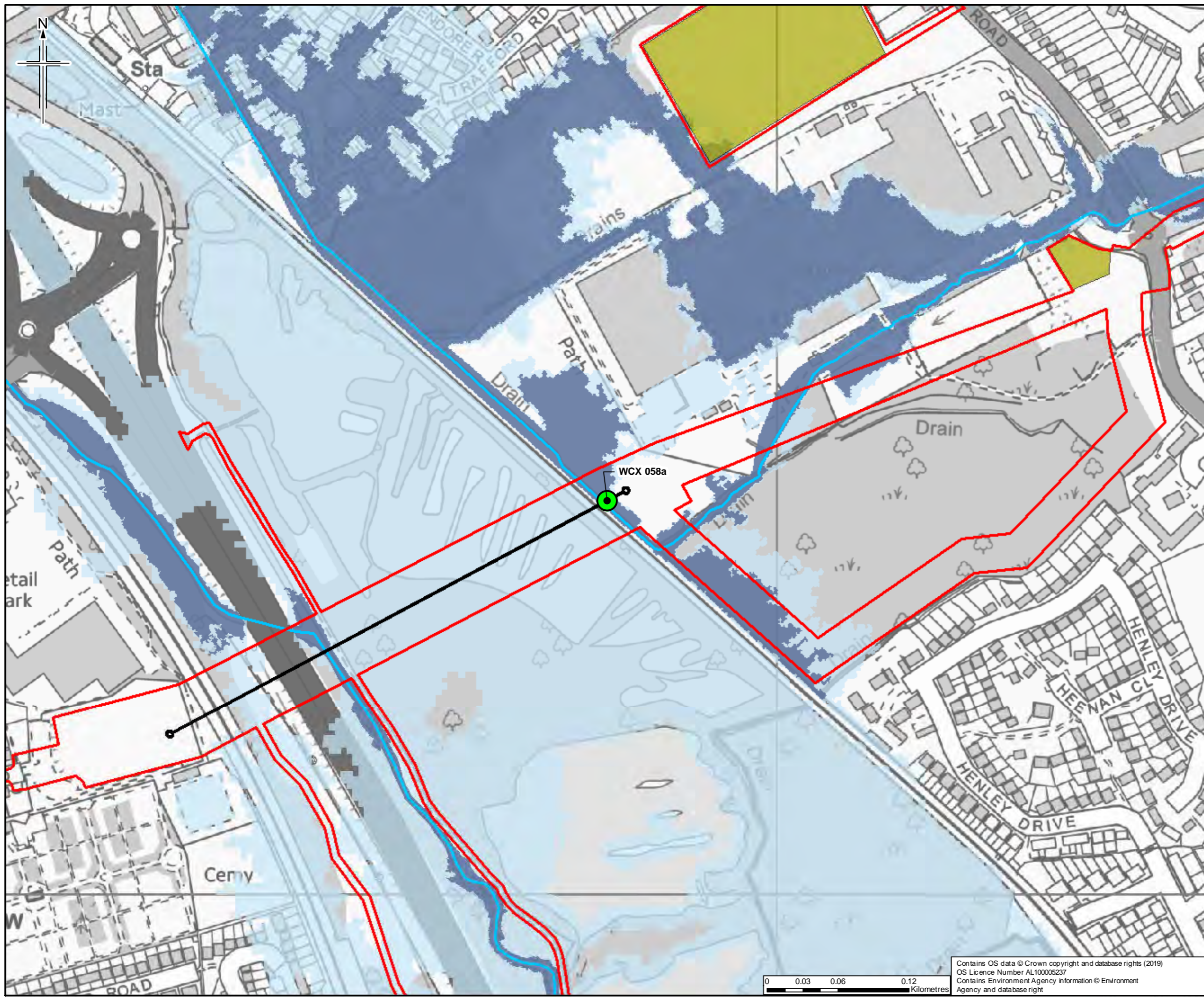
Drawing title: **FLOOD RISK ASSESSMENT THE HATCHES (FORMERLY WATER FEATURE 4) CROSSING (WCX 055) FLOOD RISK DATA APFP Reg. (2009) 5(2)(I)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project Wise No.	B2325300-JAC-000-ENV-DRG-001155
Drawing number	Figure C47 Sheet 1 of 1
Rev	0



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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue	SY	FW	SM	SH

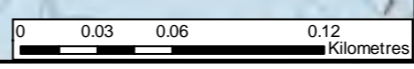
JACOBS
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 KT22 8UX

Project
 Southampton to London Pipeline Project

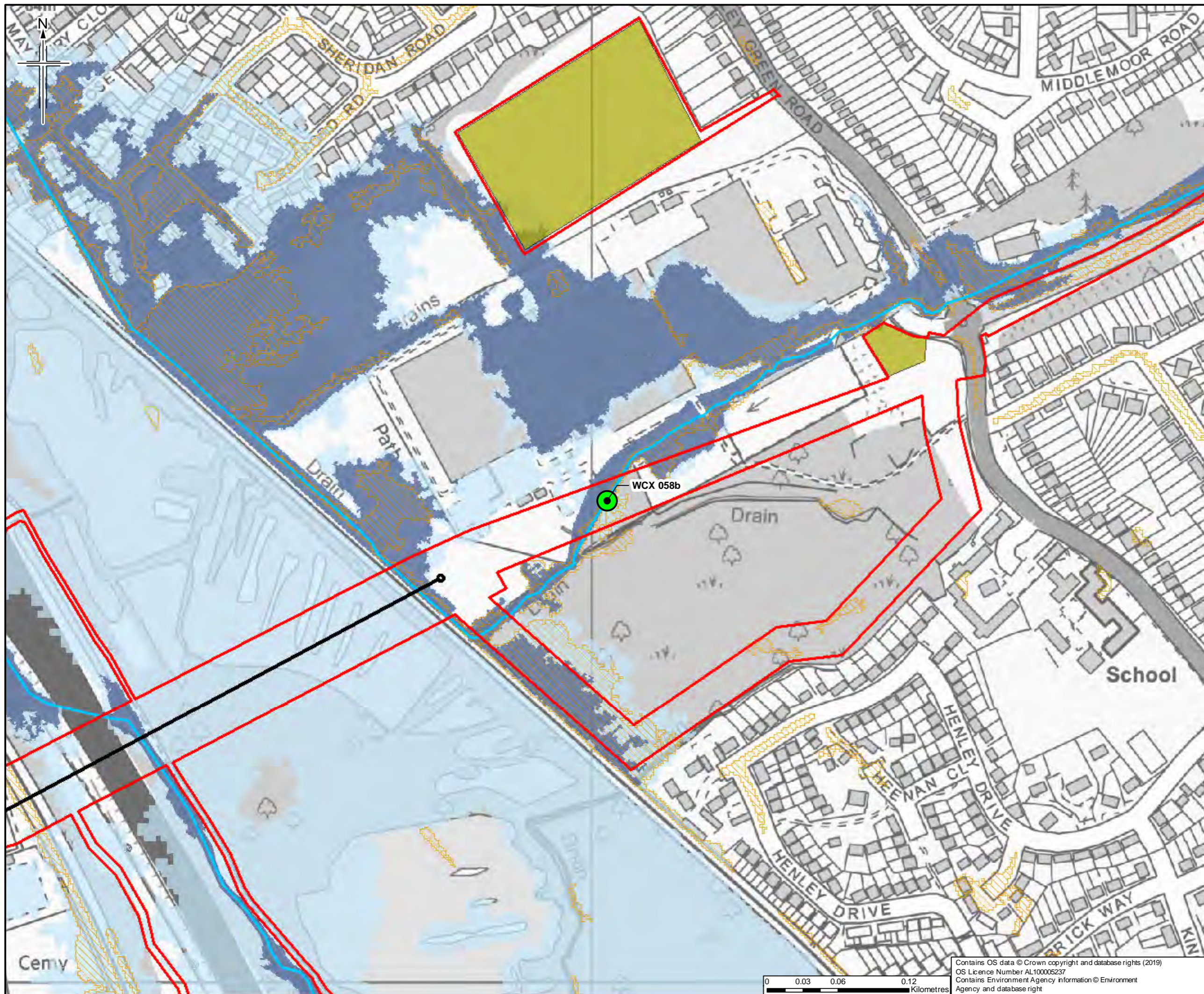
Drawing title
 FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 (ADJACENT TO RAILWAY)
 CROSSING (WCX 058A) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(I)

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001201	
Drawing number	Figure C48 Sheet 1 of 1	Rev 0



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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3%
 - Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue				

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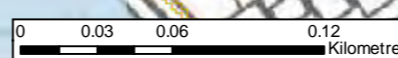
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

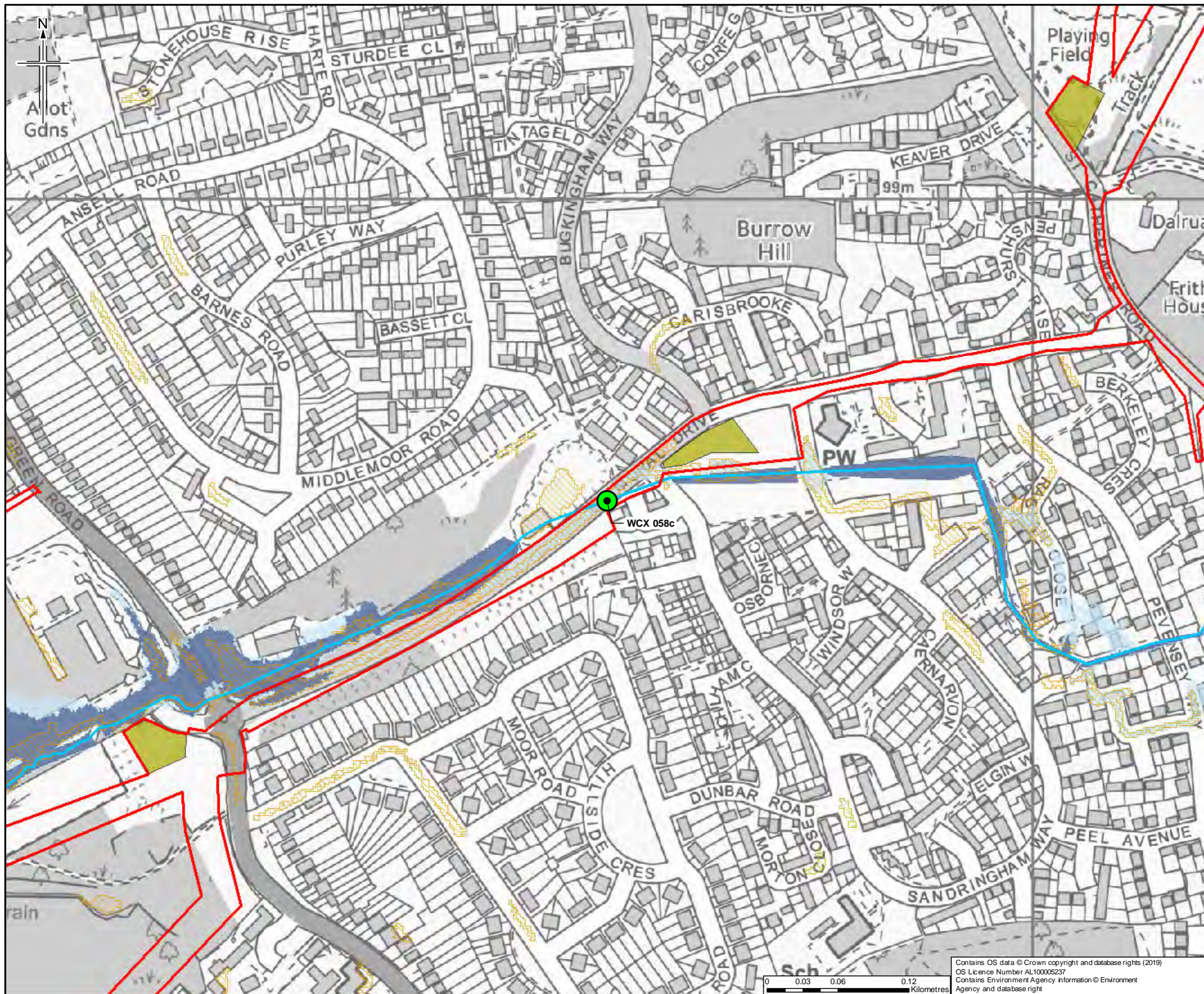
Project
 Southampton to London Pipeline Project

Drawing title
 FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 (177M NORTHEAST OF RAILWAY)
 CROSSING (WCX058B) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(I)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001200
Drawing number	Figure C49 Sheet 1 of 1
Rev	0

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- Legend**
- ▬ Order Limits
 - Construction compound
 - ▬ Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue				



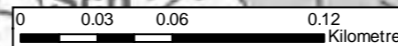
Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

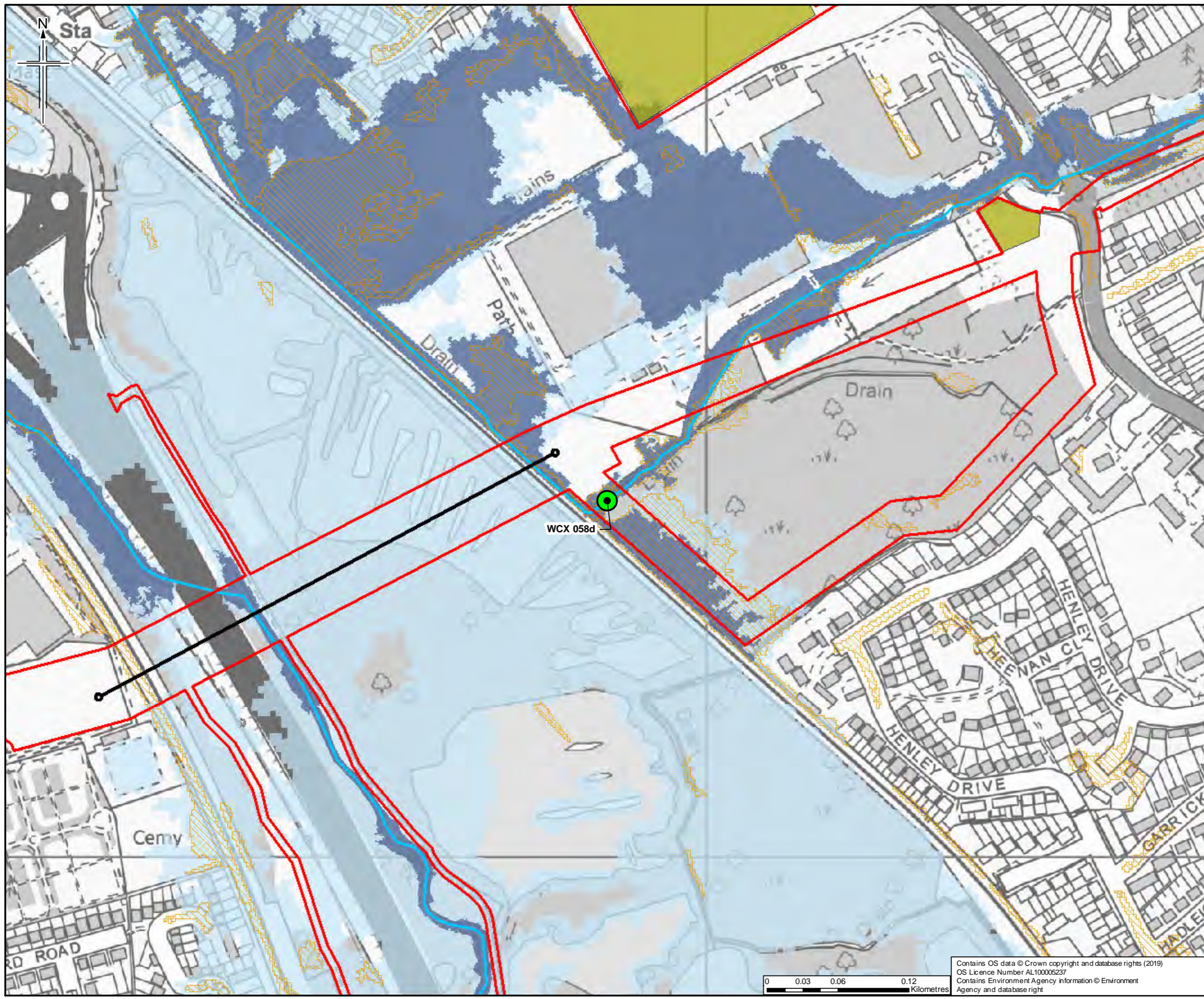


Drawing title
FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE CROSSING
(WCX 058c) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue		
Scale	1:3 000	@ A3	DO NOT SCALE
Jacobs No.	B2325300		
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001157		
Drawing number	Figure C50 Sheet 1 of 1	Rev	0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue	SY	FW	SM	SH

Author

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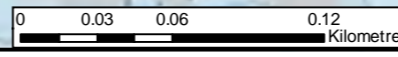
Client
 Esso Petroleum Company, Limited
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 Leatherhead,
 Surrey,
 KT22 8UX

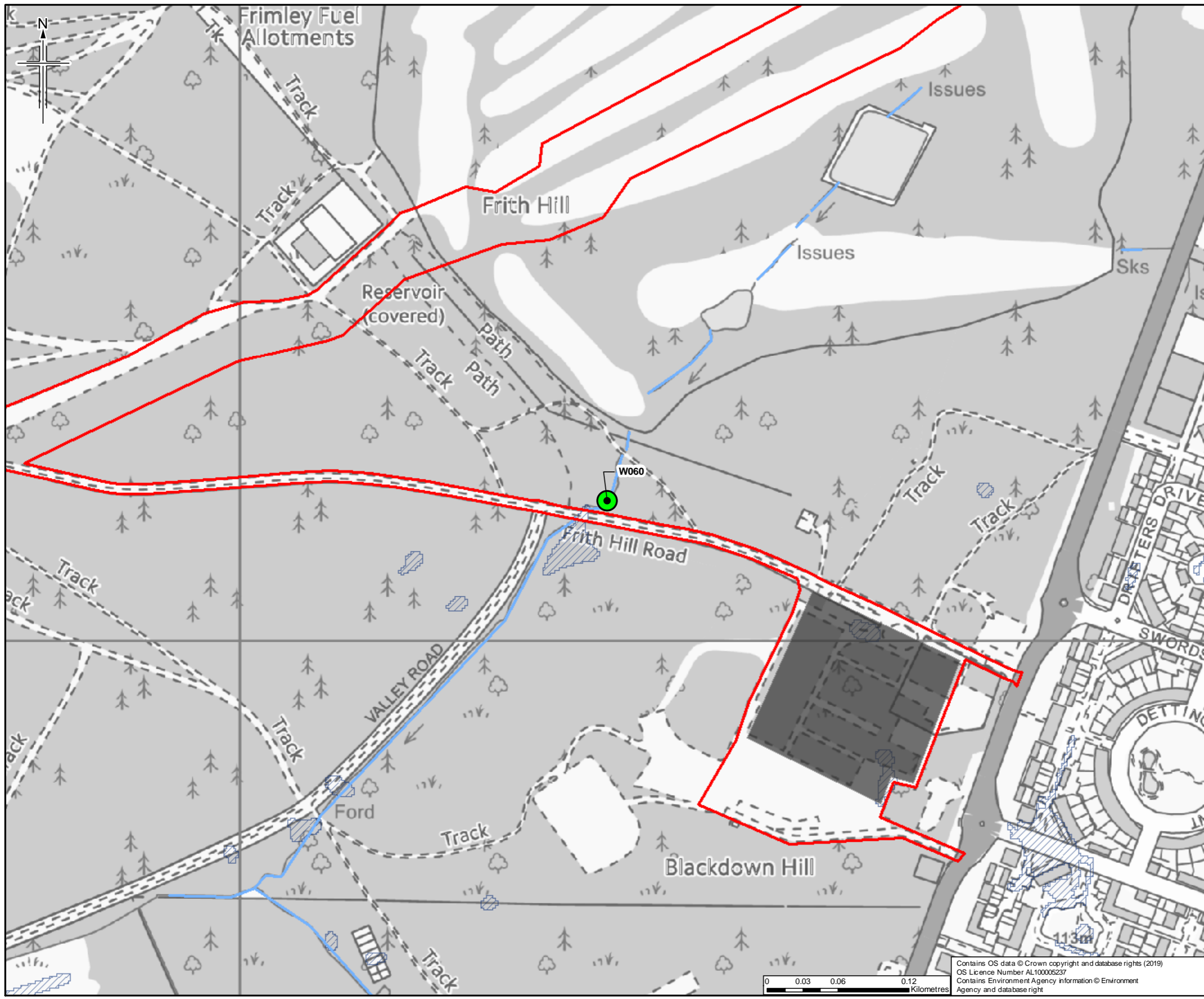
Project
 Southampton to London Pipeline Project

Drawing title
**FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 (WCX 058d) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001152
Drawing number	Figure C51 Sheet 1 of 1
Rev	0

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- Legend**
- ▬ Order Limits
 - Logistics hub
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section E

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

Author: **JACOBS**
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 Tel: +44 (0) 1344 77000 Fax: +44(0)1344 74000
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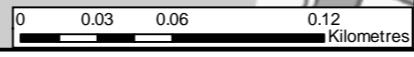
Client: Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

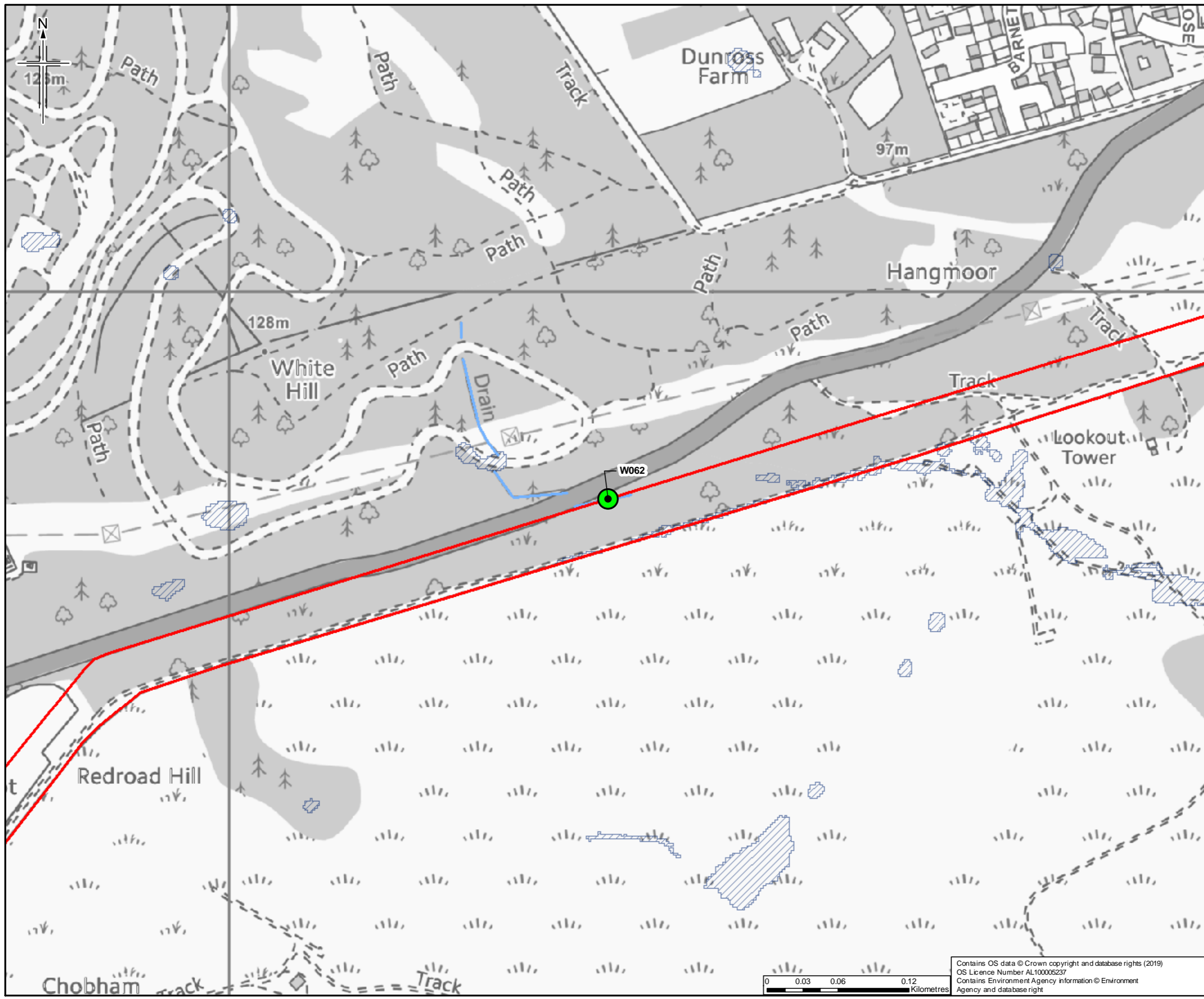
Project: Southampton to London Pipeline Project

Drawing title: **FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE (W060)
 CROSSING FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001202	
Drawing number	Figure C52 Sheet 1 of 1	Rev 0

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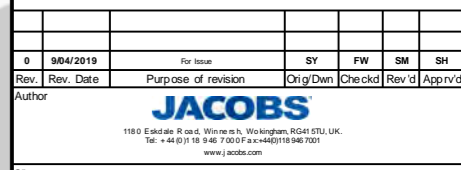


- Legend**
- ▭ Order Limits
 - Ordinary Watercourse
 - ▨ Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue			SY	FW

Author



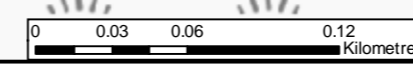
Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

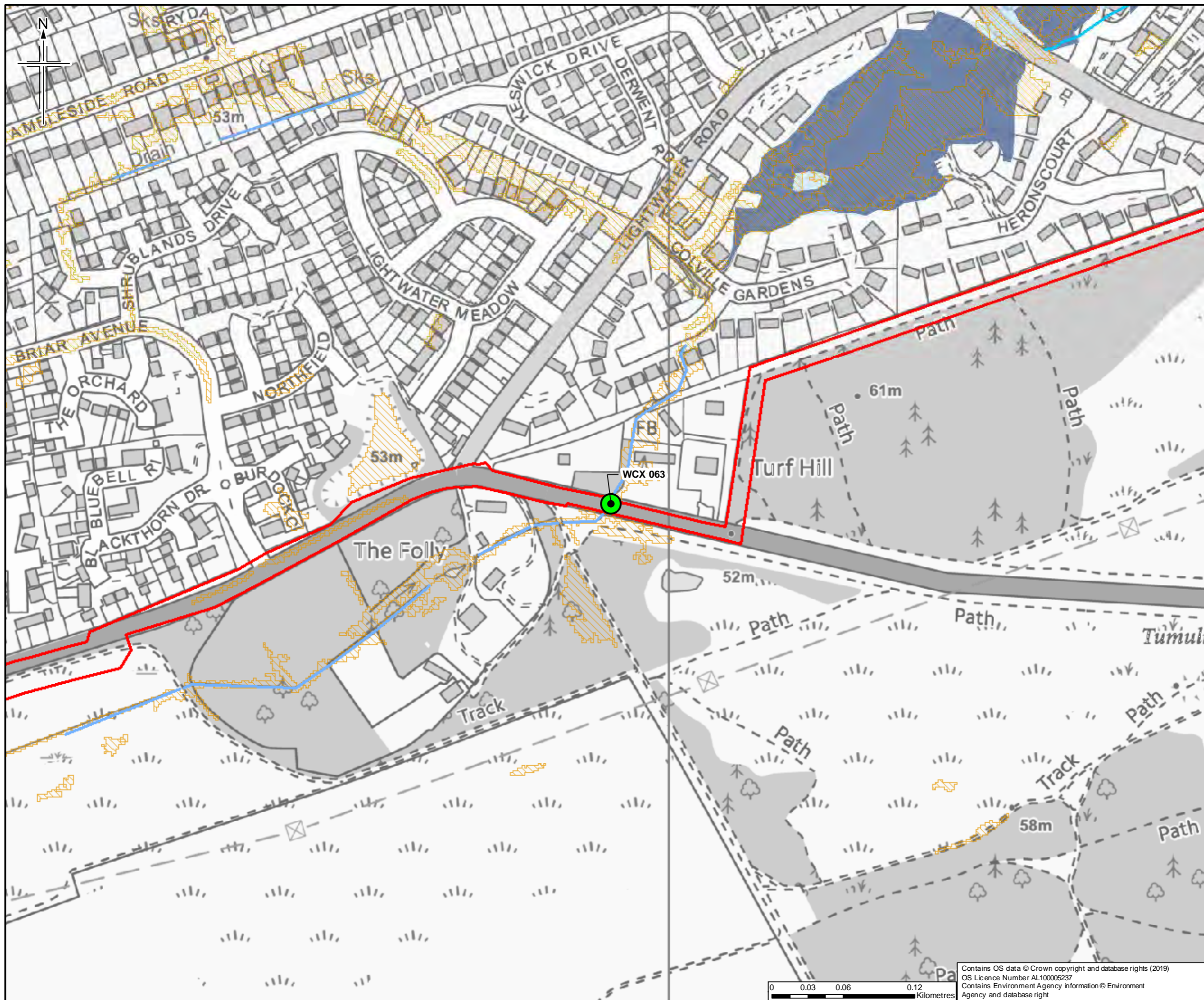


Drawing title
**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE (W062)
CROSSING FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
Project/Work No.	B2325300-JAC-000-ENV-DRG-001203	
Drawing number	Figure C53 Sheet 1 of 1	Rev 0

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- Legend**
- ▬ Order Limits
 - ▬ Main River
 - ▬ Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Appr'd
0	09/04/2019	For Issue	SY	FW	SM	SH



Client
Esso Petroleum Company, Limited
Ermyn House,
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Leatherhead,
Surrey,
KT22 8UX

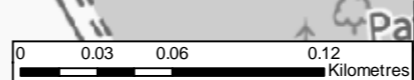


Drawing title
**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 063) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

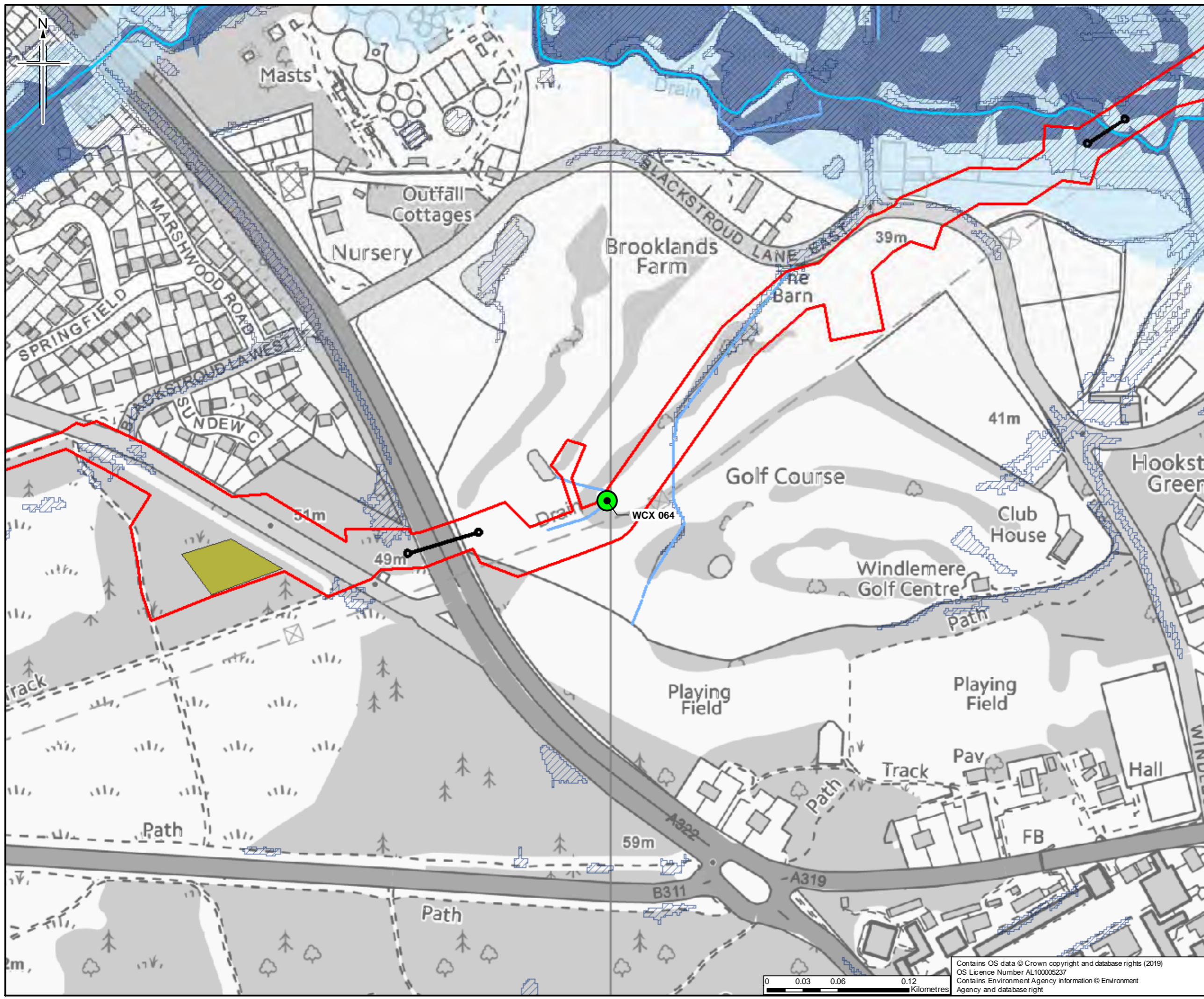
Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001204

Drawing number **Figure C54 Sheet 1 of 1** Rev **0**

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- Legend**
- █ Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue	SY	FW	SM	SH



Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

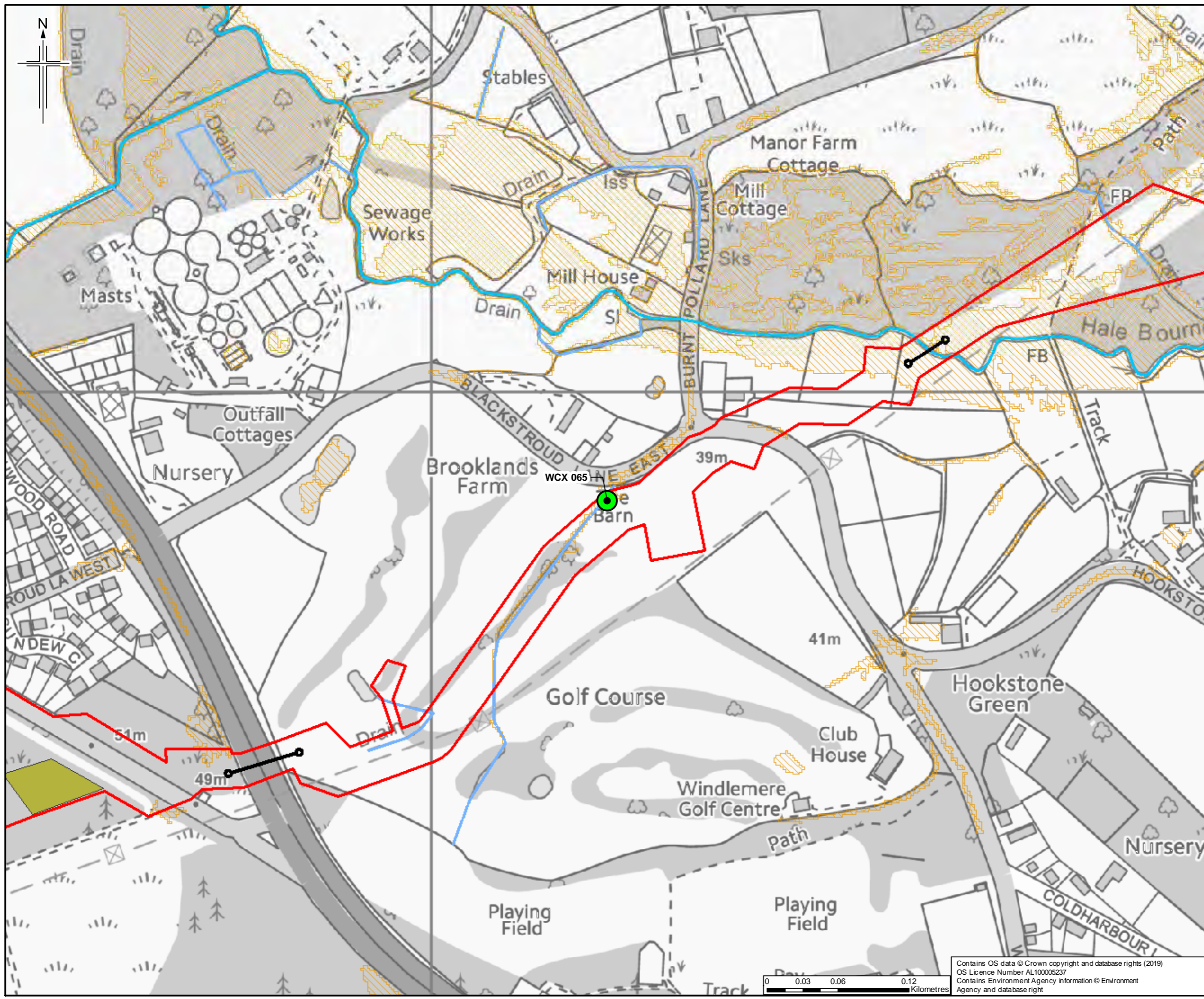


Drawing title
**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 064) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:3,000	DO NOT SCALE
Jacobs No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001205	
Drawing number	Figure C55 Sheet 1 of 1	Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
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Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

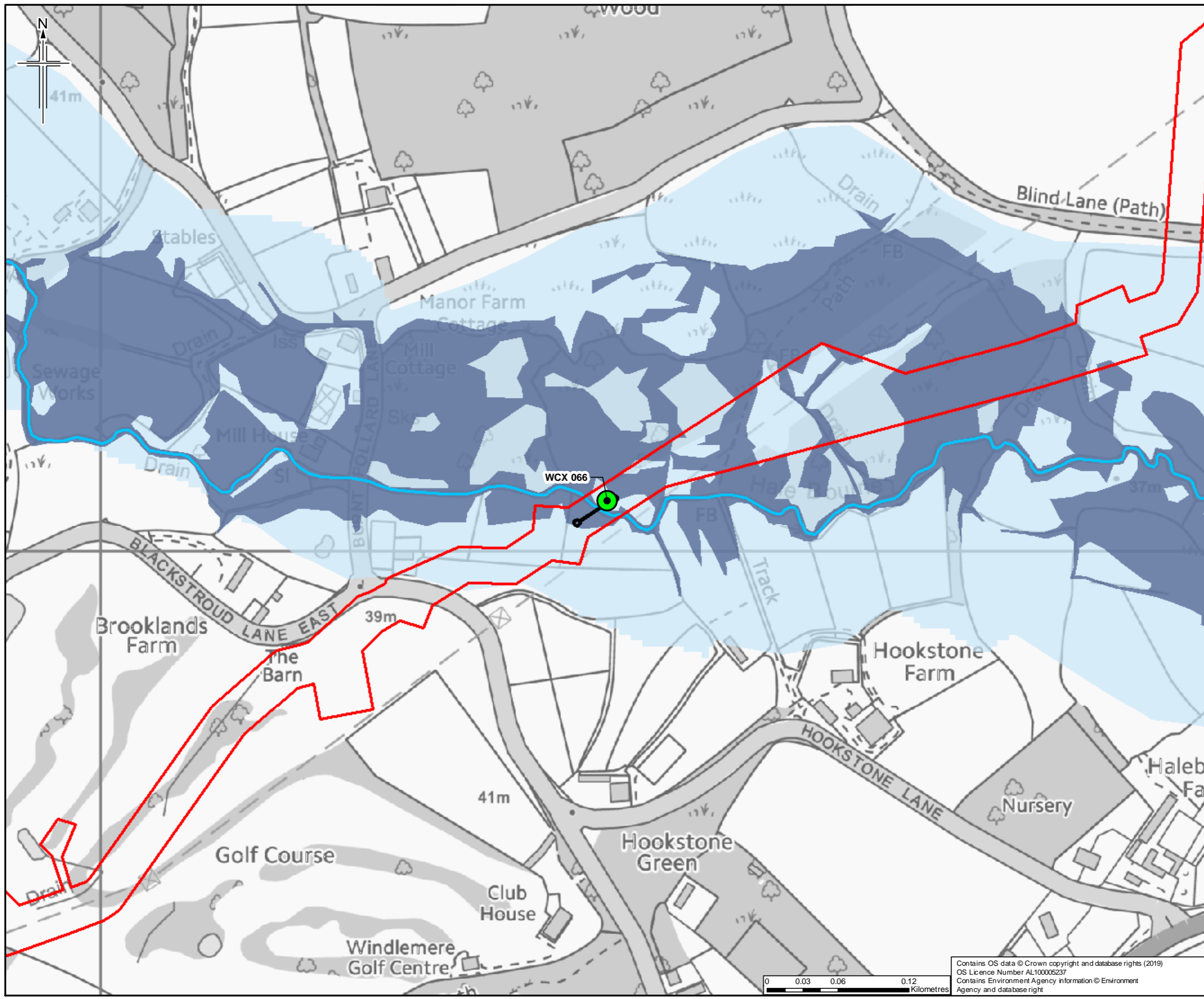


Drawing title
FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 065) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001206
Drawing number	Figure C56 Sheet 1 of 1
Rev	0

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- Legend**
- ▬ Order Limits
 - ▬ Trenchless crossing
 - ▬ Main River
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Appr'd
0	09/04/2019	For Issue				

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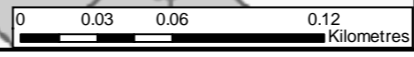
Client: Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

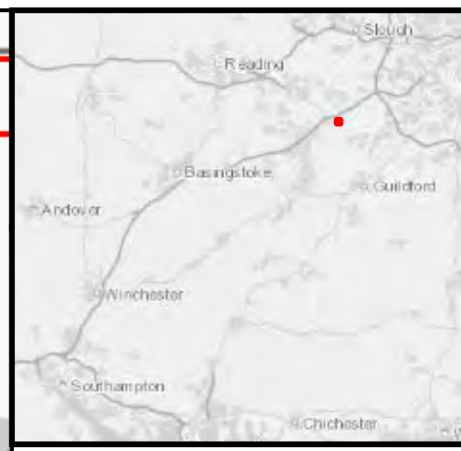
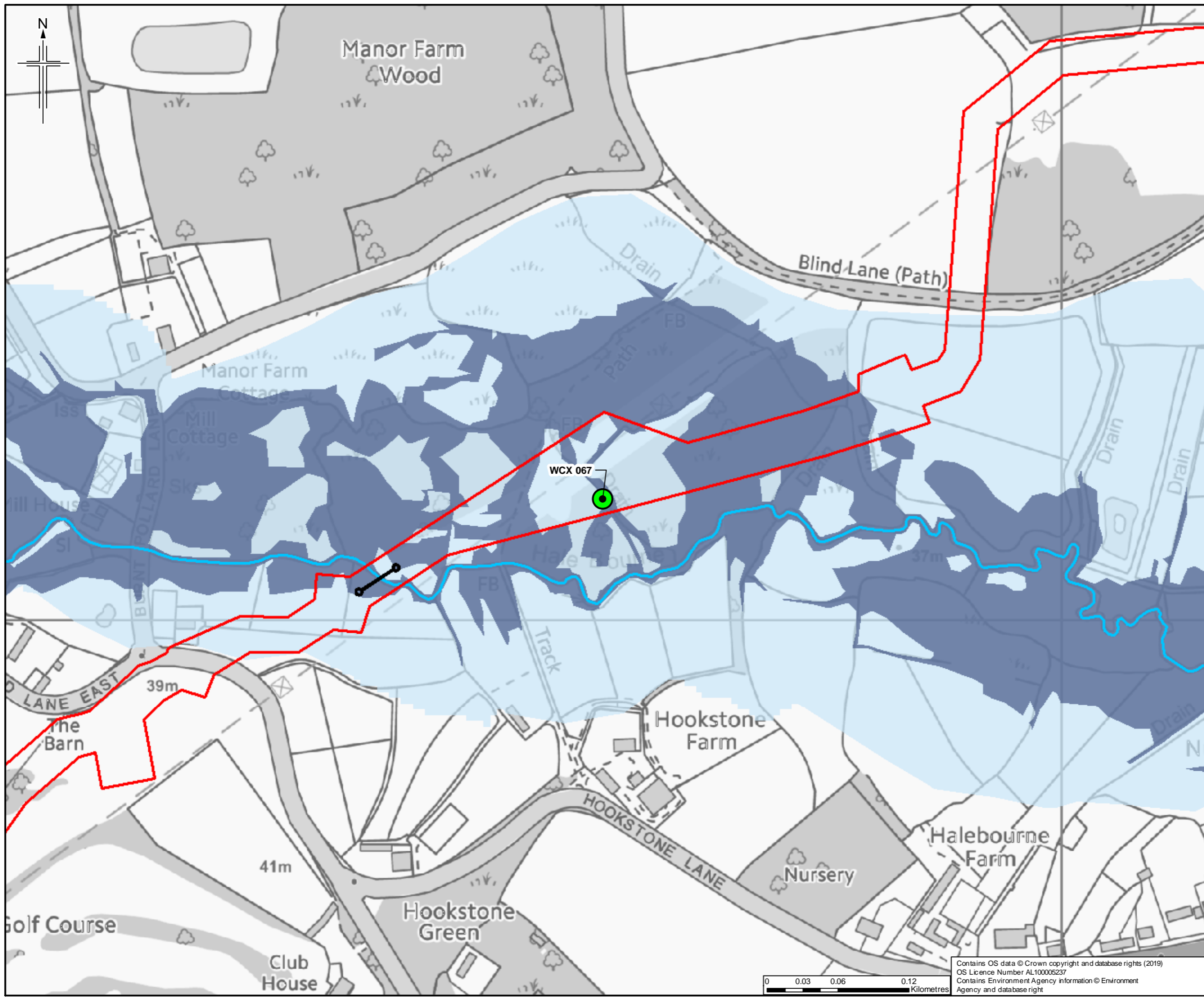
Project: Southampton to London Pipeline Project

Drawing title: **FLOOD RISK ASSESSMENT
 HALE BOURNE CROSSING
 (WCX 066) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B 2325300
Project/Work No.	B 2325300-JAC-000-ENV-DRG-001158
Drawing number	Figure C57 Sheet 1 of 1
Rev	0

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- Legend**
- ▭ Order Limits
 - Trenchless crossing
 - Main River
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section F

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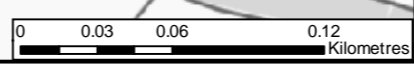
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 KT22 8UX

Project
 Southampton to London Pipeline Project

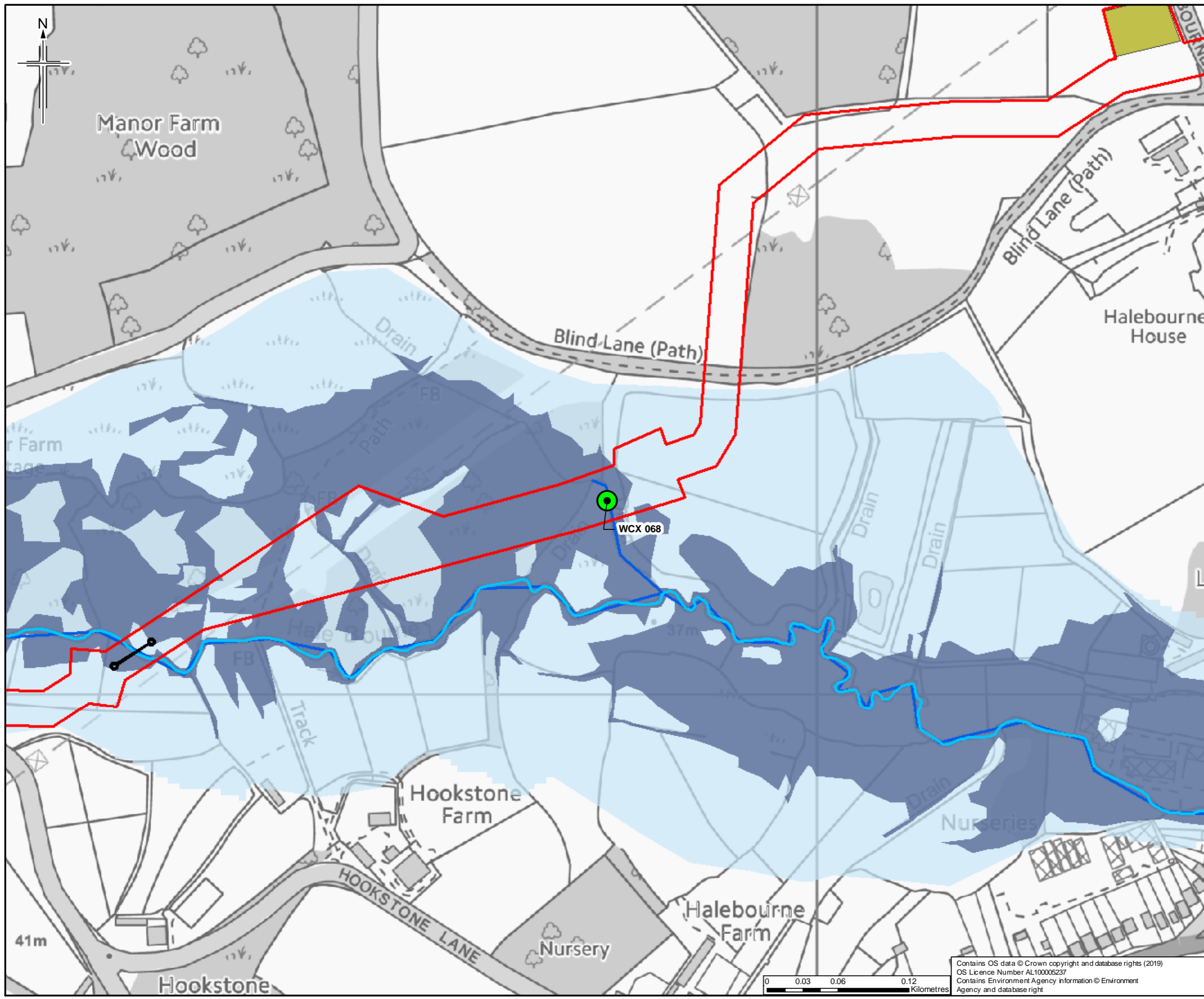
Drawing title
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 UNNAMED WATERCOURSE CROSSING
 (WCX 067) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001207	
Drawing number	Figure C58 Sheet 1 of 1	Rev 0



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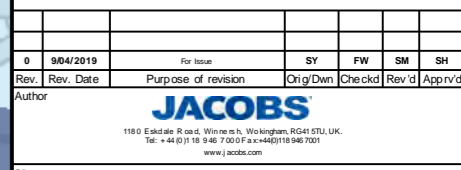


- Legend**
- ▭ Order Limits
 - ▭ Construction compound
 - Trenchless crossing
 - Main River
 - OS River
 - ▭ Flood Zone 2
 - ▭ Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Appr'd
0	09/04/2019	For Issue				

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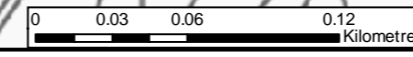
Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

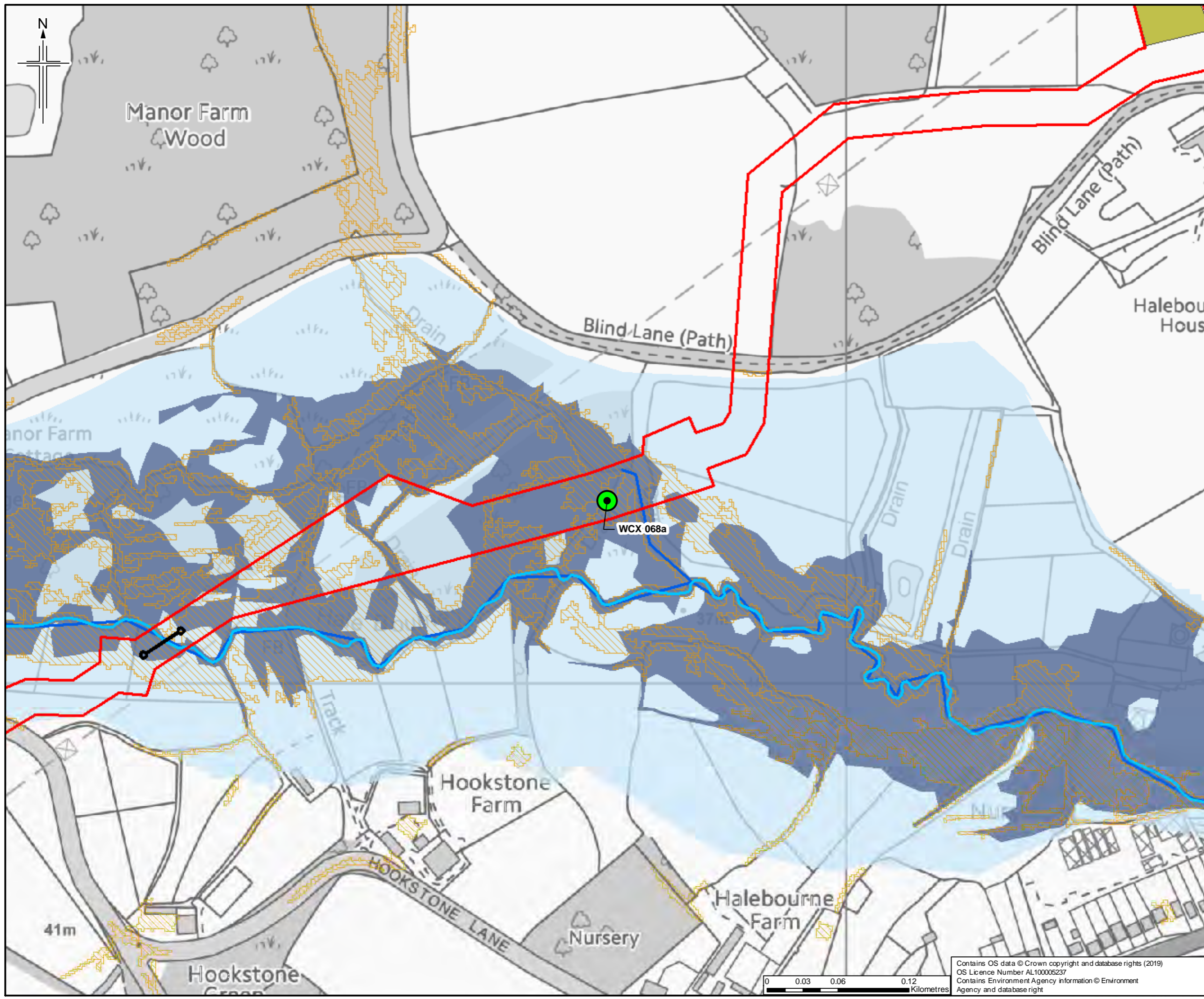


Drawing title
**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 068) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue		
Scale	1:3,000	@ A3	DO NOT SCALE
Jacobs No.	B2325300		
Project/Work No.	B2325300-JAC-000-ENV-DRG-001208		
Drawing number	Figure C59 Sheet 1 of 1	Rev	0

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Legend

- █ Order Limits
- Construction compound
- Trenchless crossing
- Main River
- OS River
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3
- Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
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Project

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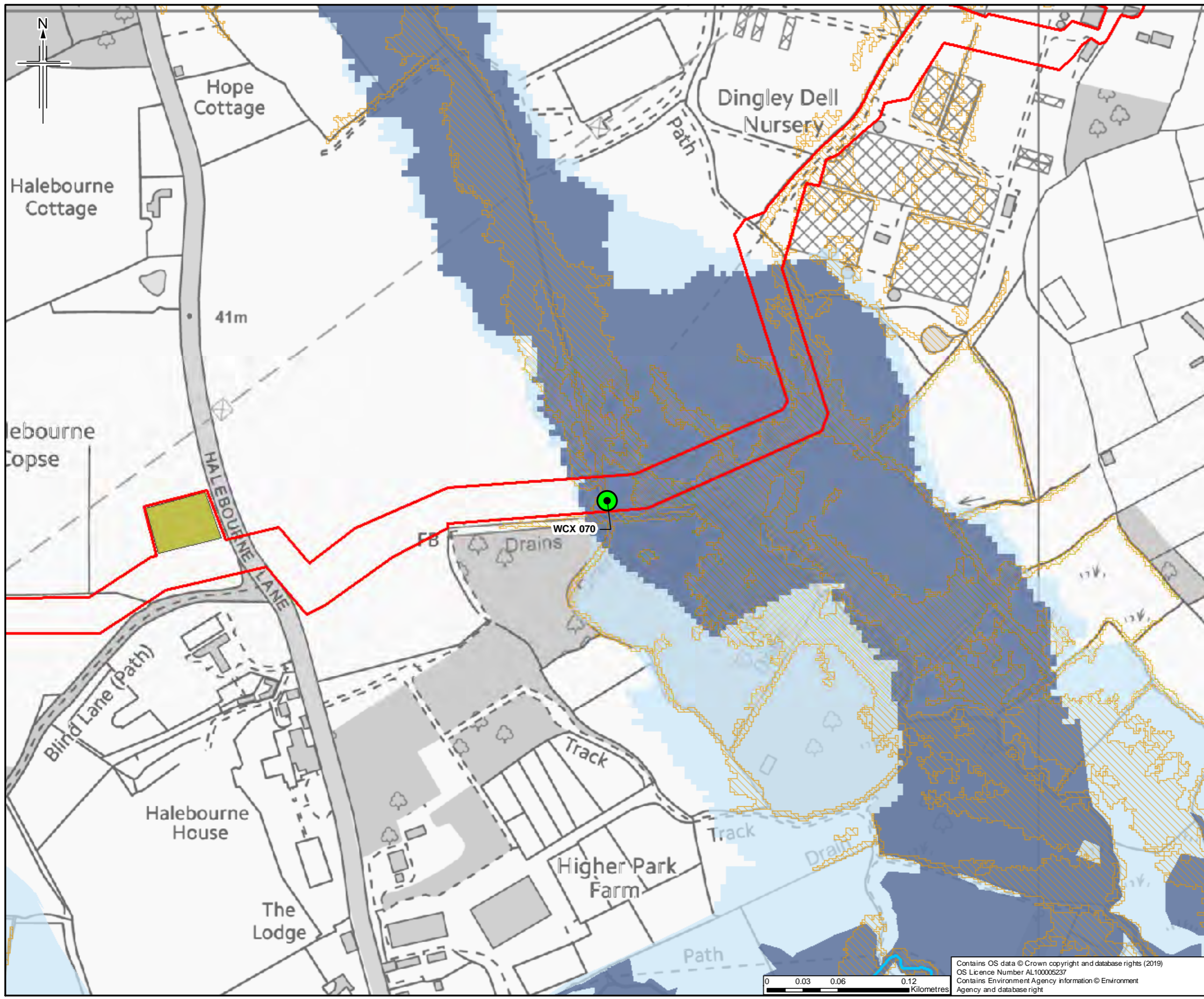
Drawing title

**FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE CROSSING
 (WCX 068a) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:3 000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001233	
Drawing number	Figure C60 Sheet 1 of 1	Rev 0

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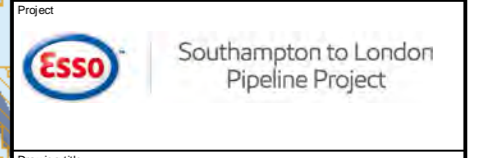
- Legend**
- Order Limits
 - Construction compound
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
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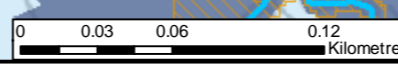
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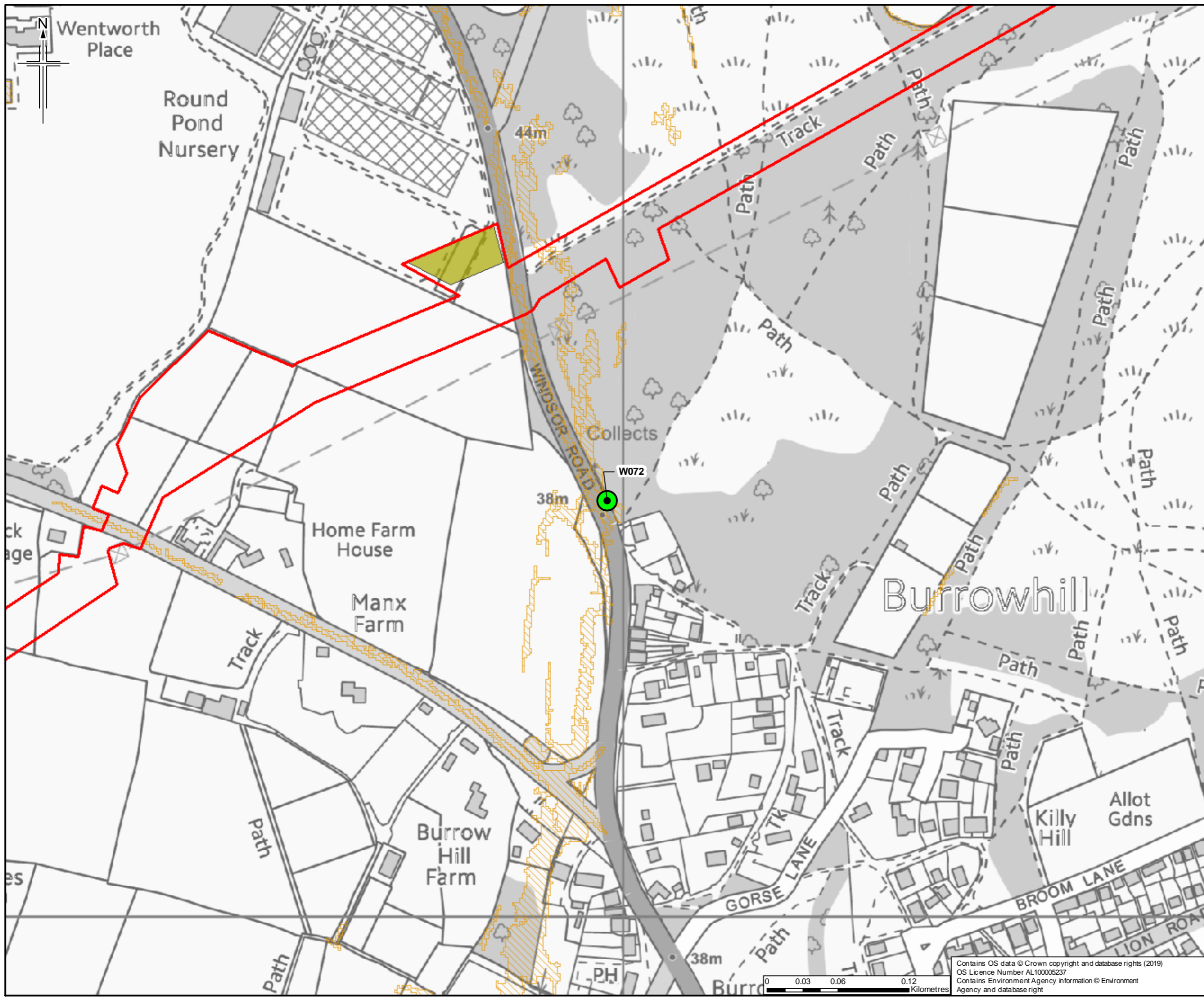


Drawing title
FLOOD RISK ASSESSMENT
CLAPPERS BROOK CROSSING (WCX 070)
FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001159
Drawing number	Figure C61 Sheet 1 of 1
Rev	0

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- Legend**
- Order Limits
 - Construction compound
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

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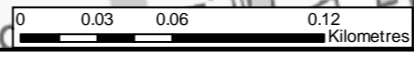
Southampton to London Pipeline Project

Drawing title

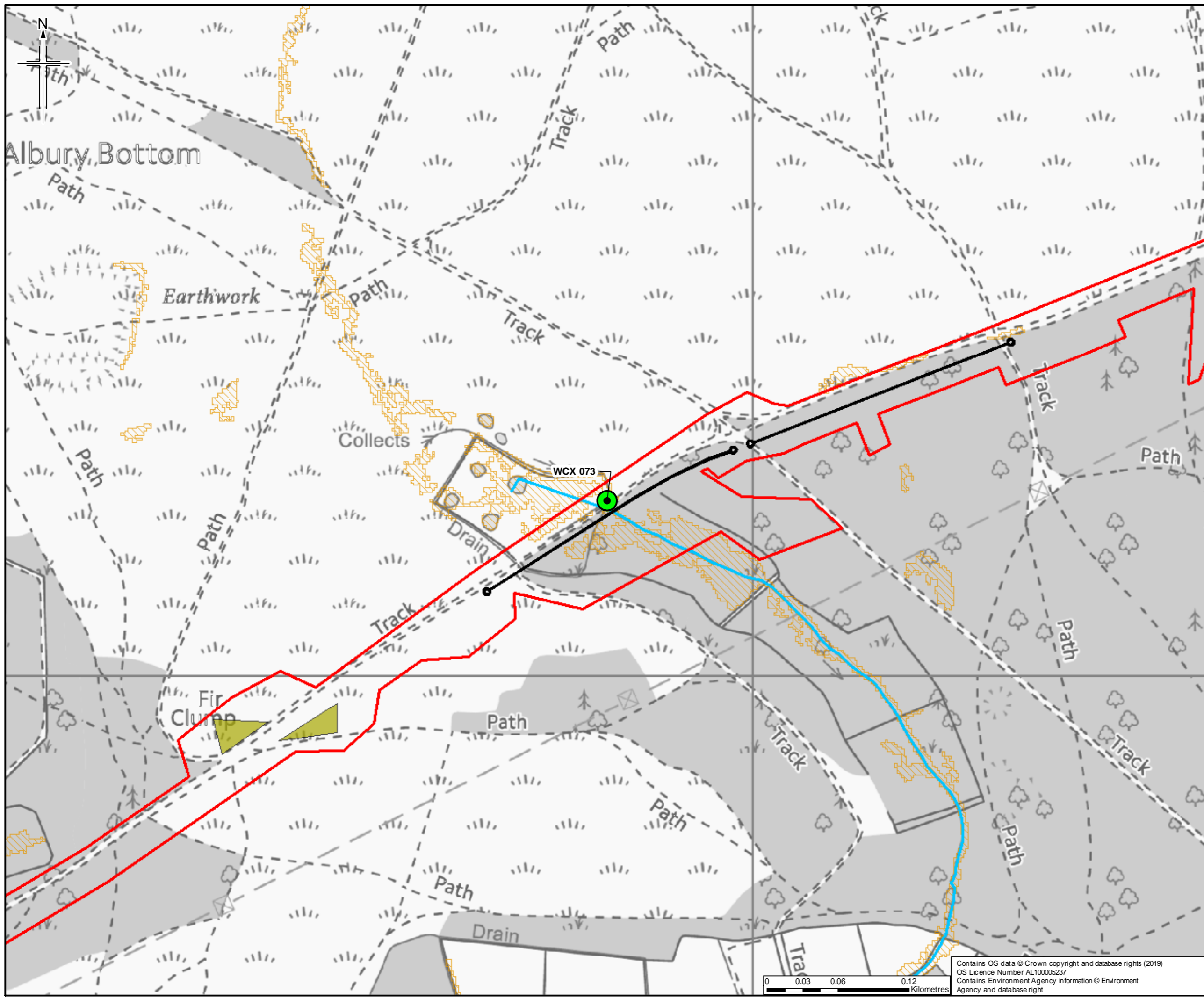
FLOOD RISK ASSESSMENT
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 (W072) CROSSING FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
Project/Work No.	B2325300-JAC-000-ENV-DRG-001236	
Drawing number	Figure C62 Sheet 1 of 1	Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
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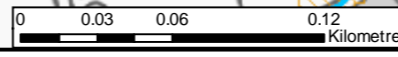
Client
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Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX



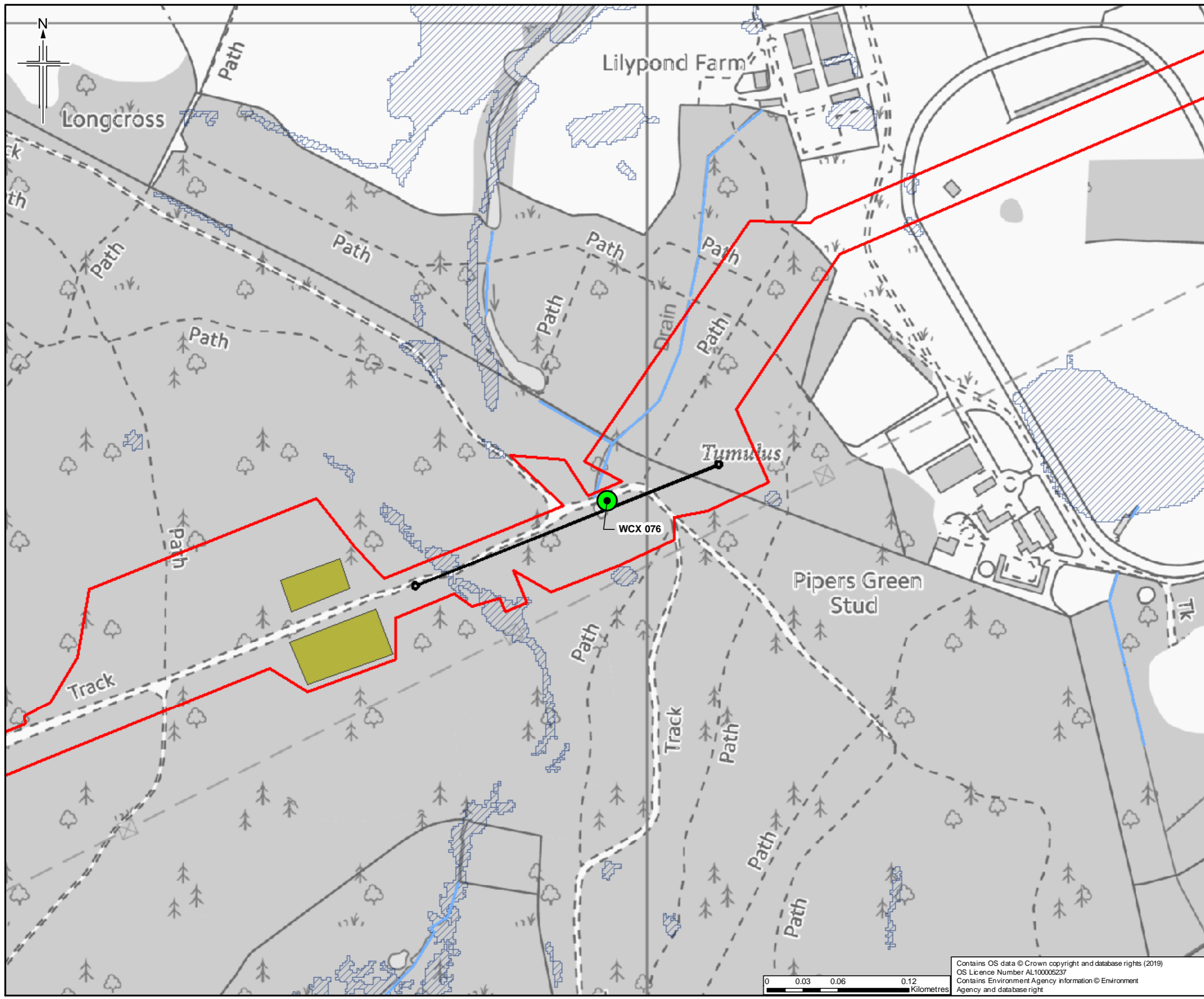
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UNNAMED WATERCOURSE
CROSSING (WCX 073) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)

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Scale	1:3,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
Project/Work No.	B2325300-JAC-000-ENV-DRG-001160	
Drawing number	Figure C63 Sheet 1 of 1	Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
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Author

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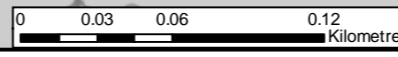
Client
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 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

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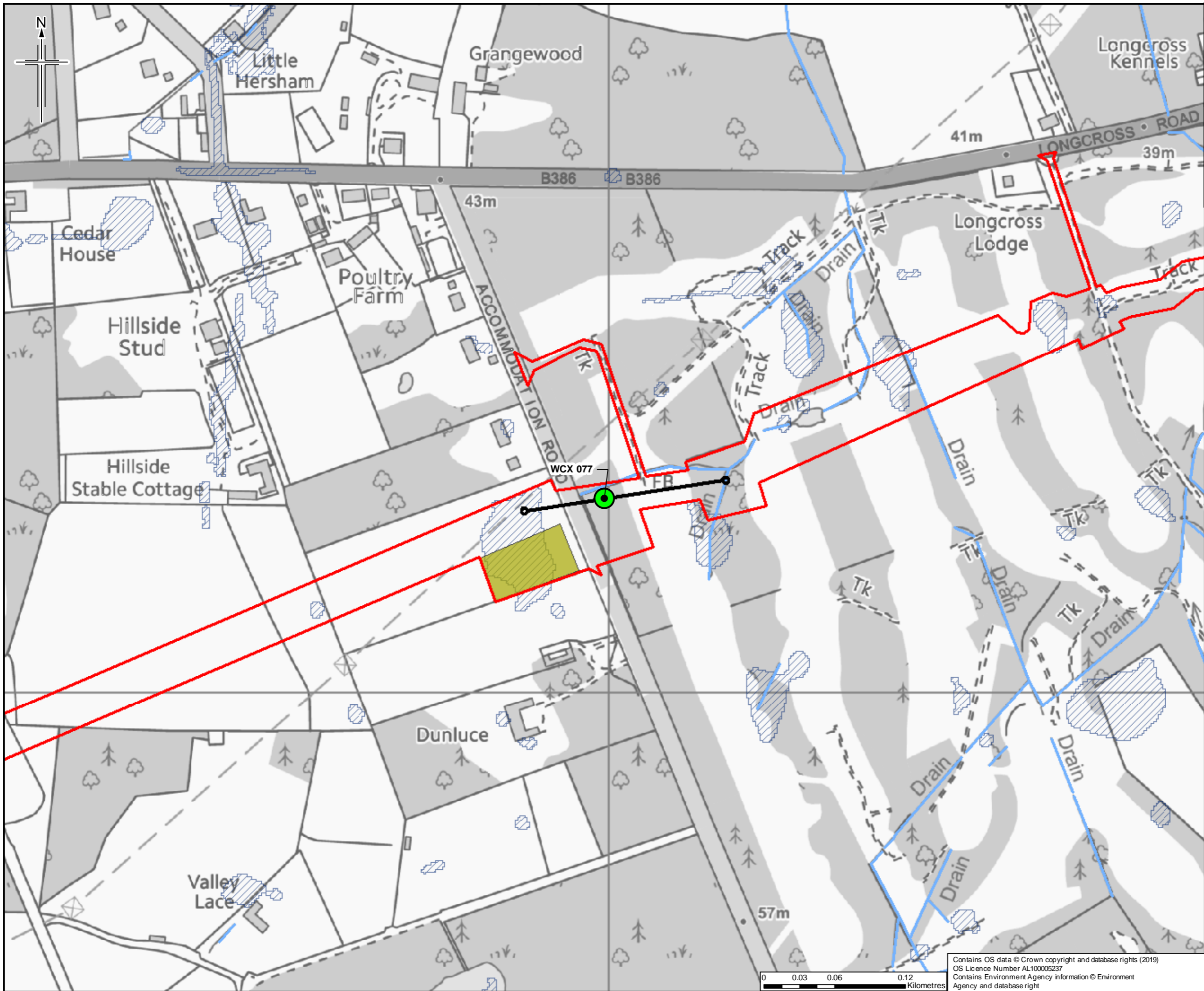
Drawing title
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 UNNAMED WATERCOURSE
 CROSSING (WCX 076) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
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Jacobs No.	B2325300
Project/Work No.	B2325300-JAC-000-ENV-DRG-001209
Drawing number	Figure C64 Sheet 1 of 1
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- Legend**
- ▭ Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW)
 - extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
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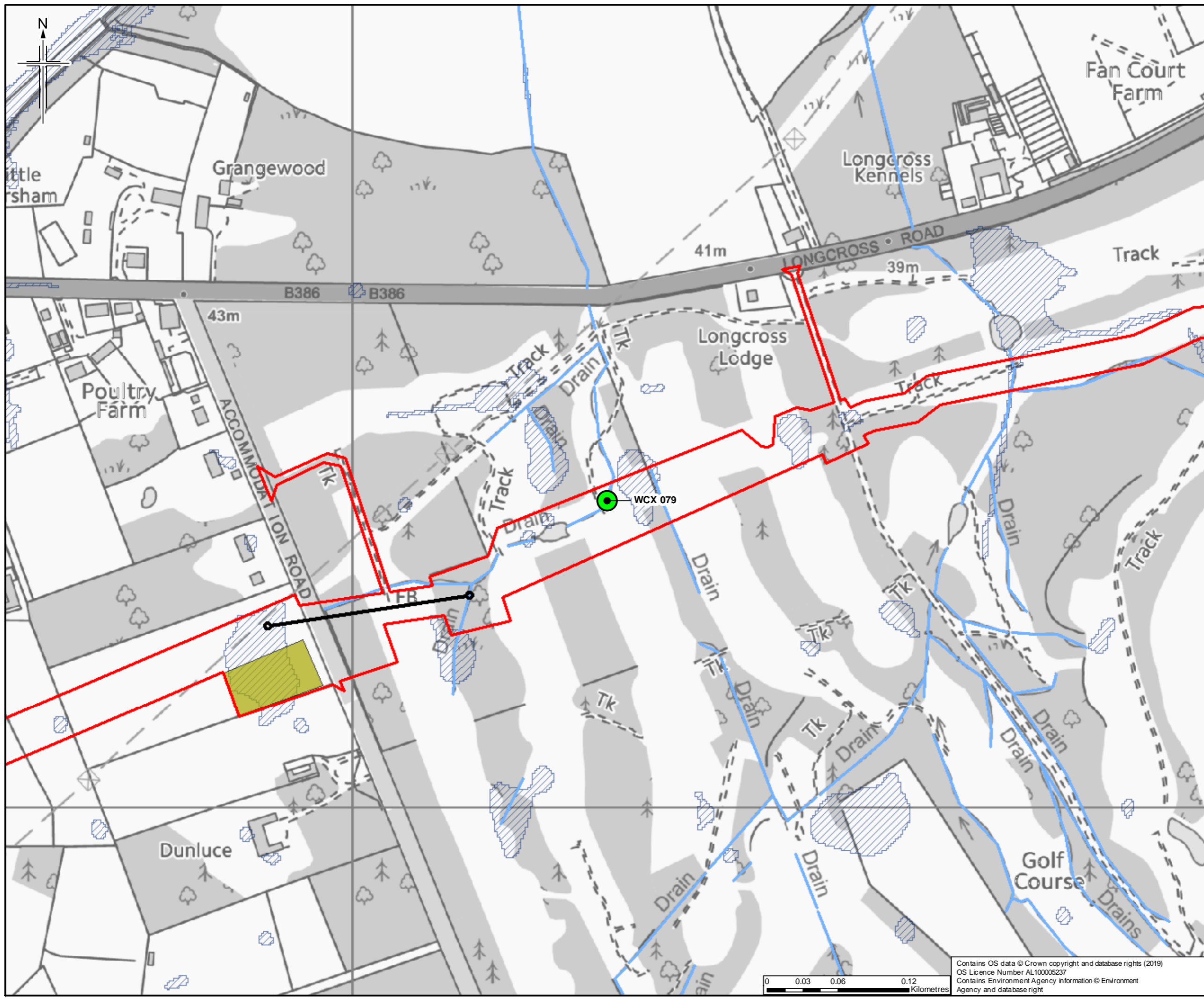
Project
 Southampton to London Pipeline Project

Drawing title
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 UNNAMED WATERCOURSE
 CROSSING (WCX 077) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001210
Drawing number	Figure C65 Sheet 1 of 1
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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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 Ermyn Way,
 Leatherhead,
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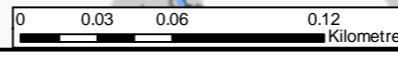
Southampton to London Pipeline Project

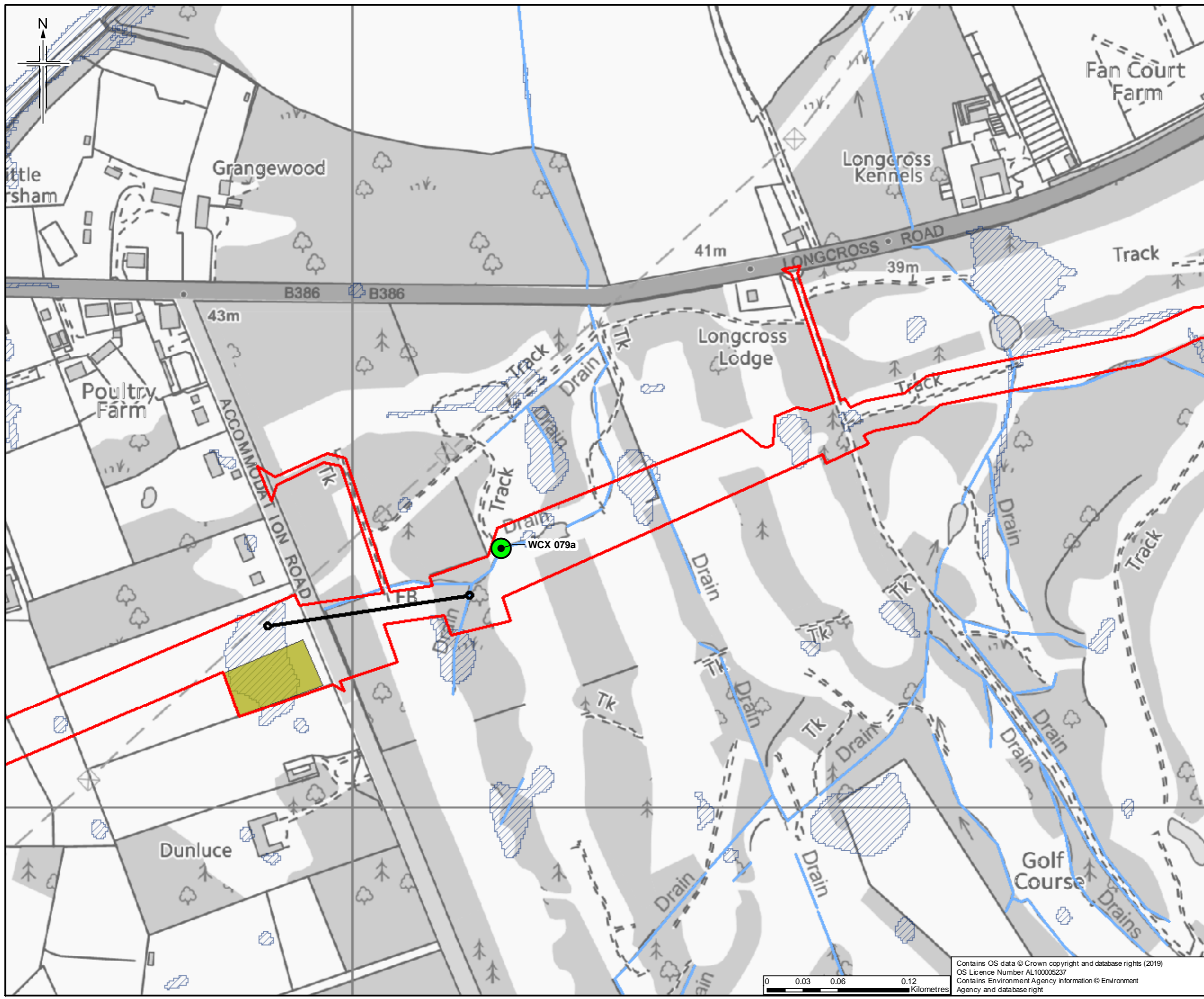
Drawing title

**FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 CROSSING (WCX 079) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3 000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001235
Drawing number	Figure C66 Sheet 1 of 1
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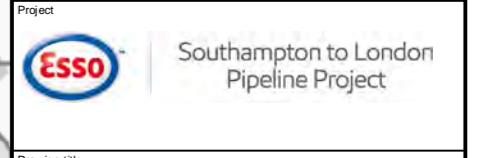
- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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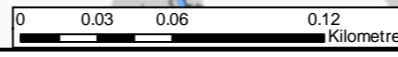
Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

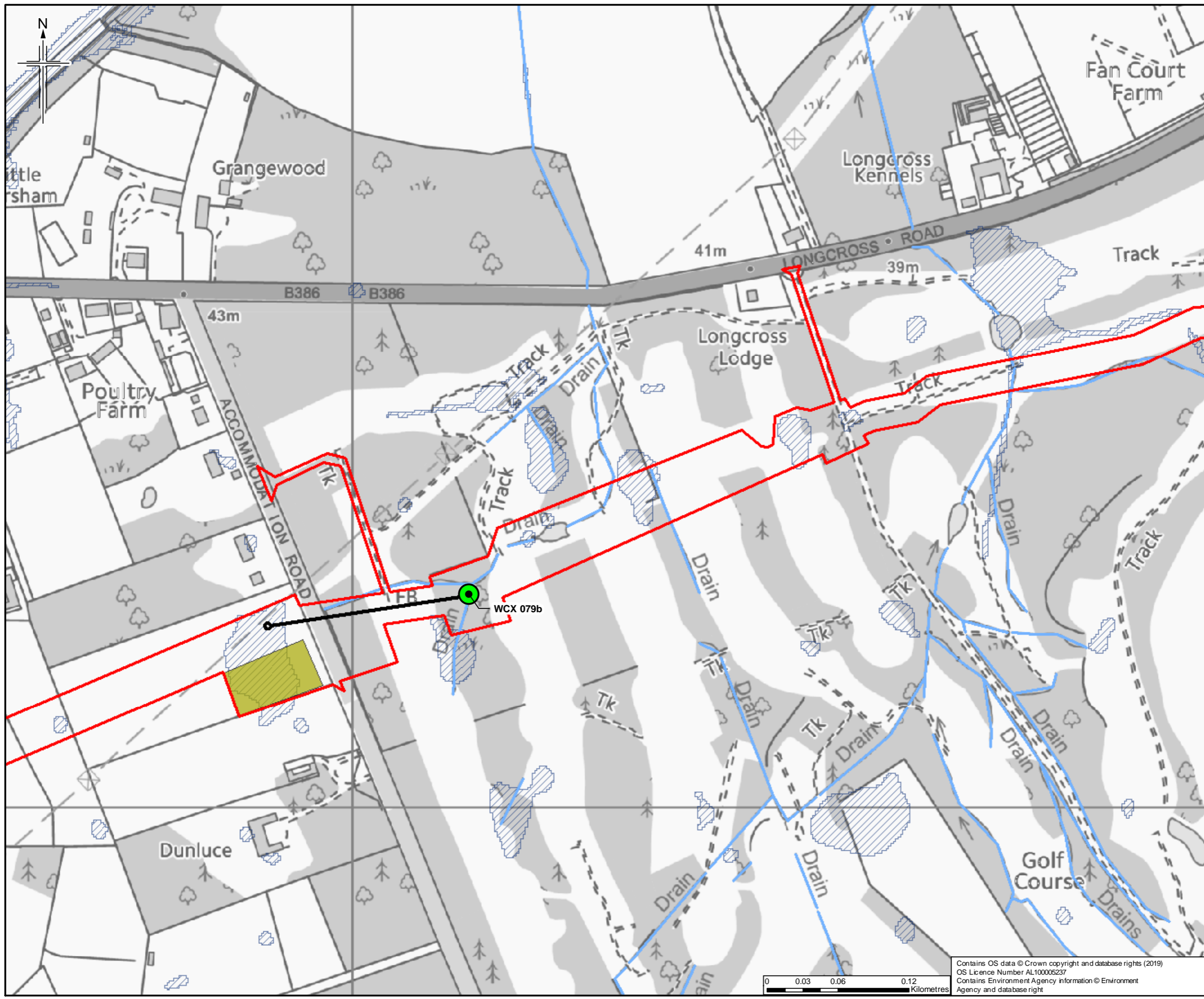


Drawing title
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UNNAMED WATERCOURSE
CROSSING (WCX 079a) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001227
Drawing number	Figure C67 Sheet 1 of 1
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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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 Ermyn Way,
 Leatherhead,
 Surrey,
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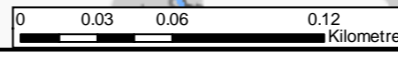
Project
 Southampton to London Pipeline Project

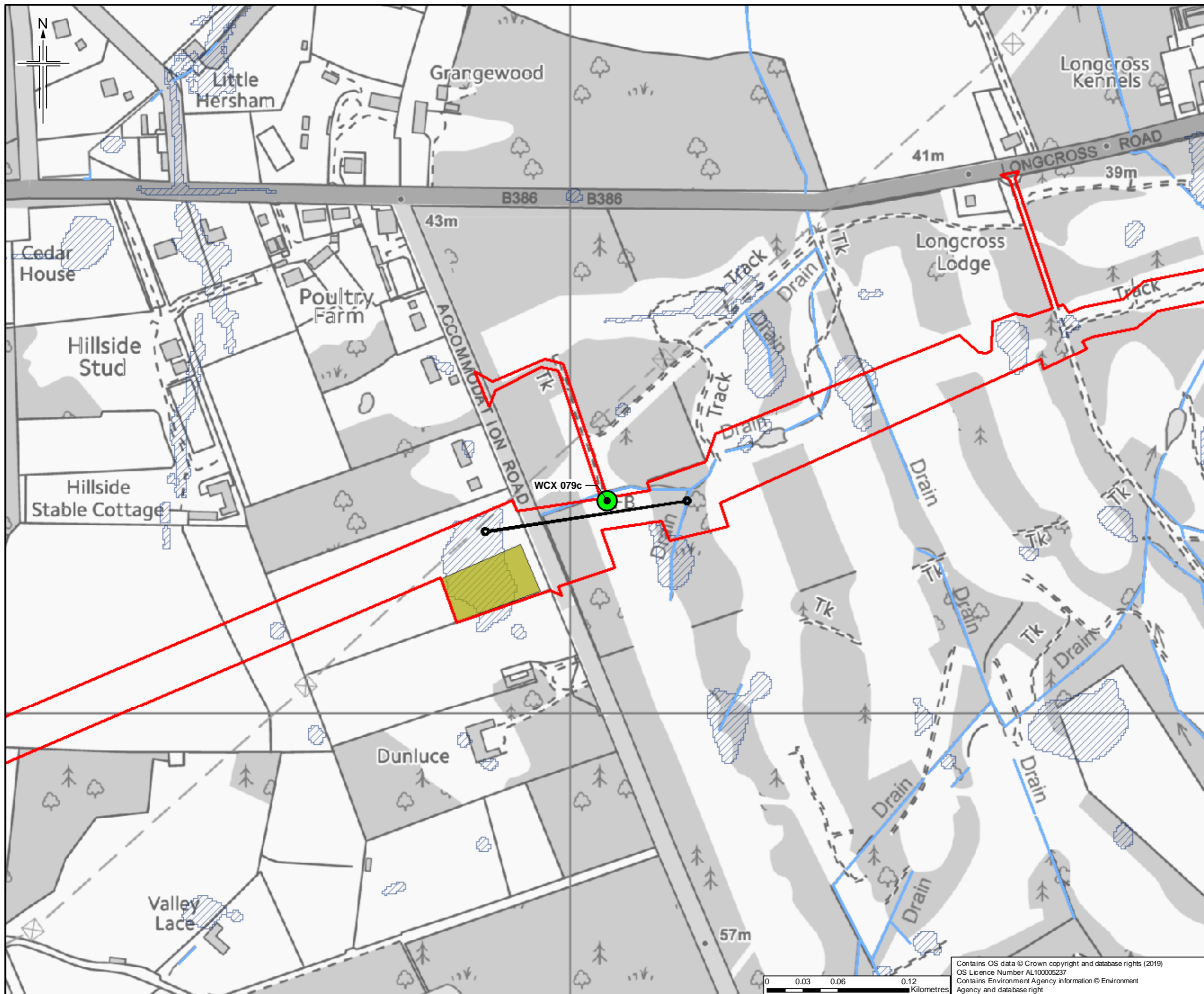
Drawing title
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 UNNAMED WATERCOURSE
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 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001211

Drawing number Figure C68 Sheet 1 of 1 **Rev** 0
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- Legend**
- ▬ Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
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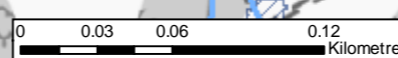
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

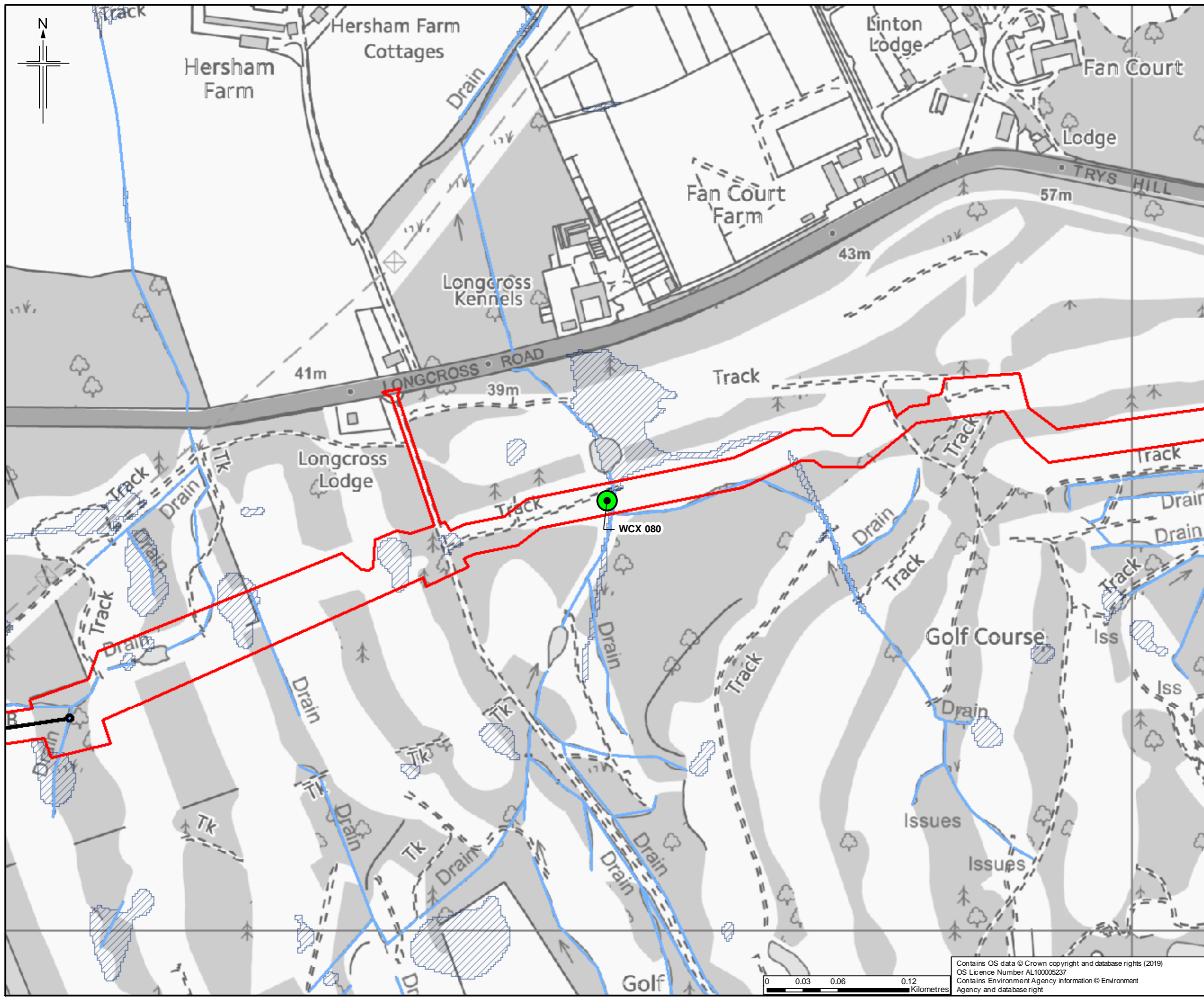
Project
 Southampton to London Pipeline Project

Drawing title
**FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE CROSSING
 (WCX 079c) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project/Work No.	B2325300-JAC-000-ENV-DRG-001613
Drawing number	Figure C69 Sheet 1 of 1
Rev	0

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- Legend**
- Order Limits
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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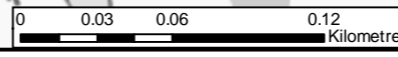
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
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 KT22 8UX

Project
 Southampton to London Pipeline Project

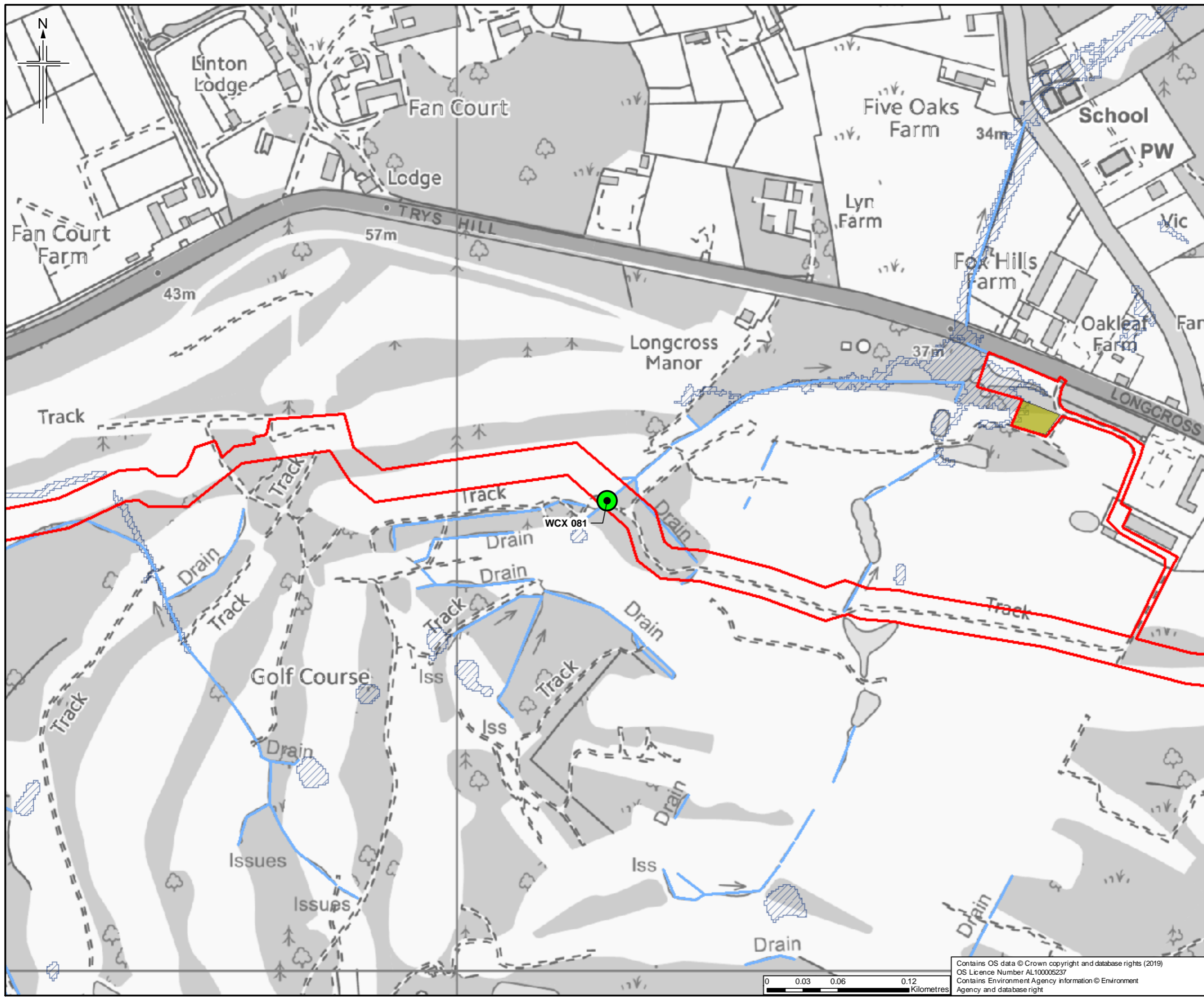
Drawing title
**FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 CROSSING (WCX 080) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3 000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project/Work No.	B2325300-JAC-000-ENV-DRG-001212
Drawing number	Figure C70 Sheet 1 of 1
Rev	0

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- Legend**
- ▭ Order Limits
 - ▭ Construction compound
 - Ordinary Watercourse
 - ▭ Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Appr'd
0	09/04/2019	For Issue				



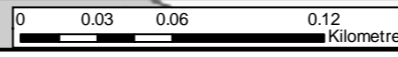
Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX



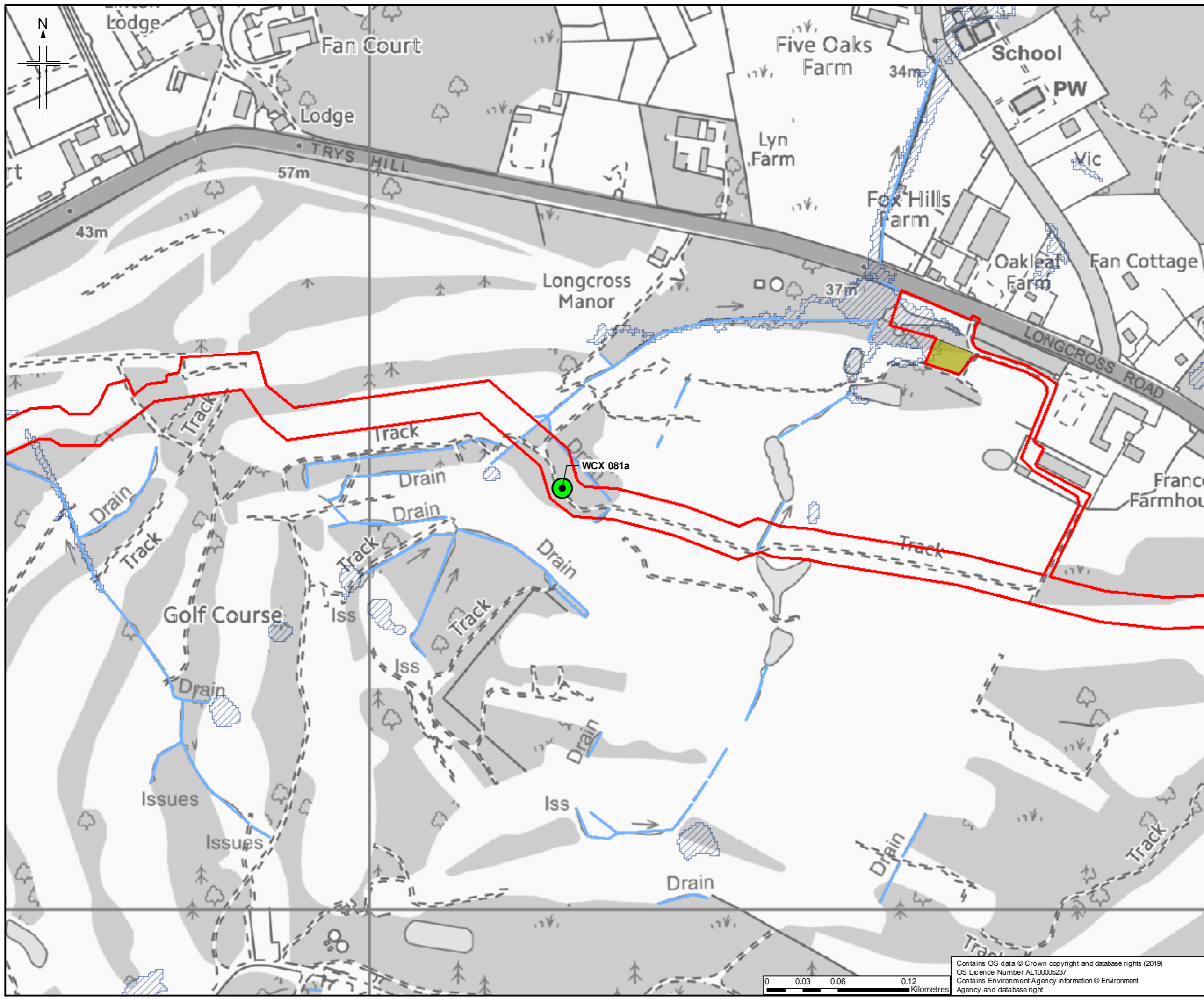
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**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 081) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project Wise No.	B2325300-JAC-000-ENV-DRG-001213
Drawing number	Figure C71 Sheet 1 of 1
Rev	0

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Legend

- Order Limits
- Construction compound
- Ordinary Watercourse
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Appr'd
0	09/04/2019	For Issue			SY	FW SM SH

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Project

Southampton to London Pipeline Project

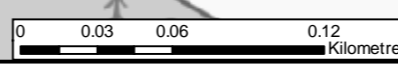
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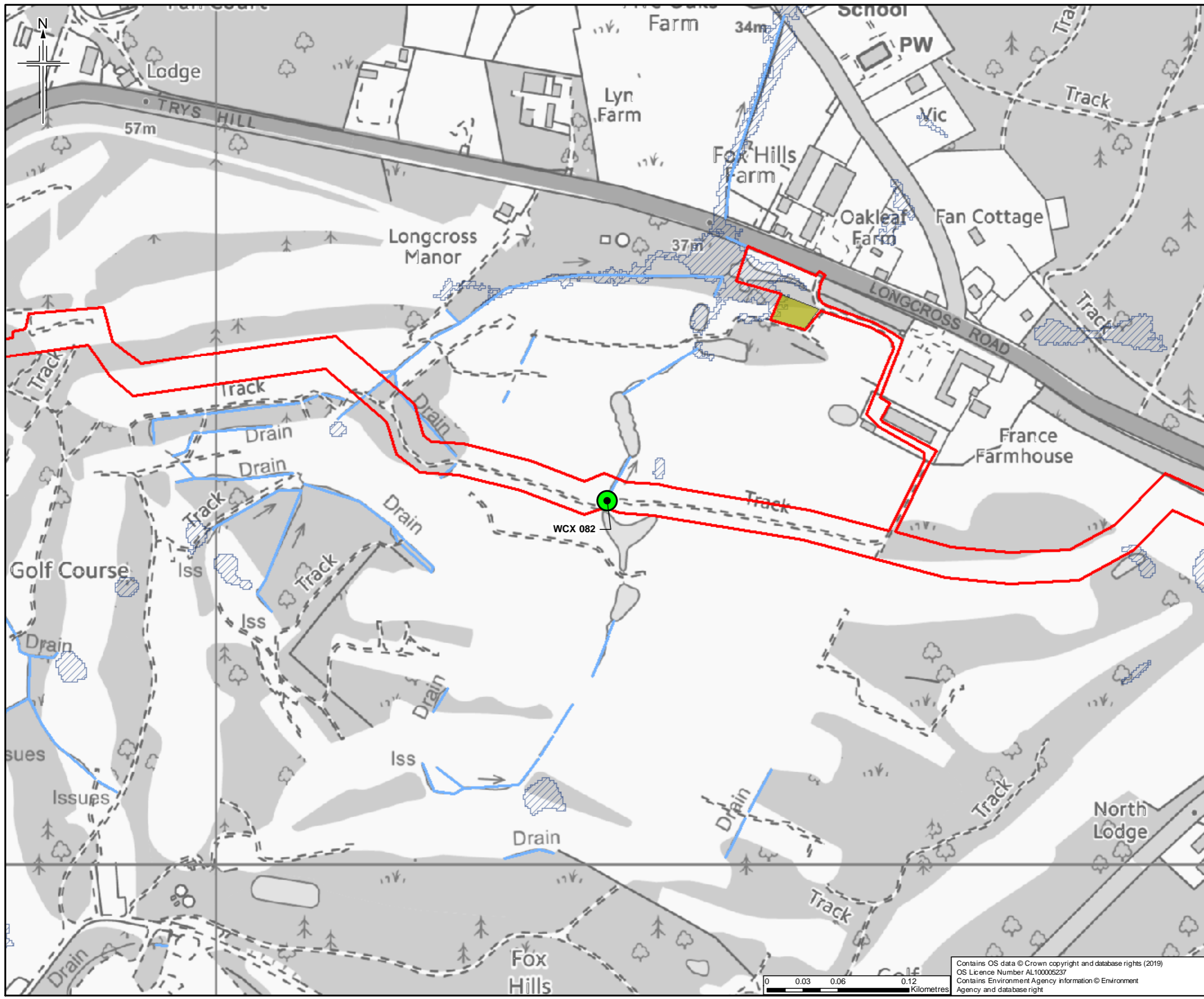
FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
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 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project/Work No.	B2325300-JAC-000-ENV-DRG-001234
Drawing number	Figure C72 Sheet 1 of 1
Rev	0

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- Legend**
- ▬ Order Limits
 - Construction compound
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

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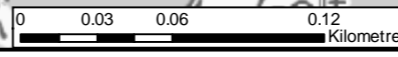
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
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 KT22 8UX

Project
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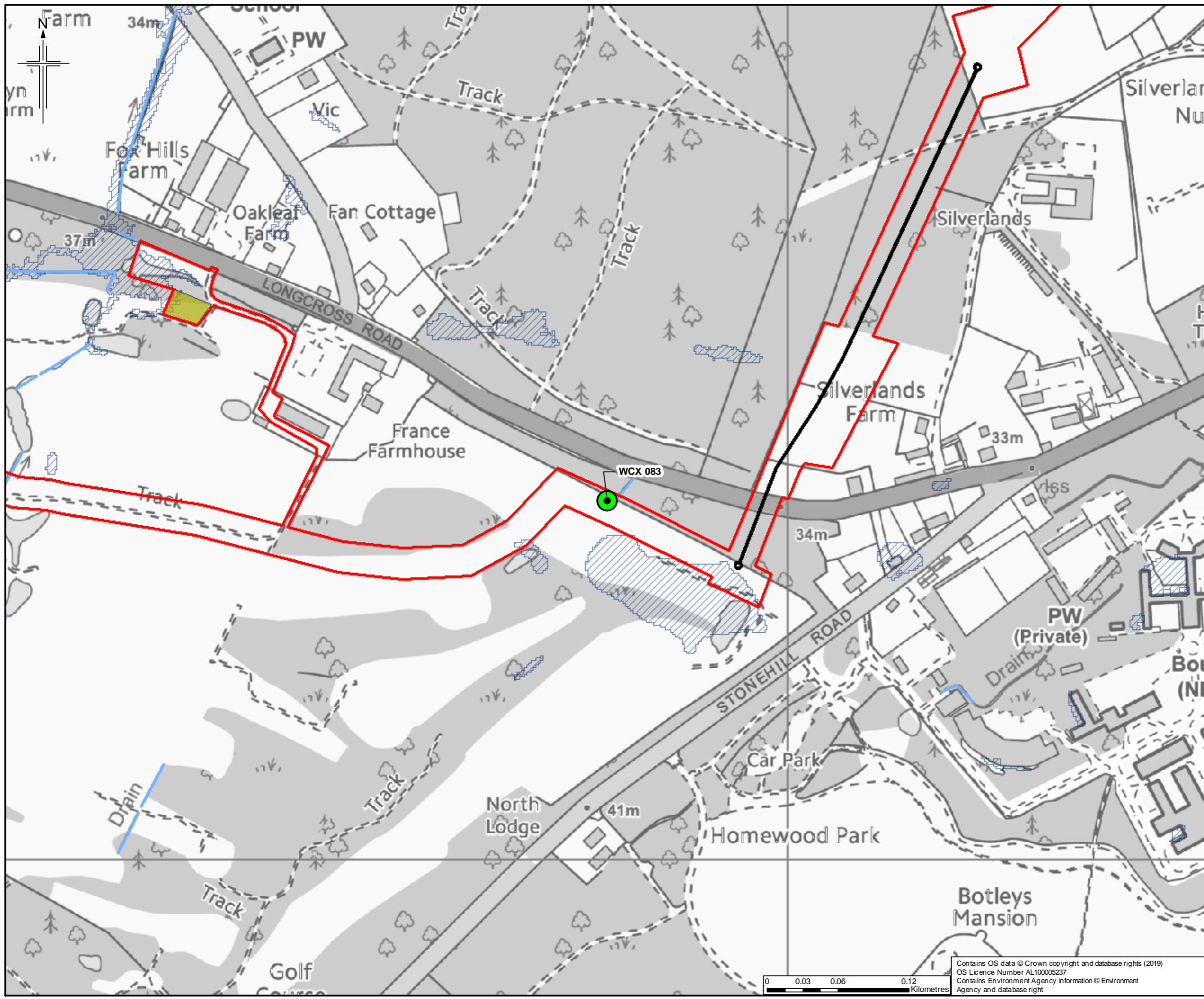
Drawing title
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 UNNAMED WATERCOURSE
 CROSSING (WCX 082) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3 000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project Wise No.	B2325300-JAC-000-ENV-DRG-001214
Drawing number	Figure C73 Sheet 1 of 1
Rev	0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue	SY	FW	SM	SH



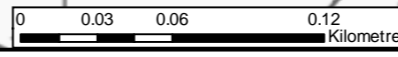
Client
Esso Petroleum Company, Limited
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Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX



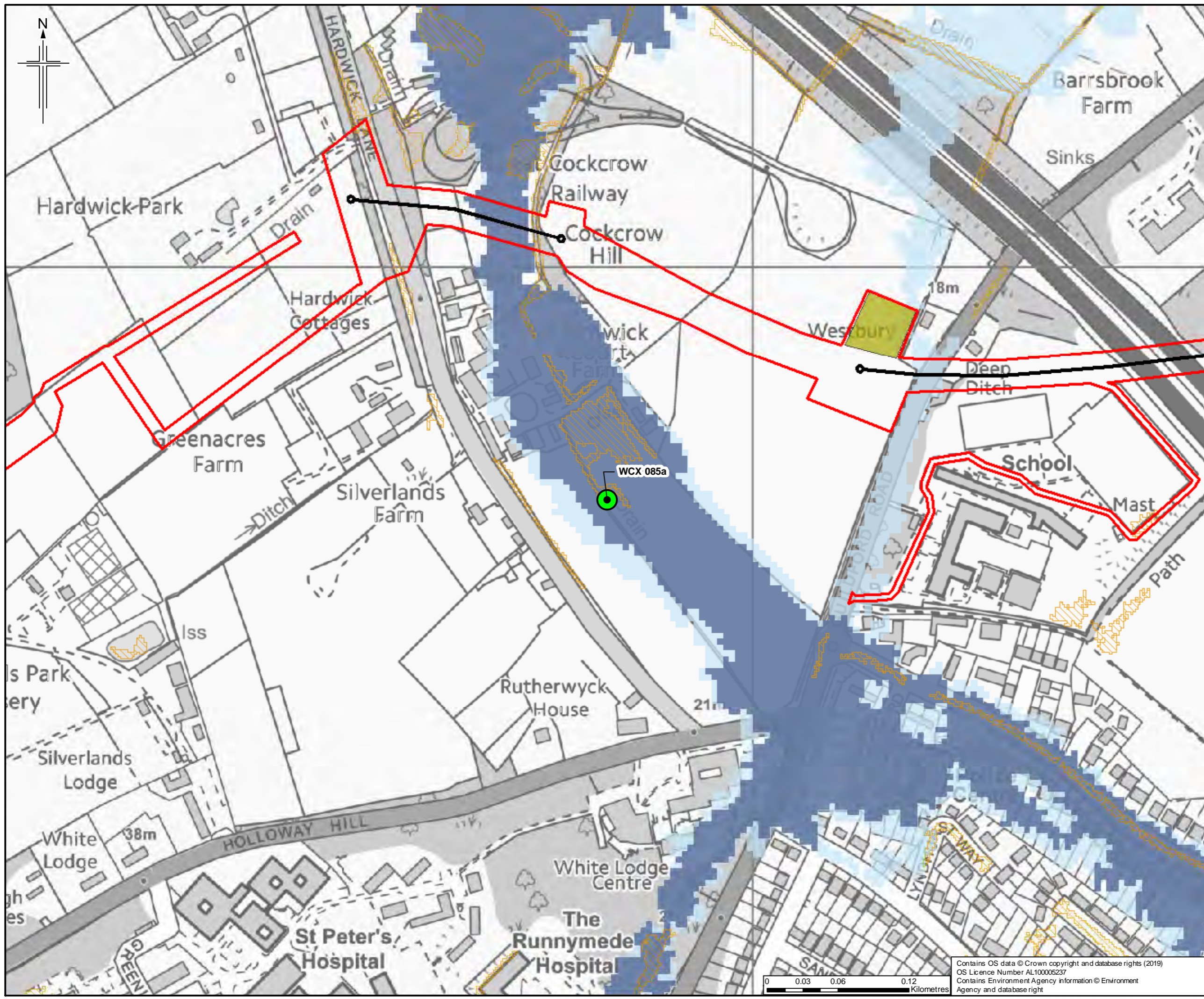
Drawing title
**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 083) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
Project Wise No.	B2325300-JAC-000-ENV-DRG-001215	
Drawing number	Figure C74 Sheet 1 of 1	Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Appr'd
0	09/04/2019	For Issue	SY	FW	SM	SH



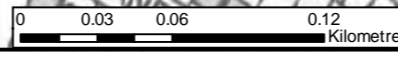
Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX



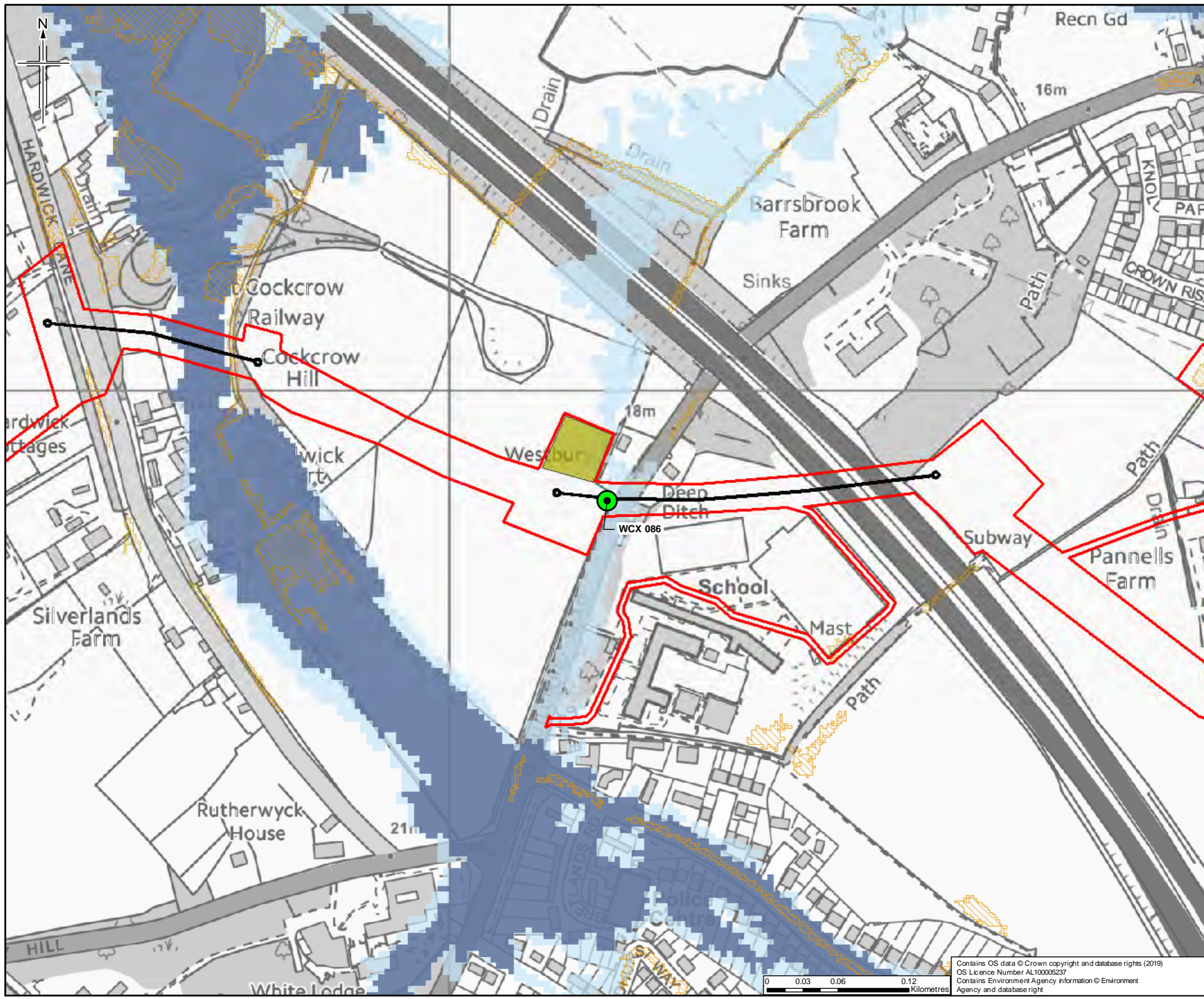
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**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 085a) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project/Work No.	B2325300-JAC-000-ENV-DRG-001216
Drawing number	Figure C75 Sheet 1 of 1
Rev	0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section F and Section G

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue	SY	FW	SM	SH

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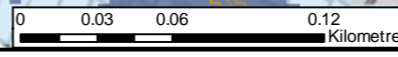
Client
 Esso Petroleum Company, Limited
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 Leatherhead,
 Surrey,
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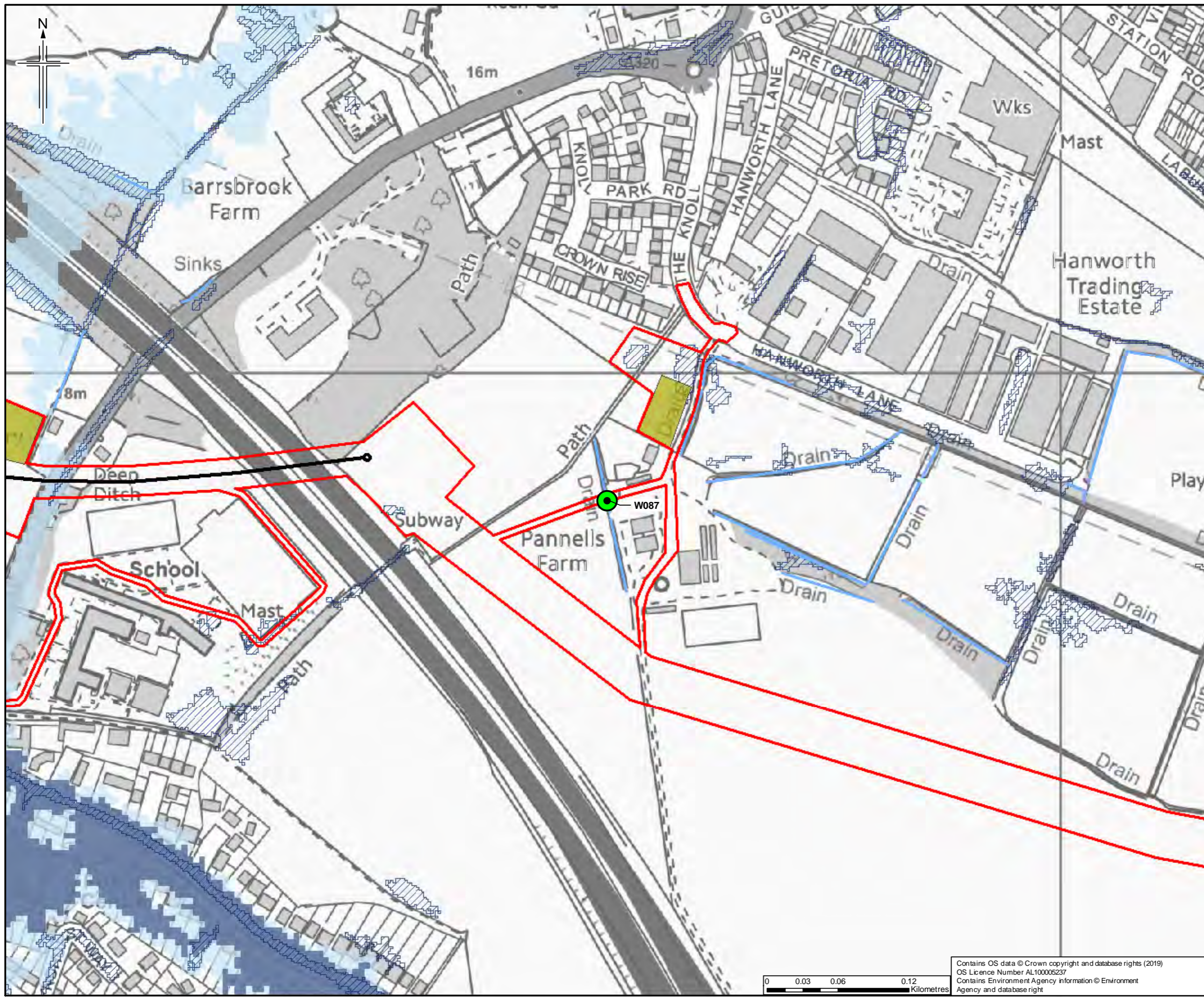
Project
 Southampton to London Pipeline Project

Drawing title
**FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 CROSSING (WCX 086) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:3 000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001161	
Drawing number	Figure C76 Sheet 1 of 1	Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section F and Section G

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

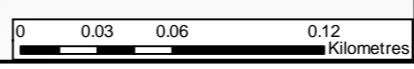
JACOBS
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Client
 Esso Petroleum Company, Limited
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 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

Project
 Southampton to London Pipeline Project

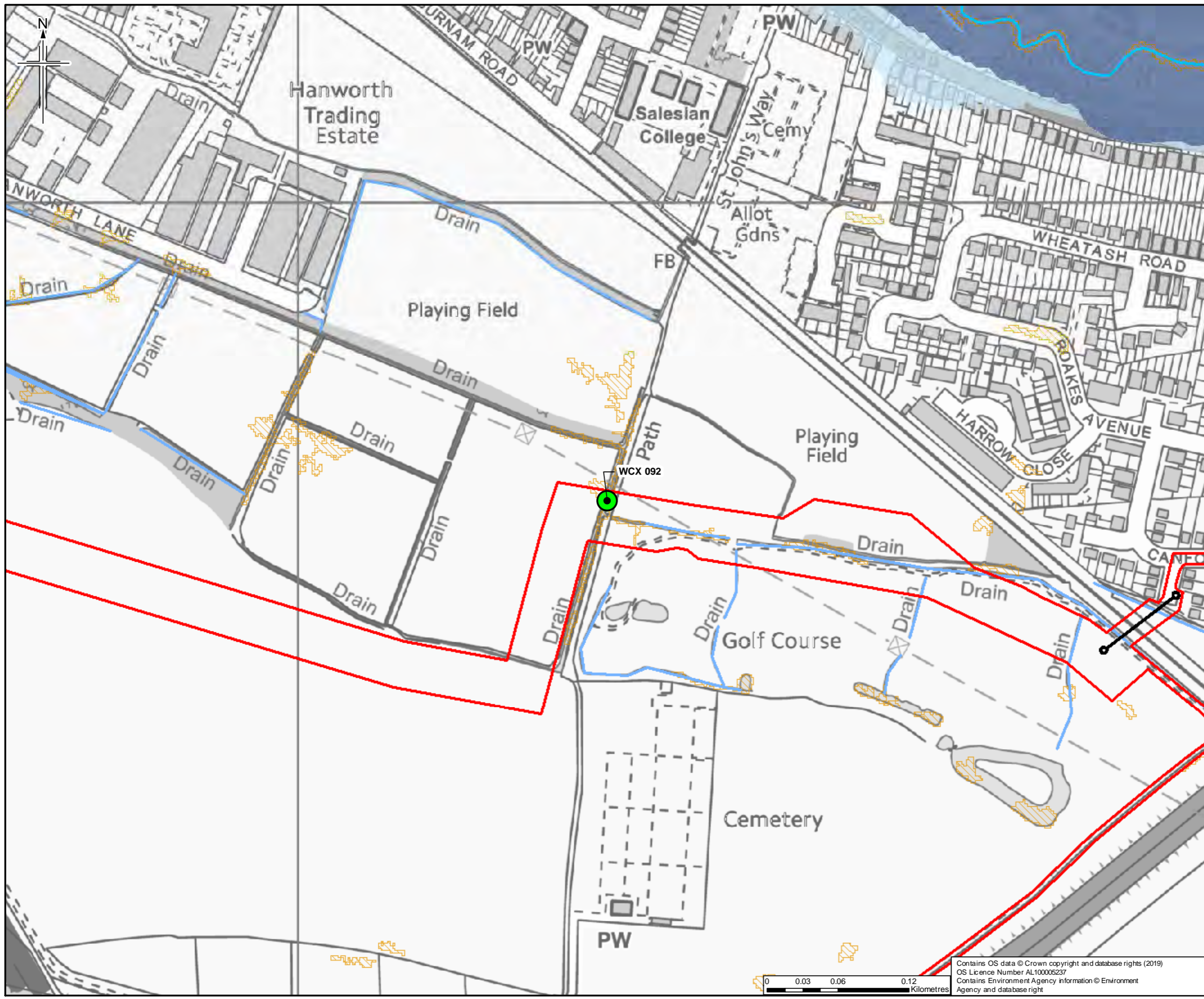
Drawing title
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 UNNAMED WATERCOURSE (W087)
 CROSSING FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001217
Drawing number	Figure C77 Sheet 1 of 1
Rev	0



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Legend

- ▭ Order Limits
- Trenchless crossing
- Main River
- Ordinary Watercourse
- ▨ Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- ▭ Flood Zone 2
- ▭ Flood Zone 3
- Crossing identification number

Sheet displays parts of Section G

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

Author: **JACOBS**
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Client: Esso Petroleum Company, Limited
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 KT22 8UX

Project: **Esso** Southampton to London Pipeline Project

Drawing title: **FLOOD RISK ASSESSMENT UNNAMED WATERCOURSE CROSSING (WCX 092) FLOOD RISK DATA APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3 000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001218
Drawing number	Figure C78 Sheet 1 of 1
Rev	0

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Sheet displays parts of Section G

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

Author: **JACOBS**
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 Tel: +44 (0) 18 45 7000 Fax: +44(0)18 457021
 www.jacobs.com

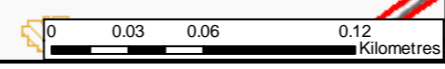
Client: Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

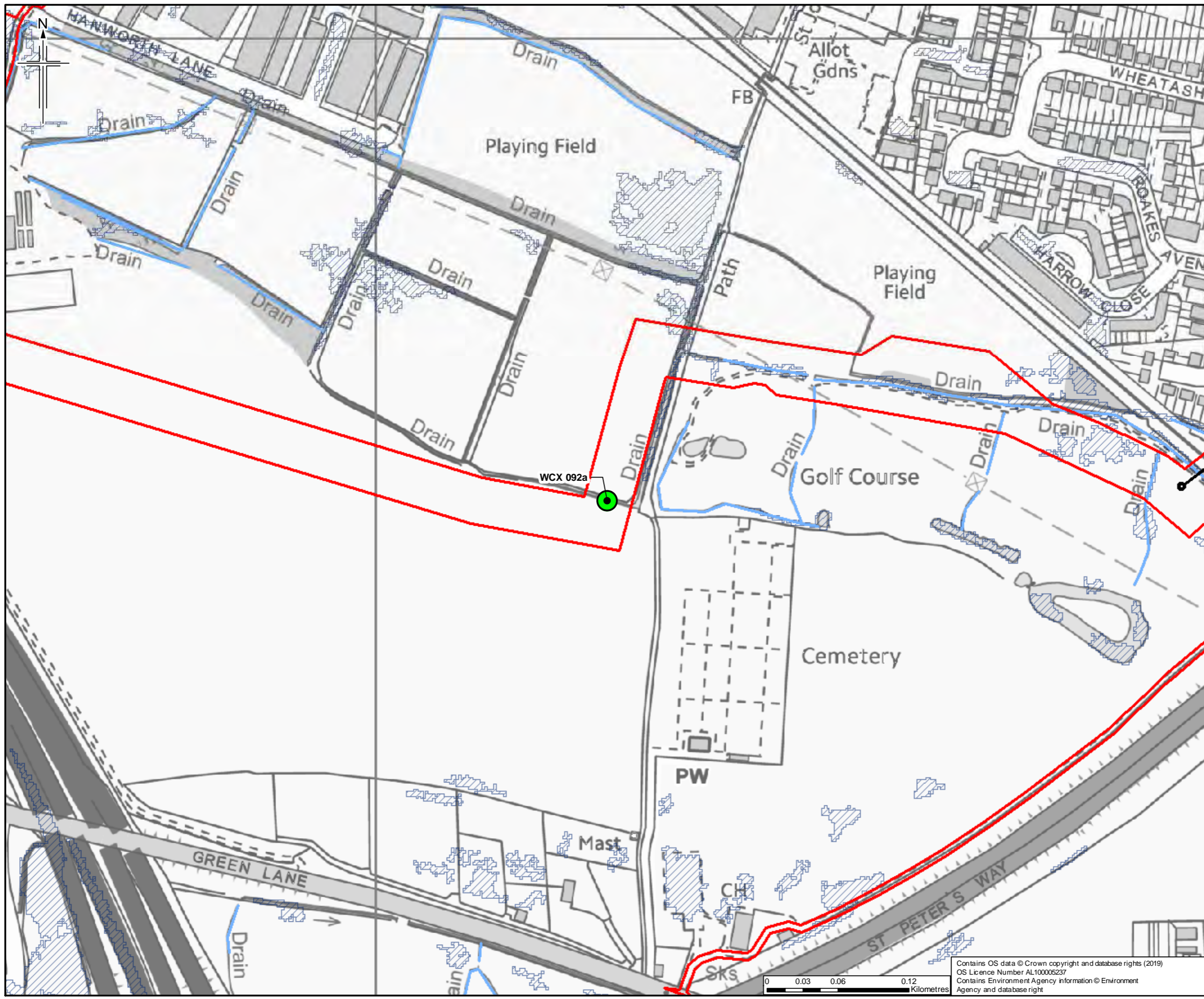
Project: **Esso** Southampton to London Pipeline Project

Drawing title: **FLOOD RISK ASSESSMENT UNNAMED WATERCOURSE CROSSING (WCX 092) FLOOD RISK DATA APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3 000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001218
Drawing number	Figure C78 Sheet 1 of 1
Rev	0

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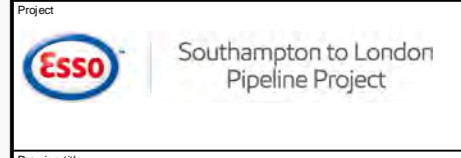
- Legend**
- ▬ Order Limits
 - Trenchless crossing
 - Ordinary Watercourse
 - ▨ Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section G

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue	SY	FW	SM	SH



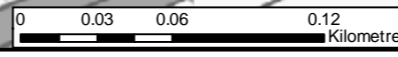
Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

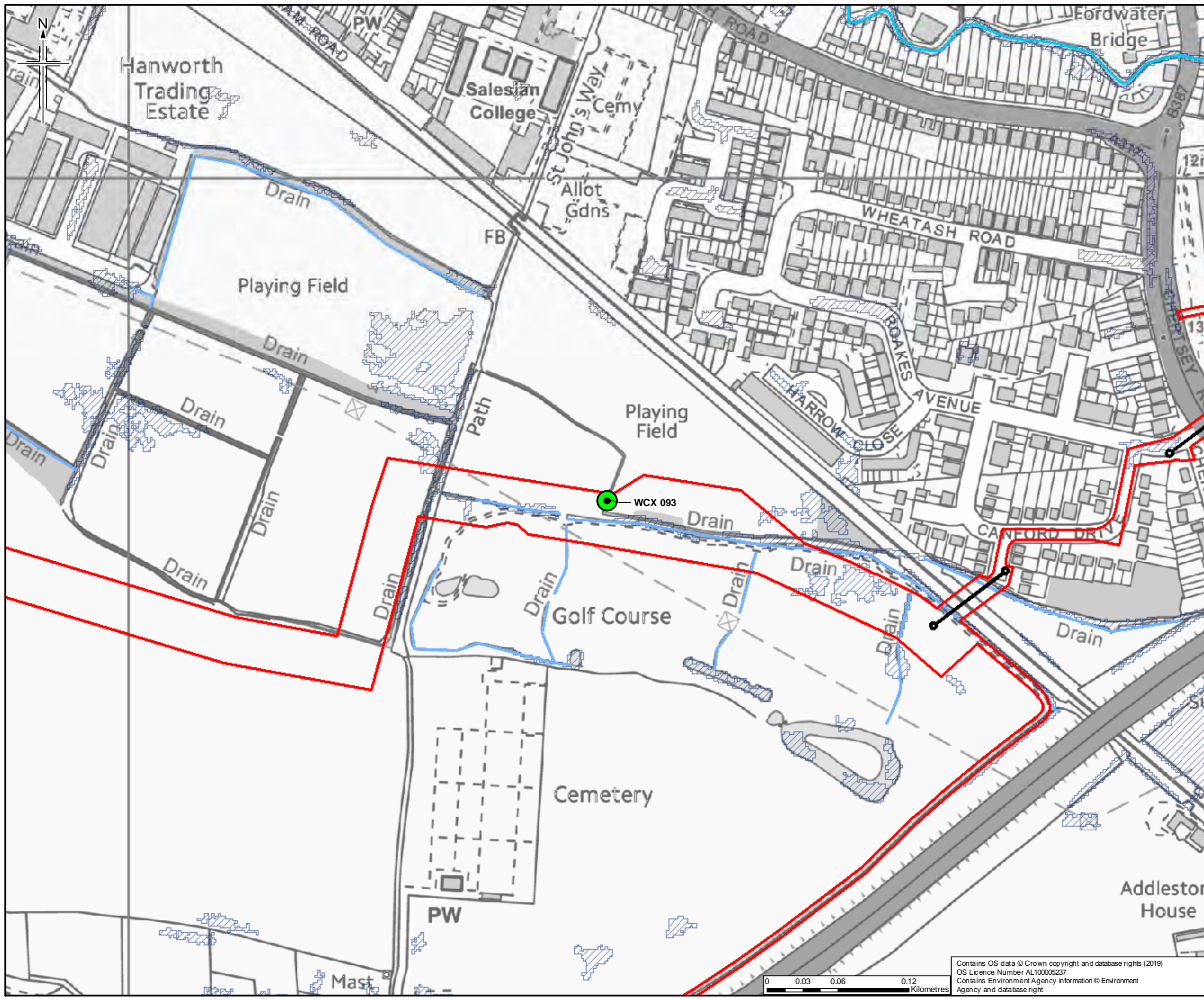


Drawing title
FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 092a) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001237
Drawing number	Figure C79 Sheet 1 of 1
Rev	0

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Legend

- Order Limits
- Trenchless crossing
- Main River
- Ordinary Watercourse
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Crossing identification number

Sheet displays parts of Section G

Rev.	Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

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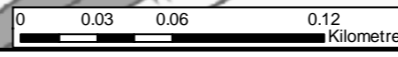
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

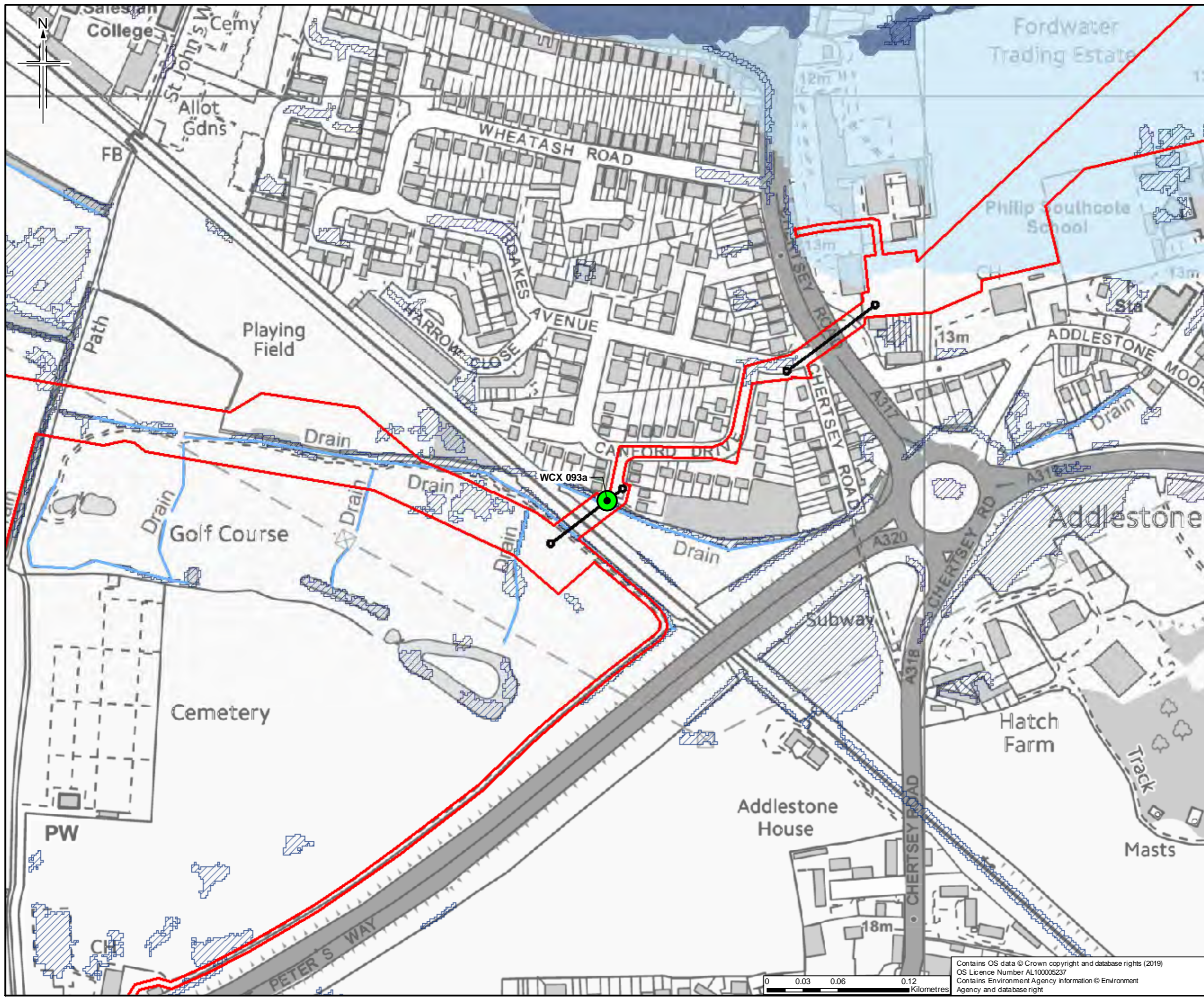
Project
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Drawing title
**FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 CROSSING (WCX 093) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	Scale	DO NOT SCALE
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Jacobs No.	B2325300		
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001219		
Drawing number	Figure C80 Sheet 1 of 1		Rev 0

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- Legend**
- ▬ Order Limits
 - ▬ Trenchless crossing
 - ▬ Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section G

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue				

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 www.jacobs.com

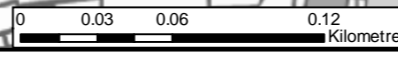
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

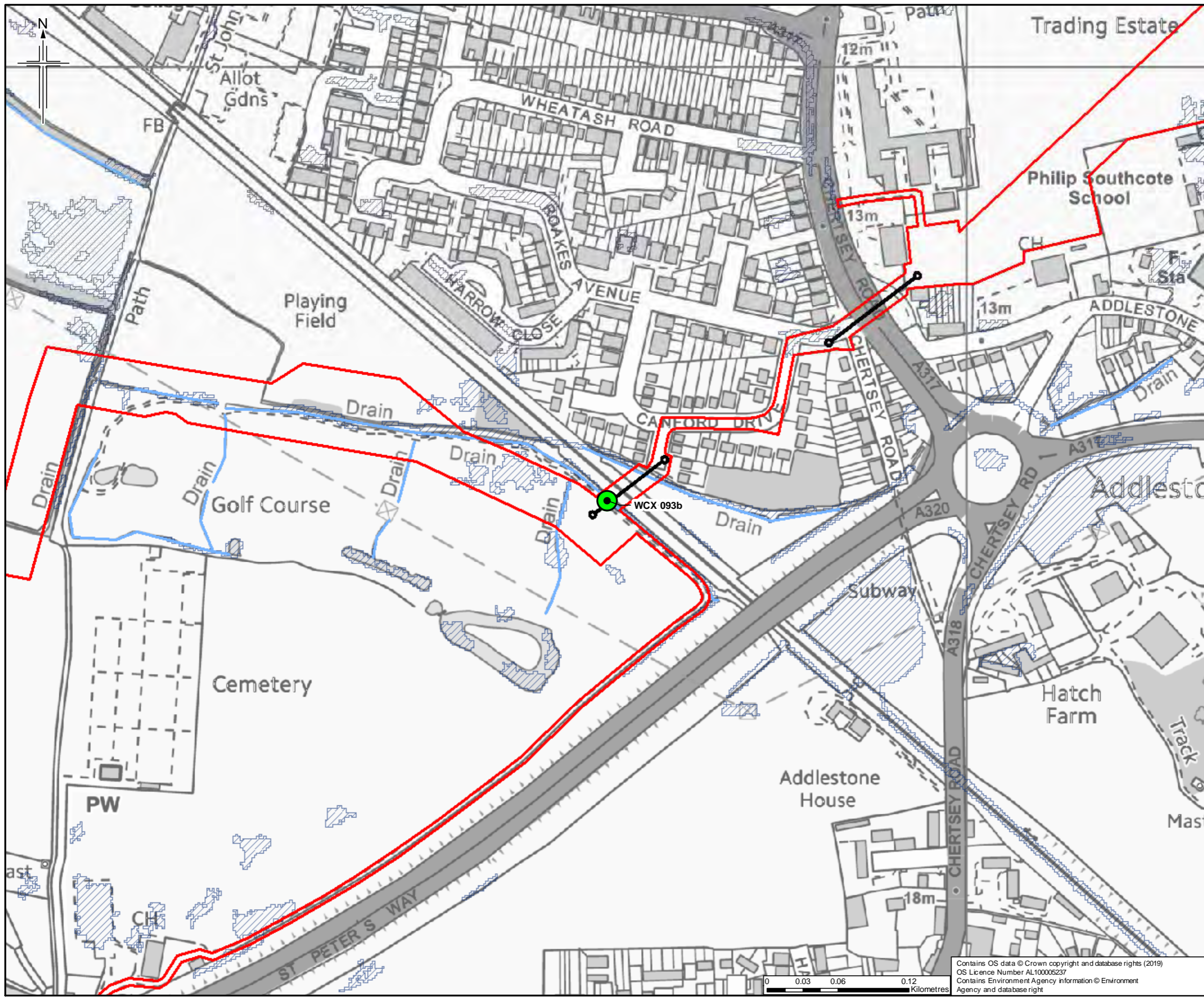
Project
 Southampton to London Pipeline Project

Drawing title
**FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 CROSSING (WCX 093a) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001220
Drawing number	Figure C81 Sheet 1 of 1
Rev	0

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- Legend**
- ▭ Order Limits
 - Trenchless crossing
 - Ordinary Watercourse
 - ▨ Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section G

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue	SY	FW	SM	SH



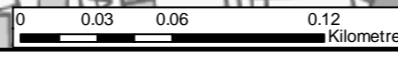
Client
Esso Petroleum Company, Limited
Ermyn House,
Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

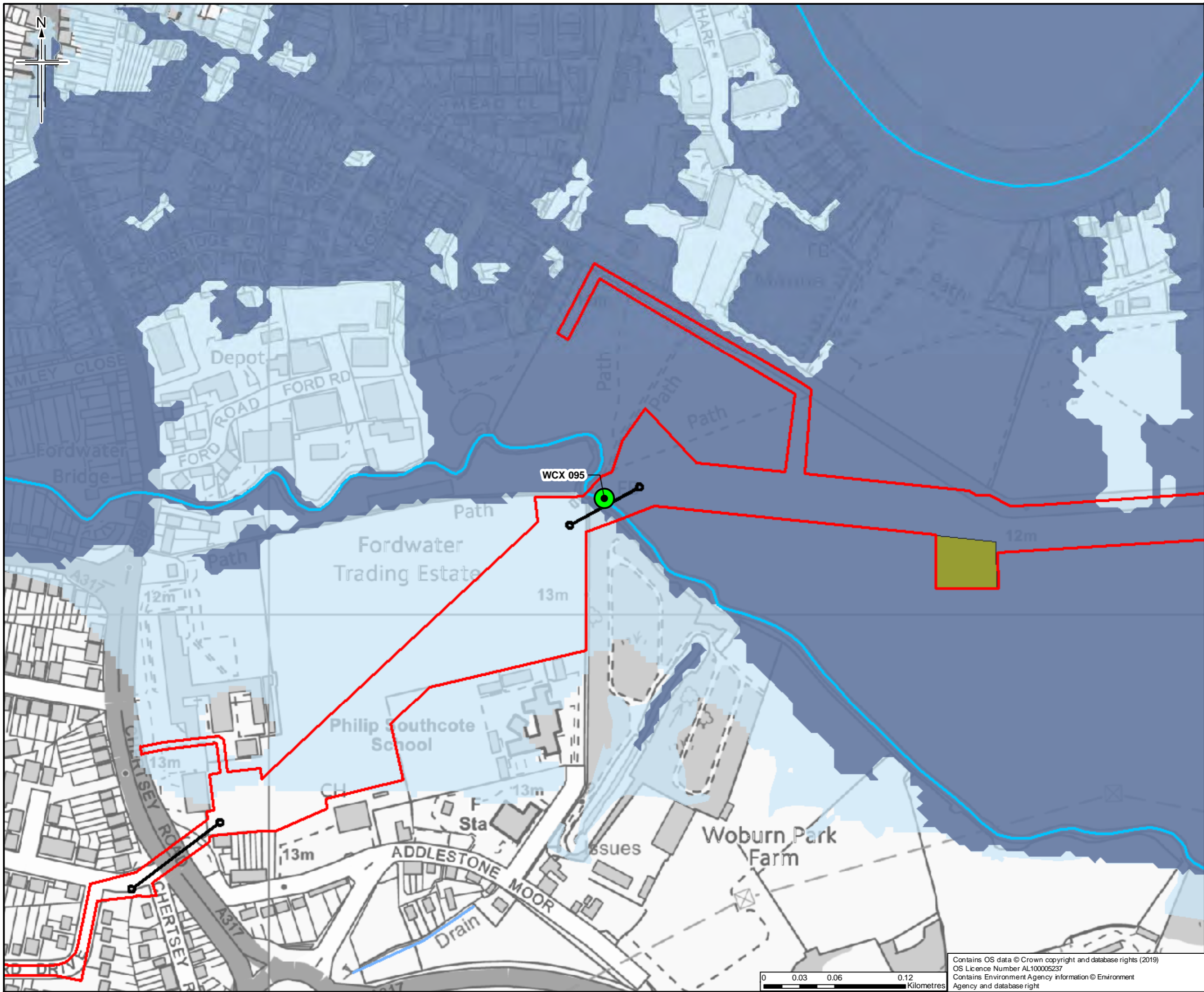


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**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 093b) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
JACOBS No.	B2325300	
Project Wise No.	B2325300-JAC-000-ENV-DRG-001232	
Drawing number	Figure C82 Sheet 1 of 1	Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Ordinary Watercourse
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section G

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue	SY	FW	SM	SH



Client
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 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

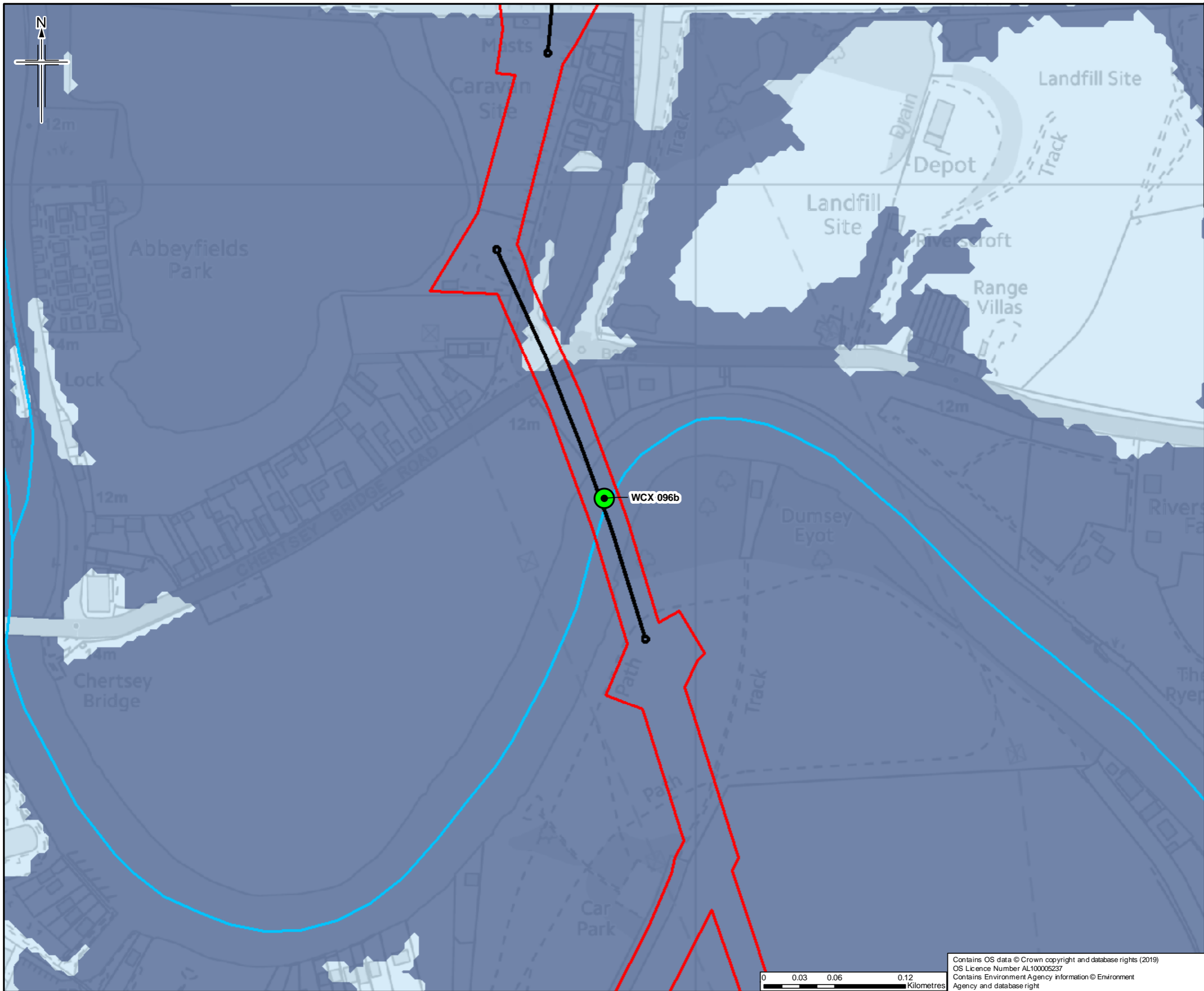


Drawing title
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 THE BOURNE CROSSING
 (WCX 095) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
JACOBS No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001162
Drawing number	Figure C83 Sheet 1 of 1
Rev	0

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- Legend**
- Order Limits
 - Trenchless crossing
 - Main River
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section G and Section H

Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Check'd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

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Drawing title

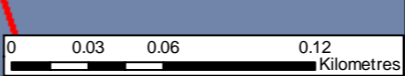
**FLOOD RISK ASSESSMENT
 RIVER THAMES CROSSING
 (WCX 096b) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
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Jacobs No.	B2325300	
Project/Work No.	B2325300-JAC-000-ENV-DRG-001163	

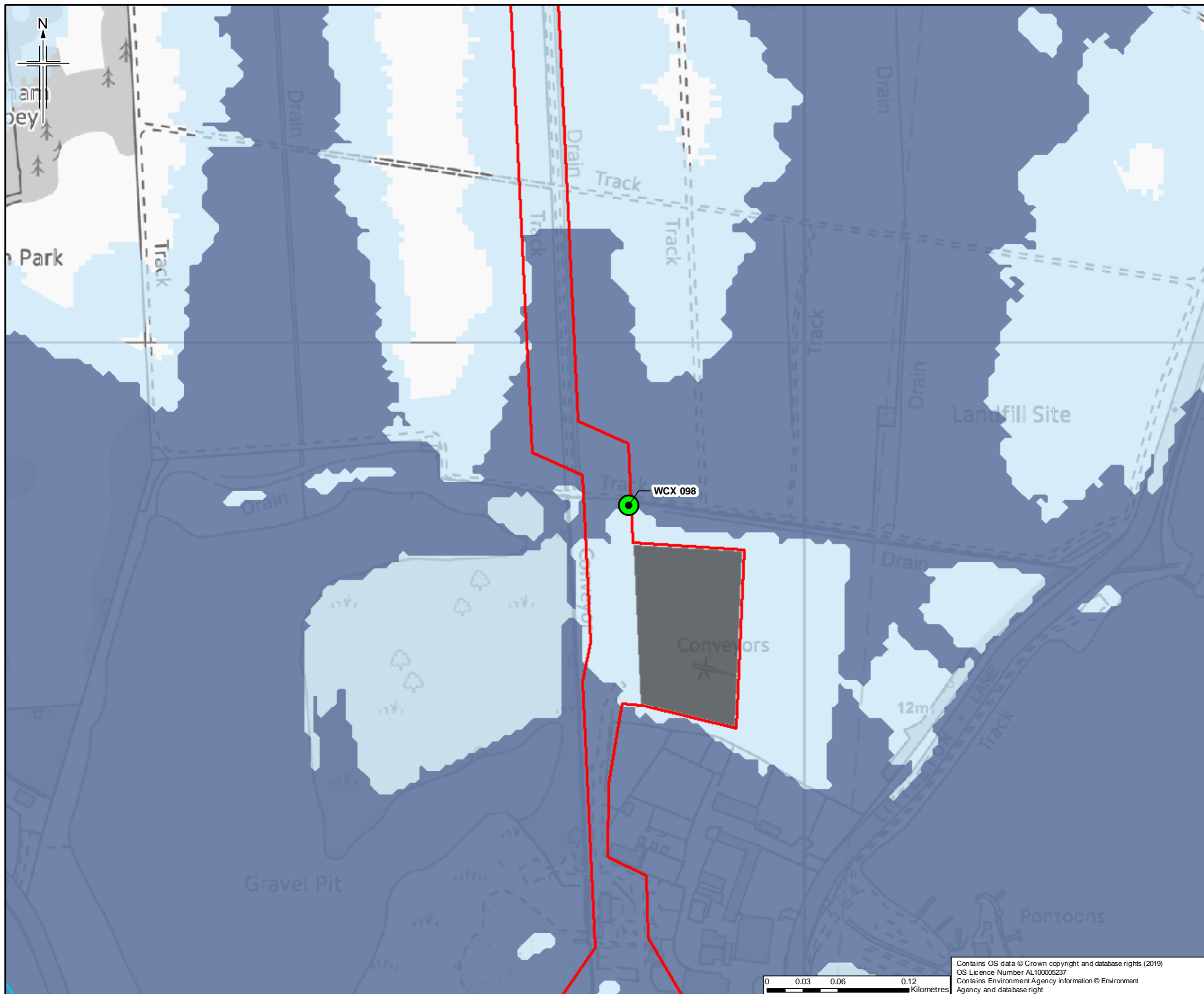
Drawing number Rev

Figure C84 Sheet 1 of 1 0

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- Legend**
- Order Limits
 - Logistics hub
 - Main River
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section H

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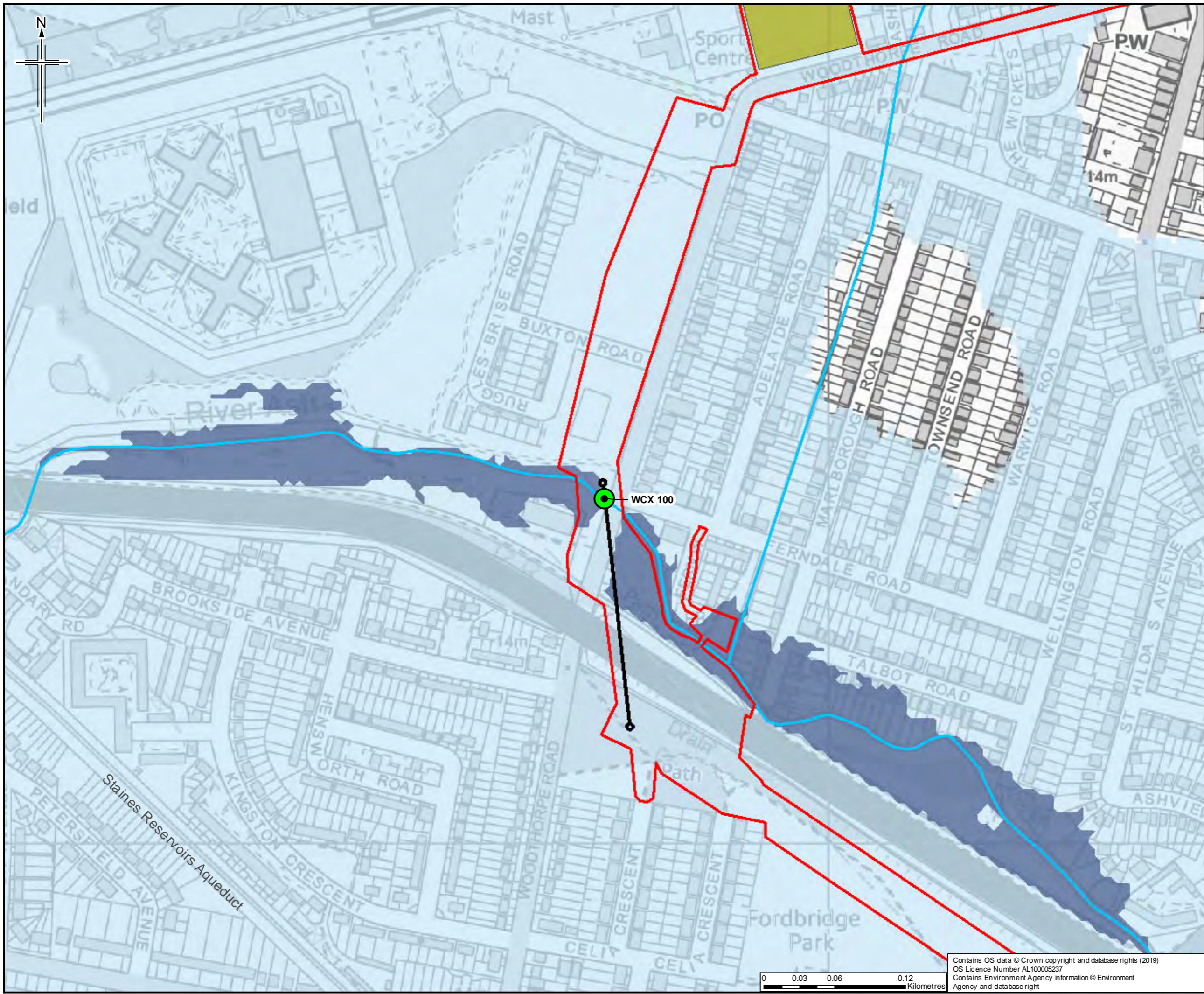


Drawing title
 FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 CROSSING (WCX 098) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001164	
Drawing number	Figure C85 Sheet 1 of 1	Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Main River
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section H

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue			SY	FW SM SH

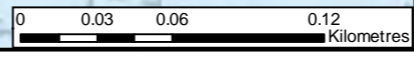


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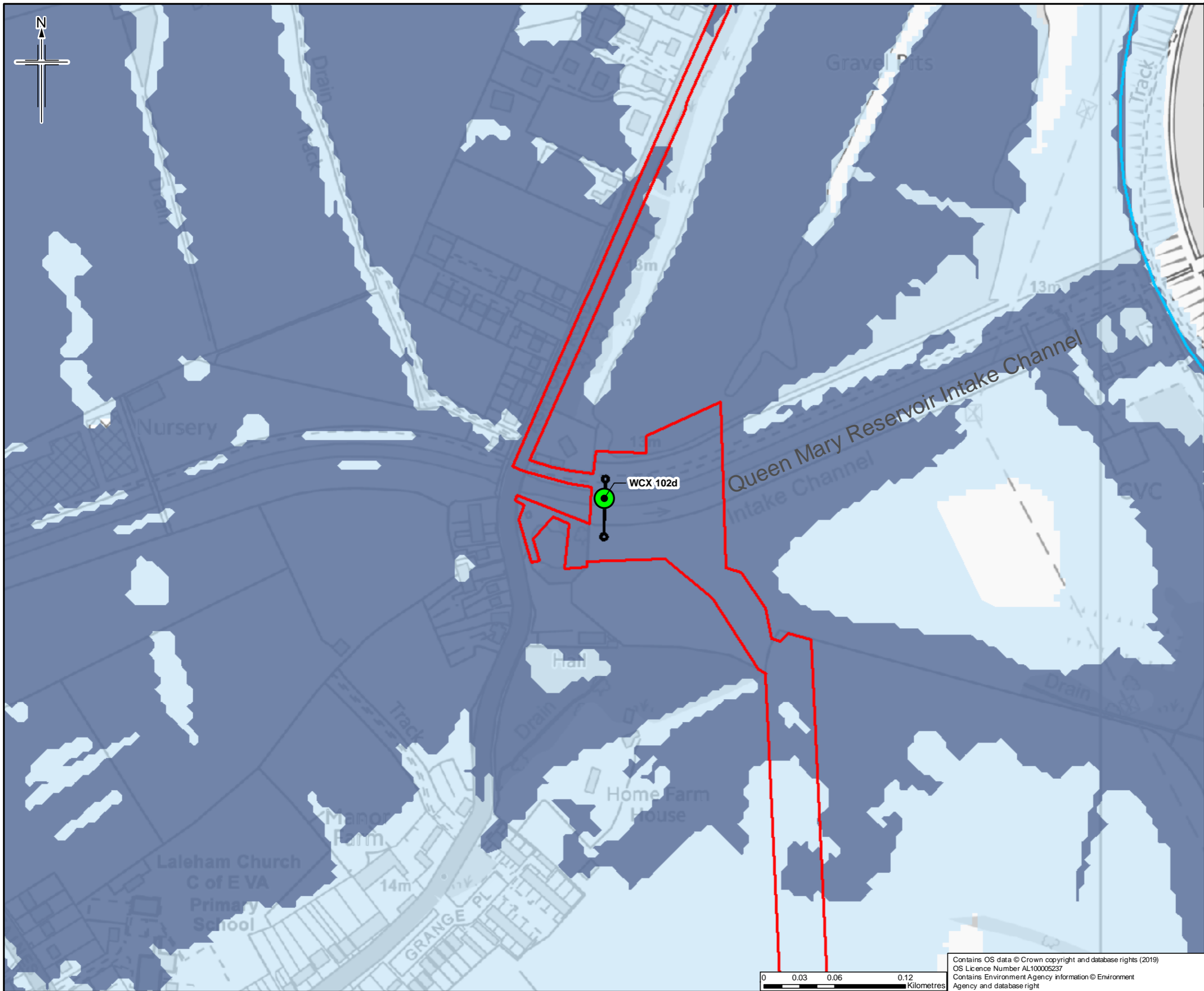
Drawing title
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RIVER ASH CROSSING
(WCX 100) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
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Project/Work No.	B2325300-JAC-000-ENV-DRG-001165
Drawing number	Figure C86 Sheet 1 of 1
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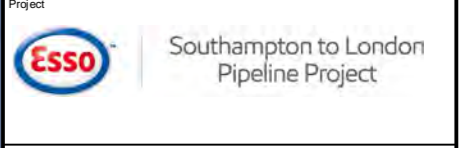
- Legend**
- Order Limits
 - Trenchless crossing
 - Main River
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section H

Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Check'd	Rev'd	Appr'd
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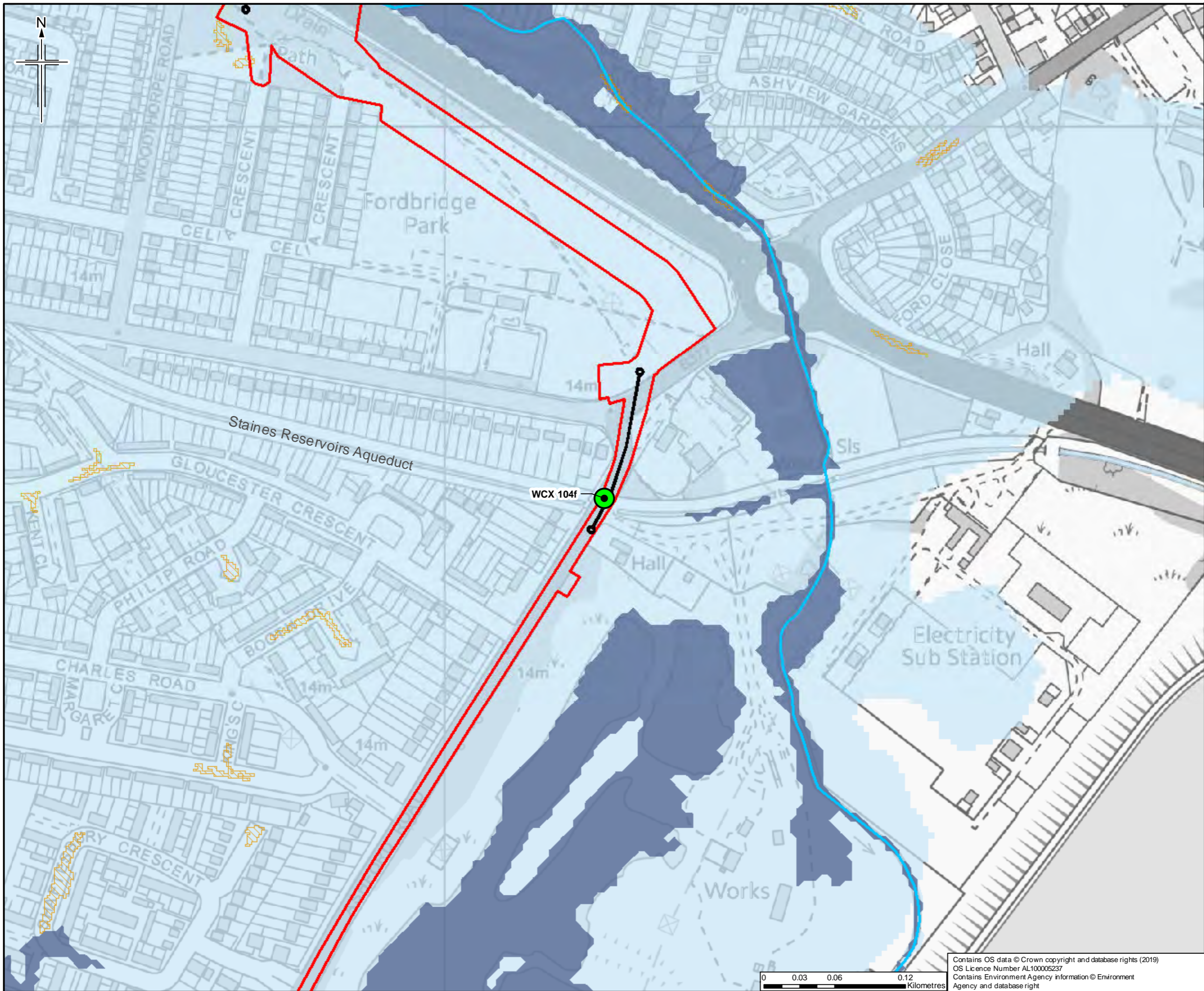
Drawing title
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 INTAKE CHANNEL CROSSING
 (WCX 102d) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue	
Scale	1:3,000 @ A3	DO NOT SCALE
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Drawing number	Figure C87 Sheet 1 of 1	Rev 0



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- Legend**
- Order Limits
 - Trenchless crossing
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section H

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
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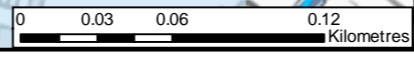
Client
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 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

Project
Southampton to London Pipeline Project

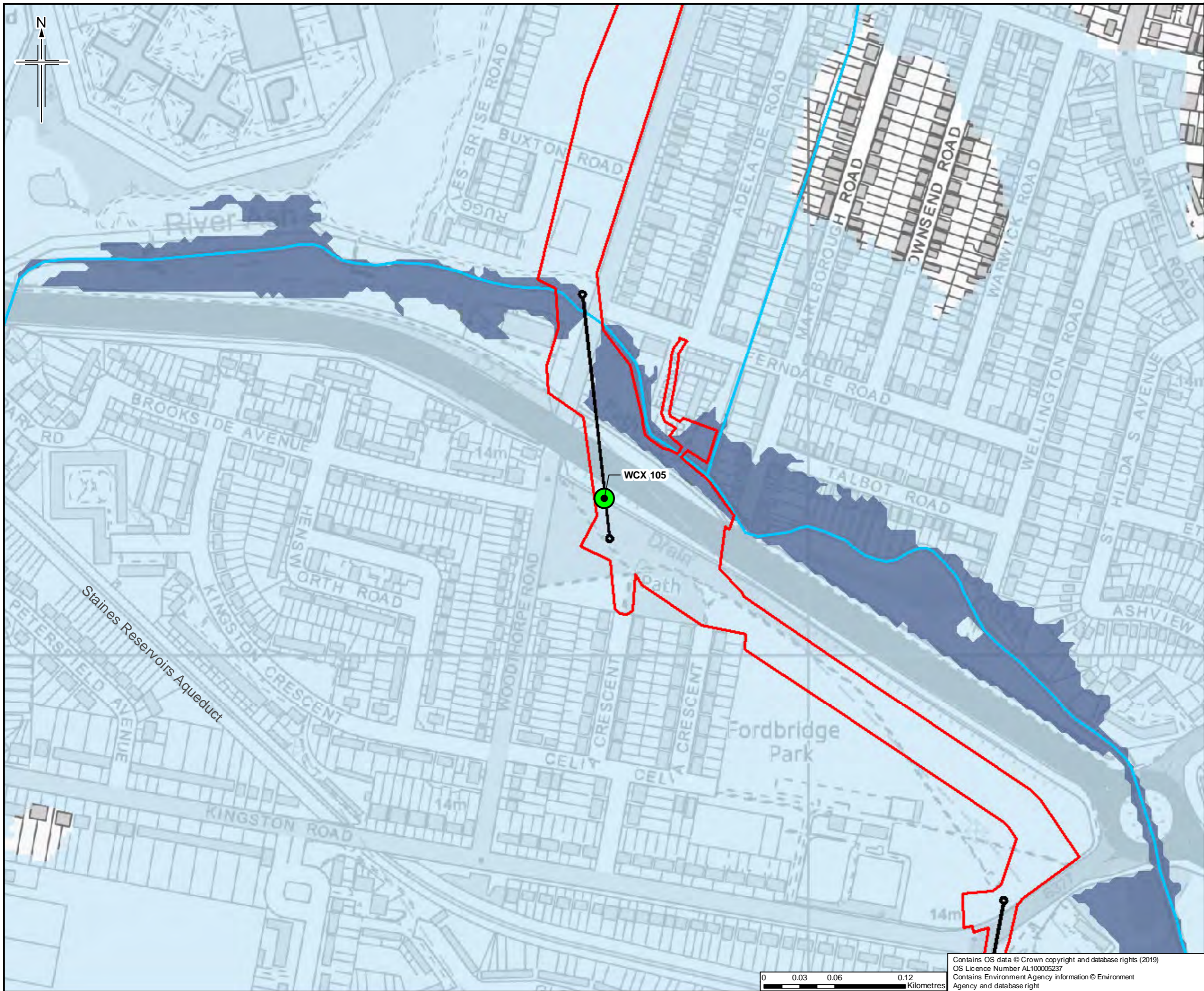
Drawing title
 FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE CROSSING
 (WCX 104f) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001153
Drawing number	Figure C88 Sheet 1 of 1
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- Legend**
- ▭ Order Limits
 - Trenchless crossing
 - Main River
 - ▭ Flood Zone 2
 - ▭ Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section H

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
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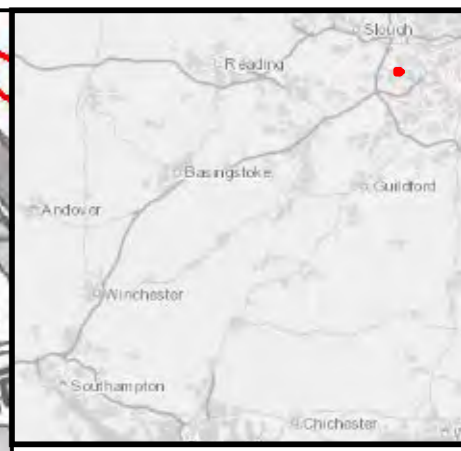
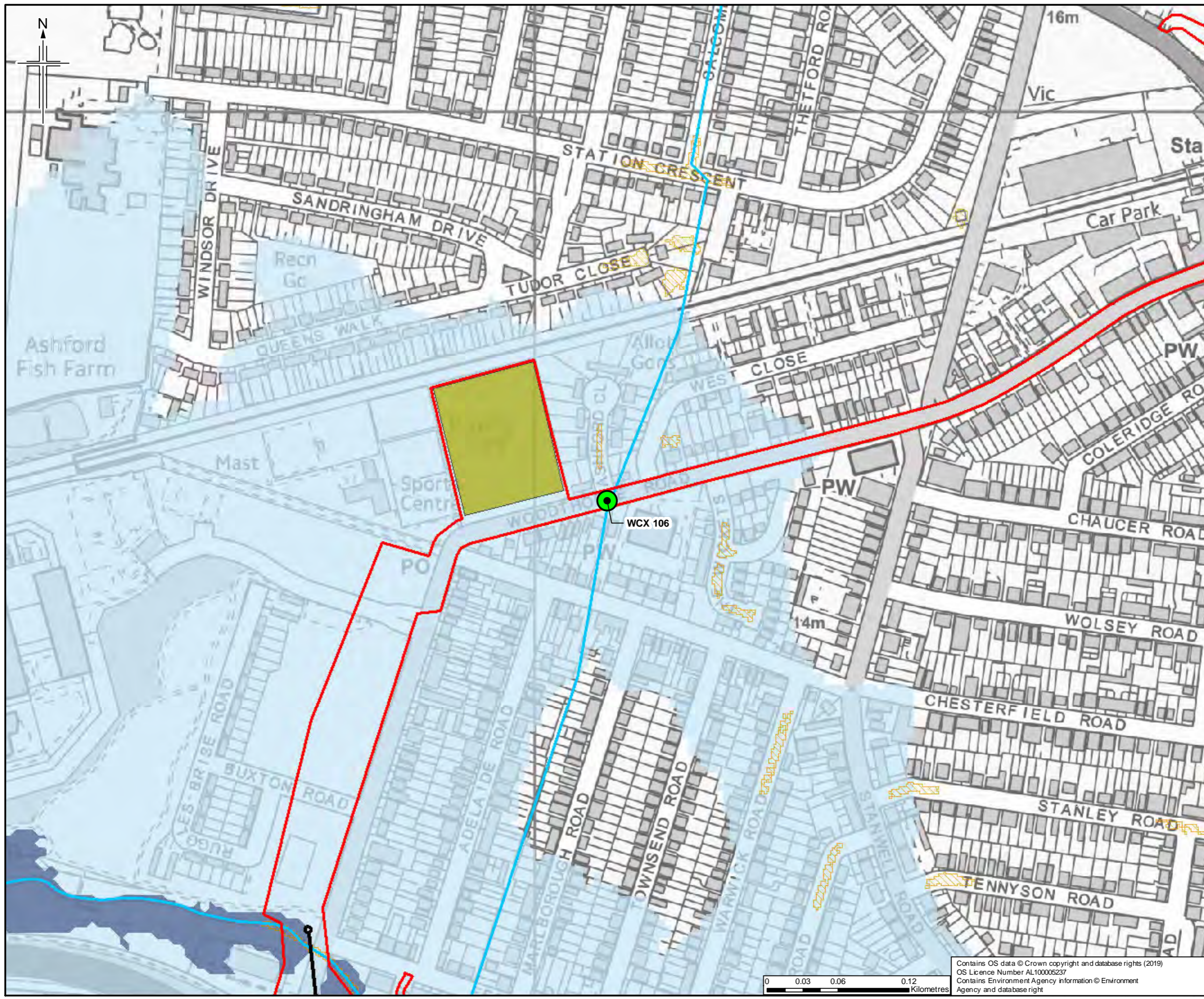


Drawing title
**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 105) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3 000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project Wise No.	B2325300-JAC-000-ENV-DRG-001223

Drawing number
Figure C89 Sheet 1 of 1 Rev 0

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Legend

- ▭ Order Limits
- ▭ Construction compound
- Trenchless crossing
- Main River
- ▨ Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- ▭ Flood Zone 2
- ▭ Flood Zone 3
- Crossing identification number

Sheet displays parts of Section H

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue			SY	FW SM SH

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Project: **Esso** Southampton to London Pipeline Project

Drawing title: **FLOOD RISK ASSESSMENT UNNAMED WATERCOURSE CROSSING (WCX 106) FLOOD RISK DATA APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale: 1:3,000 @ A3	DO NOT SCALE
Jacobs No. B2325300	
ProjectWise No. B2325300-JAC-000-ENV-DRG-001224	
Drawing number: Figure C90 Sheet 1 of 1	Rev 0

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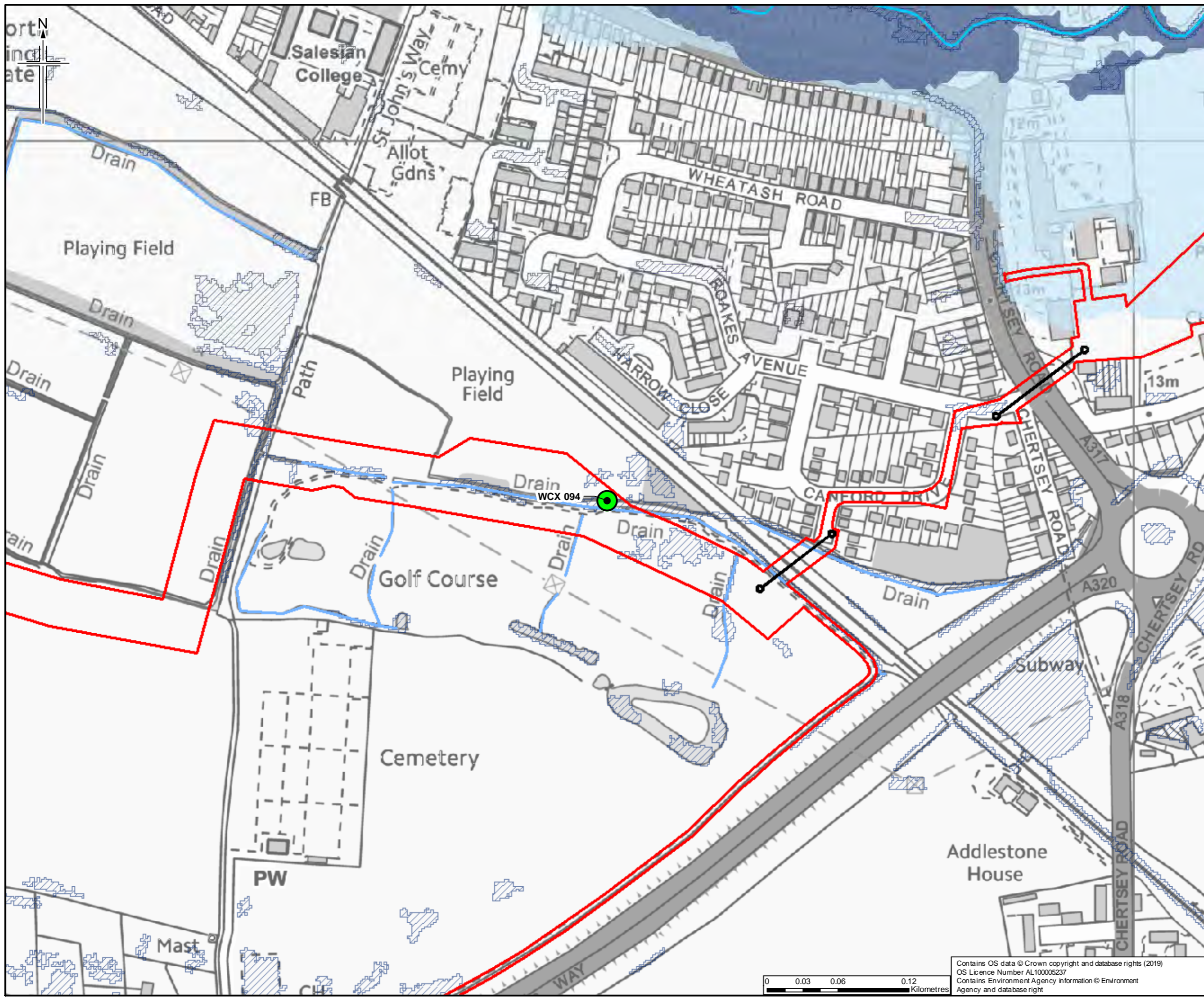
Jacobs No. B2325300

ProjectWise No. B2325300-JAC-000-ENV-DRG-001224

Drawing number: Figure C90 Sheet 1 of 1

Rev 0

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- Legend**
- ▭ Order Limits
 - Trenchless crossing
 - Main River
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - ▨ Flood Zone 2
 - ▨ Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section G

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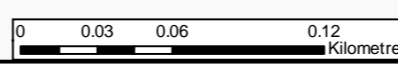
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Project
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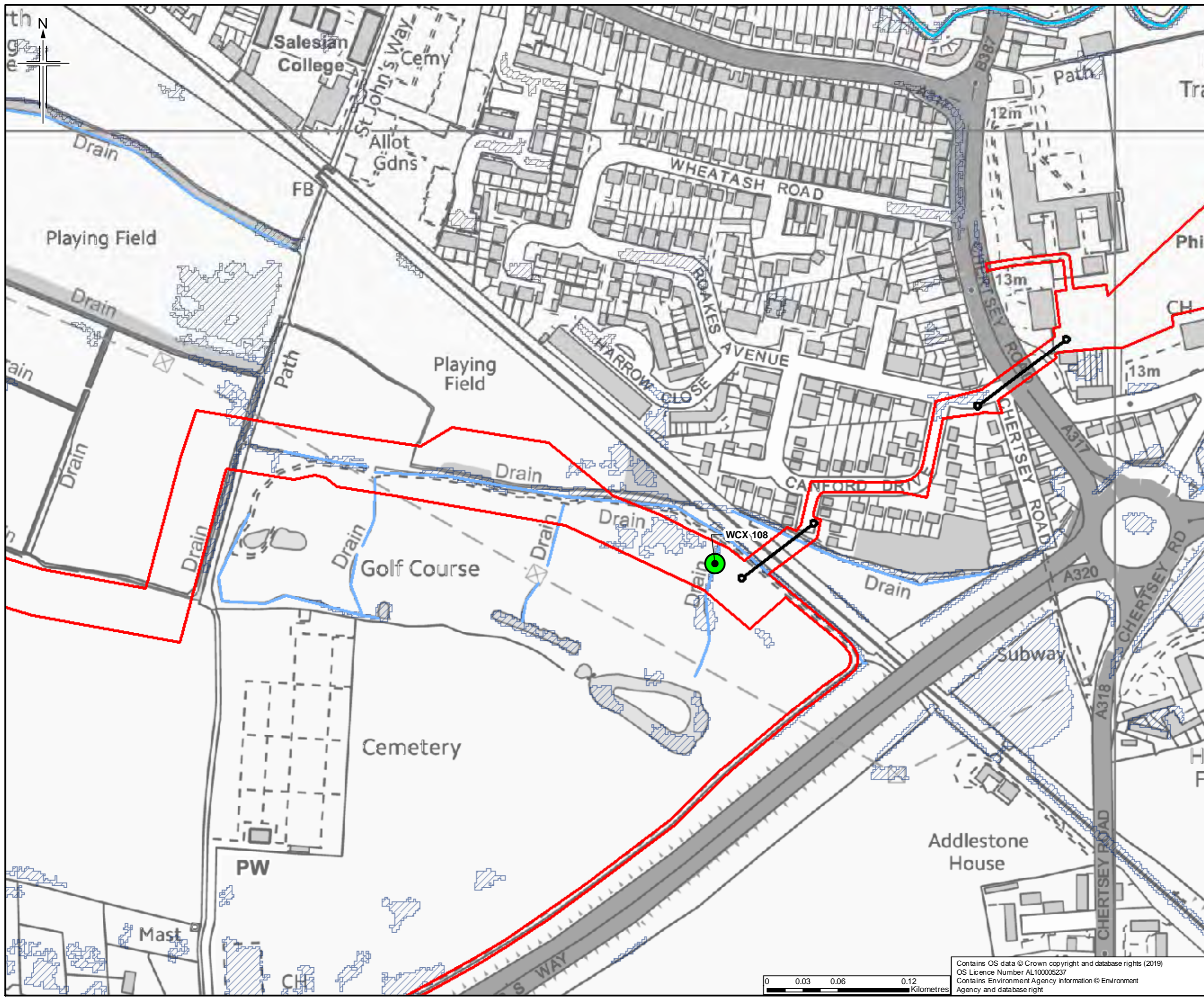
Drawing title
 FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 CROSSING (WCX 094) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project Wise No.	B2325300-JAC-000-ENV-DRG-001225
Drawing number	Figure C91 Sheet 1 of 1
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- Legend**
- ▭ Order Limits
 - Trenchless crossing
 - Main River
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP) ▨
 - Crossing identification number

Sheet displays parts of Section G

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checkd	Rev'd	Apprv'd
0	09/04/2019	For Issue				

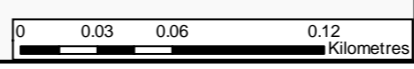


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KT22 8UX



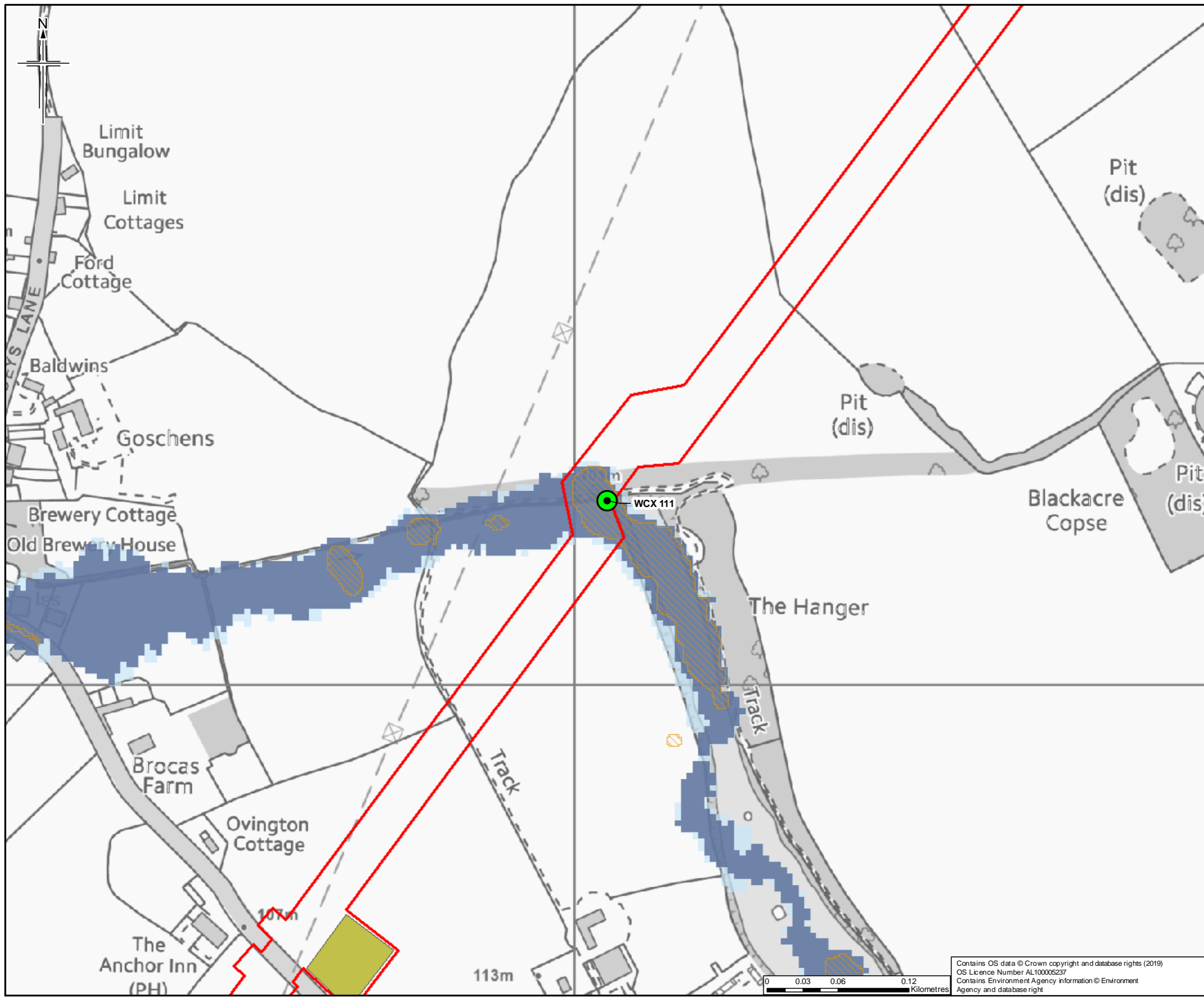
Drawing title
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UNNAMED WATERCOURSE
CROSSING (WCX 108) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
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Drawing number	Figure C92 Sheet 1 of 1
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- Legend**
- Order Limits
 - Construction compound
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section C

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
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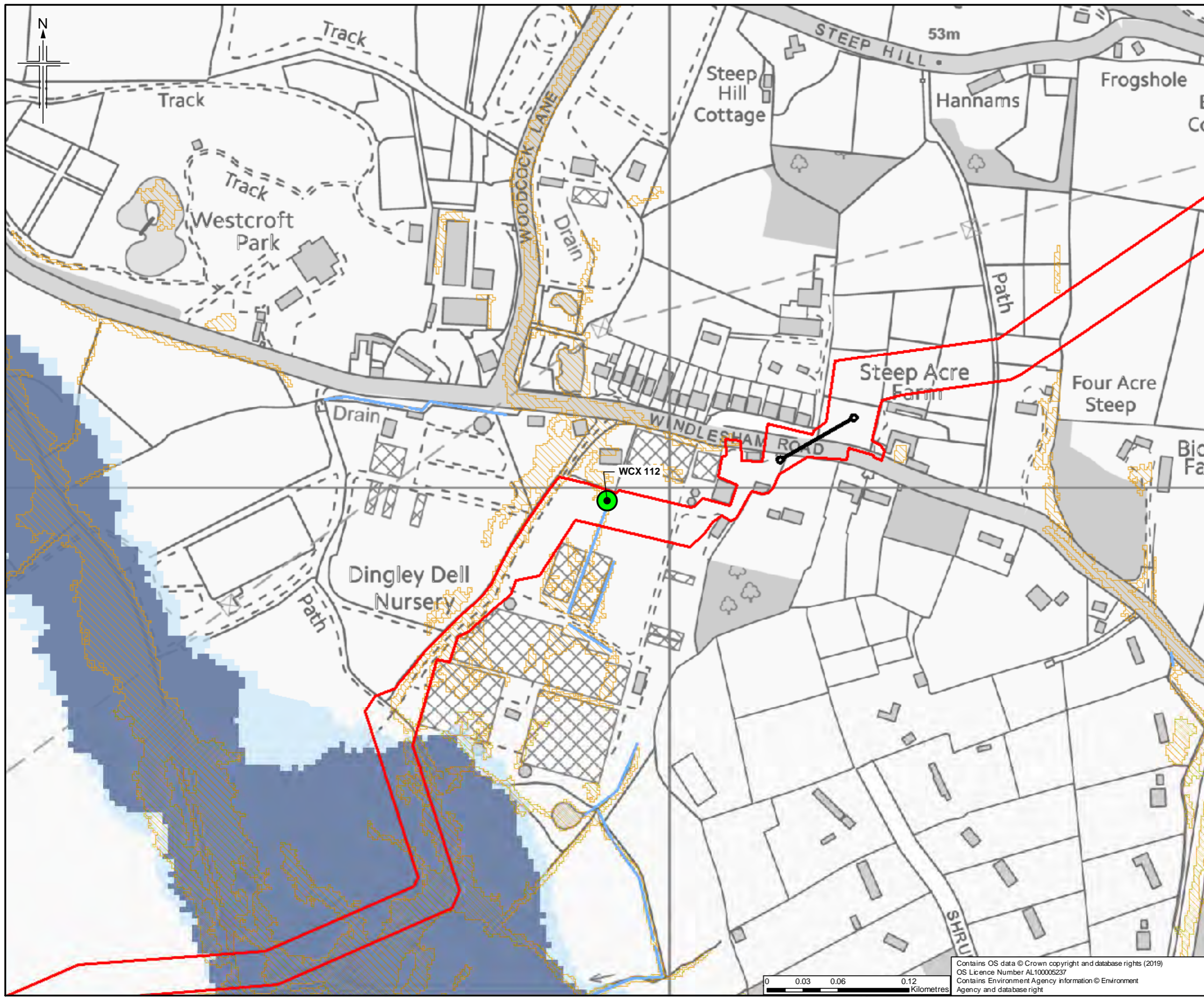
Southampton to London Pipeline Project

Drawing title

**FLOOD RISK ASSESSMENT
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 CROSSING (WCX 111) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status		For Issue	
Scale	1:3,000	@ A3	DO NOT SCALE
Jacobs No.	B2325300		
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Drawing number	Figure C93 Sheet 1 of 1	Rev	0

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- Legend**
- Order Limits
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Apprv'd
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Leatherhead,
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KT22 8UX

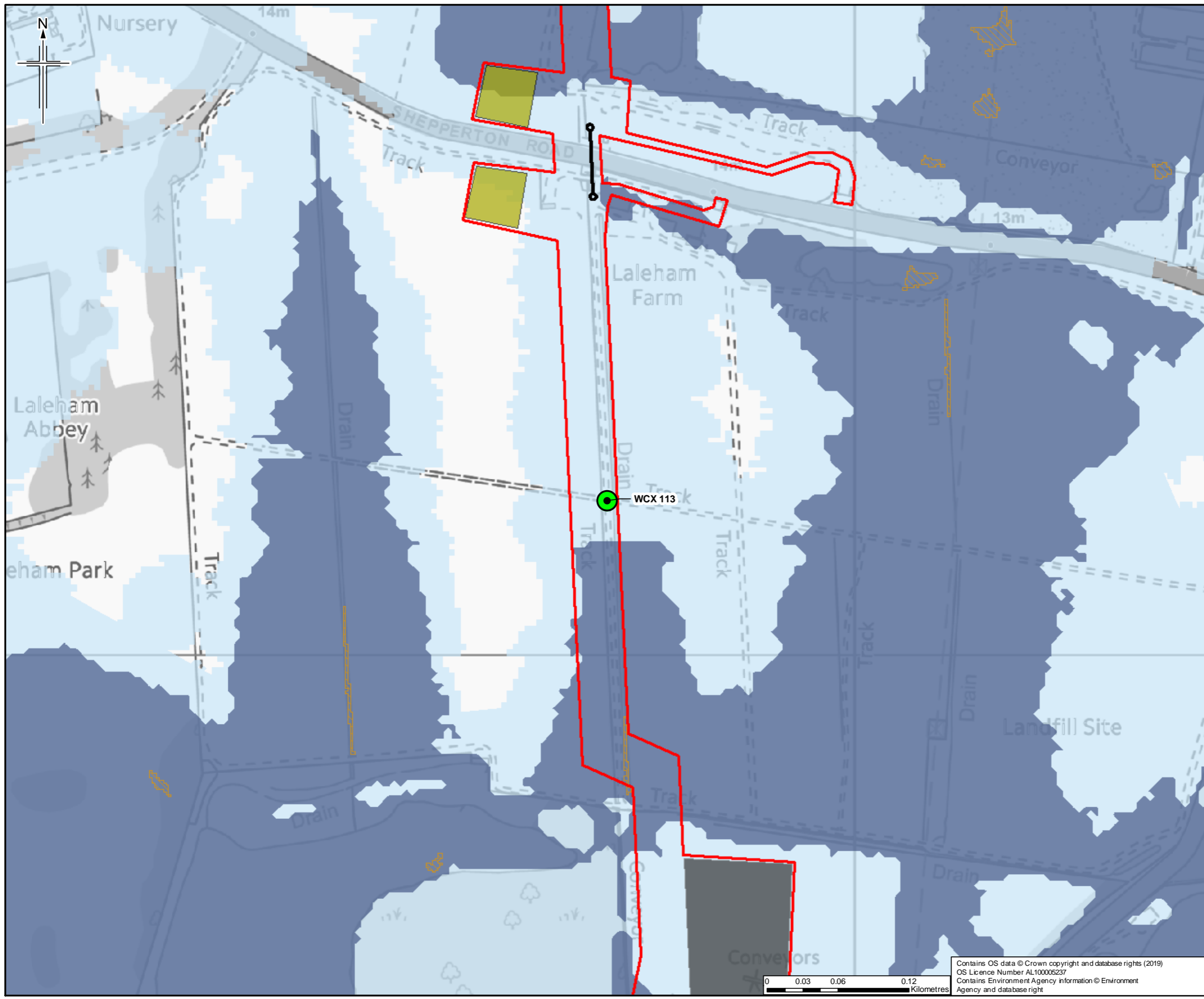


Drawing title
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UNNAMED WATERCOURSE
CROSSING (WCX 112) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
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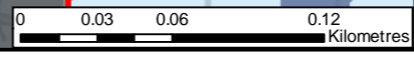


Legend

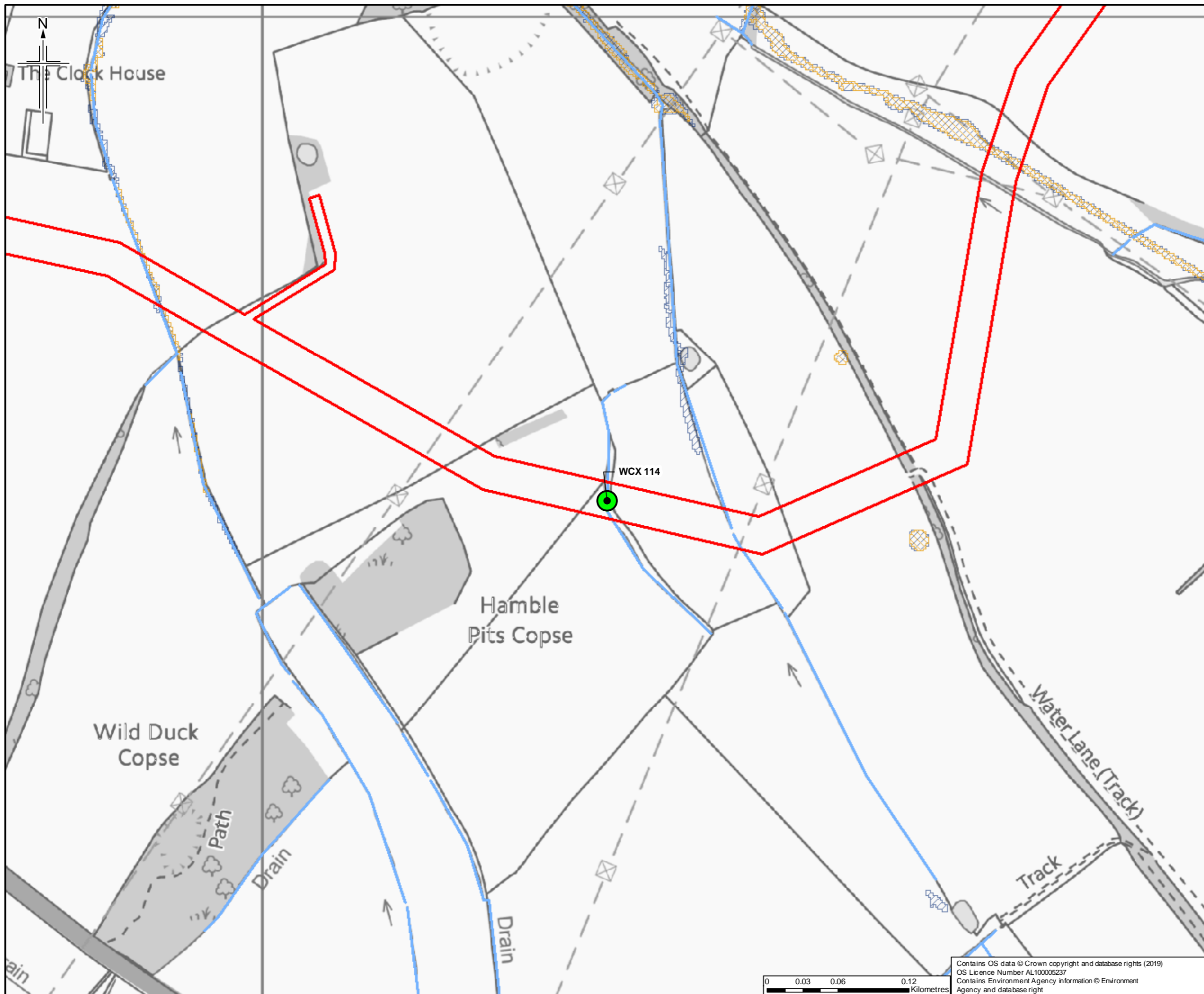
- Order Limits
- Construction compound
- Logistics hub
- Trenchless crossing
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3
- Crossing identification number

Sheet displays parts of Section H

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Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Checkd	Rev'd	Apprv'd
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Drawing title						
FLOOD RISK ASSESSMENT UNNAMED WATERCOURSE CROSSING (WCX 113) FLOOD RISK DATA APFP Reg. (2009) 5(2)(l)						
Drawing Status						
For Issue						
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Drawing number	Figure C95 Sheet 1 of 1					Rev
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- Legend**
- Order Limits
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

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Drawing title

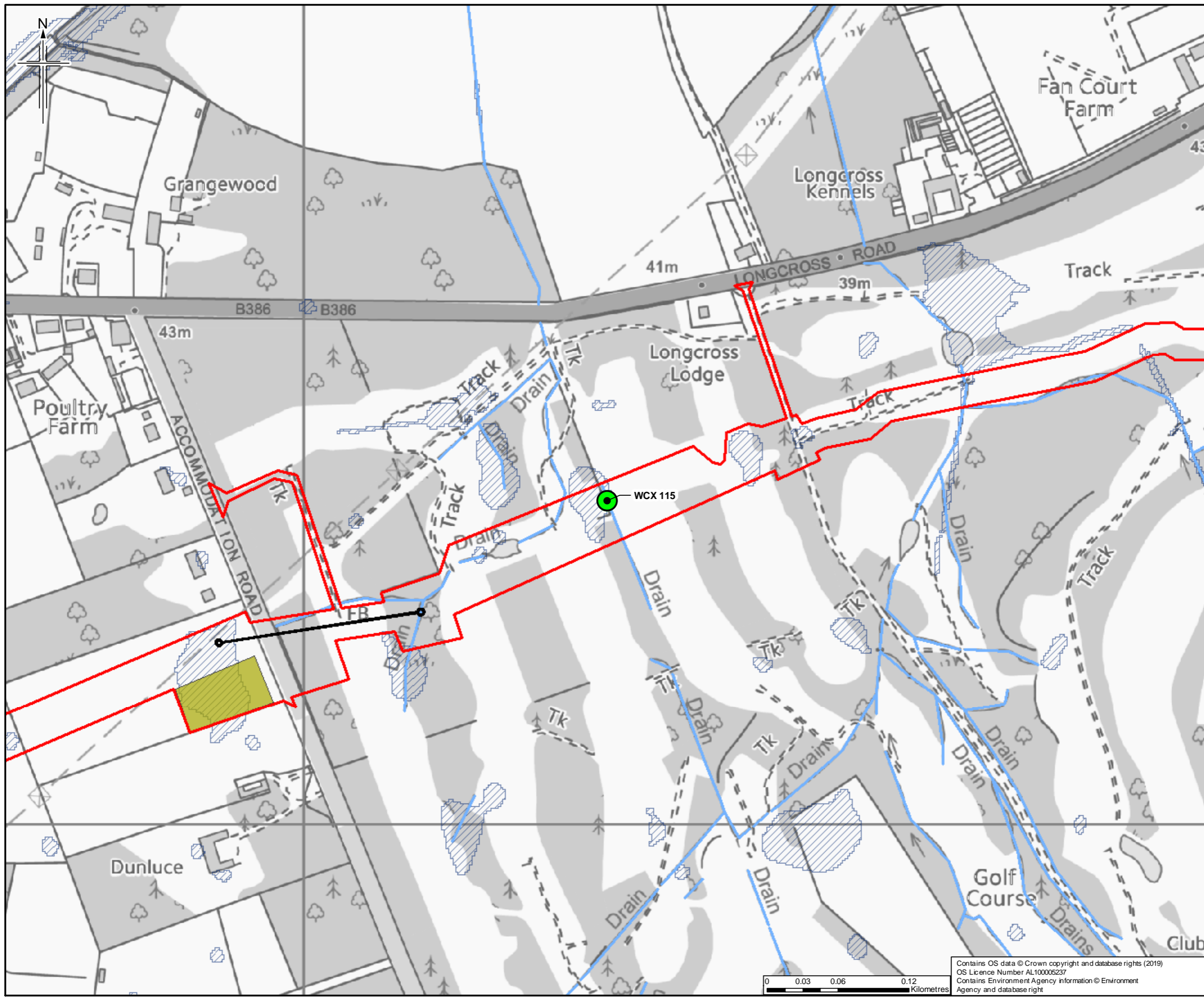
FLOOD RISK ASSESSMENT
 UNNAMED WATERCOURSE
 CROSSING (WCX 114) FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
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Drawing number Figure C96 Sheet 1 of 1 **Rev** 0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Appr'd
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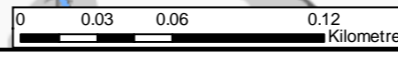
Client
Esso Petroleum Company, Limited
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Ermyn Way,
Leatherhead,
Surrey,
KT22 8UX

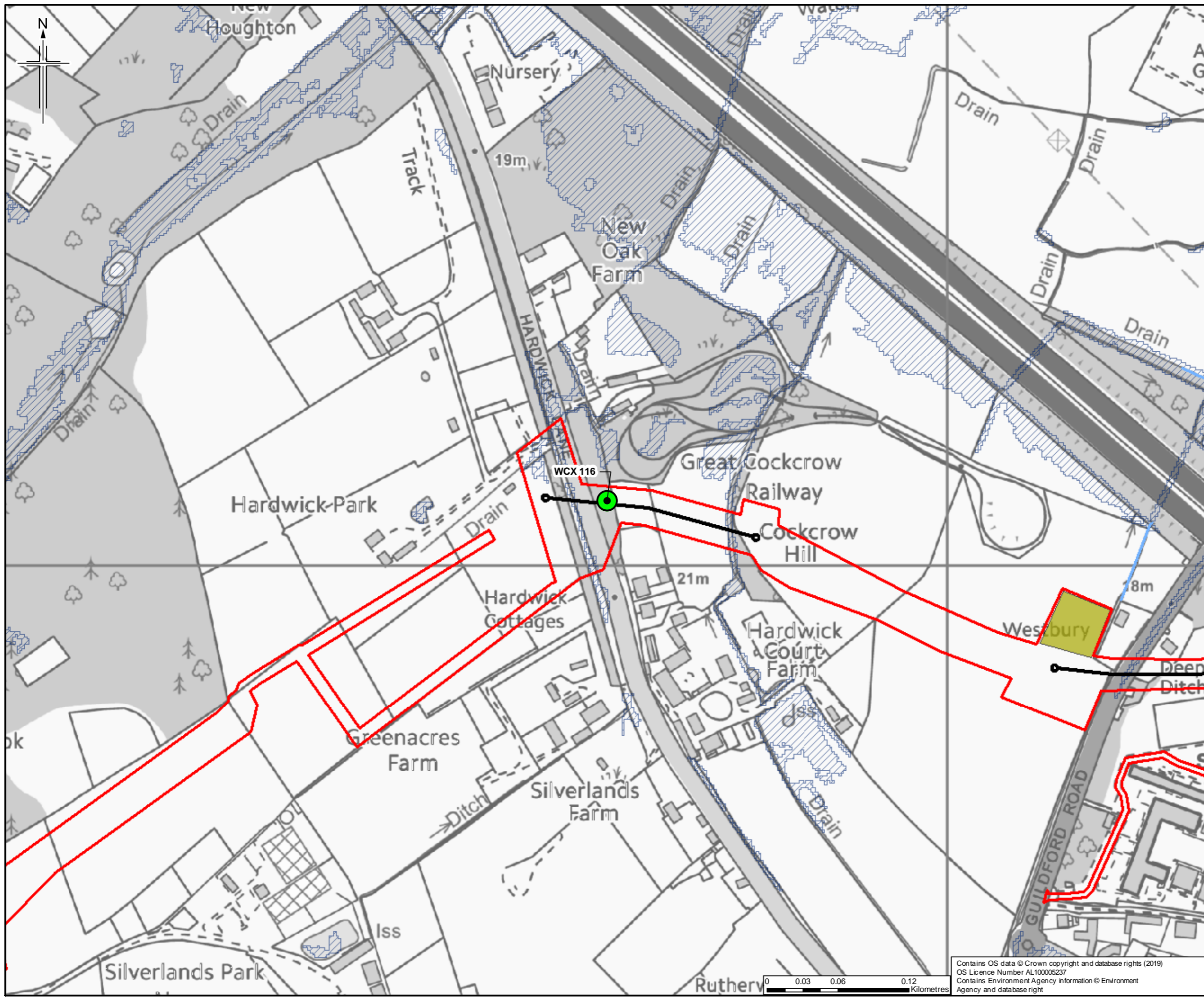


Drawing title
**FLOOD RISK ASSESSMENT
UNNAMED WATERCOURSE
CROSSING (WCX 115) FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
ProjectWise No.	B2325300-JAC-000-ENV-DRG-001230
Drawing number	Figure C97 Sheet 1 of 1
Rev	0

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- Legend**
- Order Limits
 - Construction compound
 - Trenchless crossing
 - Ordinary Watercourse
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Crossing identification number

Sheet displays parts of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Check'd	Rev'd	Appr'd
0	09/04/2019	For Issue				

Author: **JACOBS**
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Client: Esso Petroleum Company, Limited
 Ermy House,
 Ermy Way,
 Leatherhead,
 Surrey,
 KT22 8UX

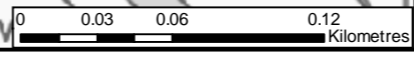
Project: Southampton to London Pipeline Project

Drawing title: **FLOOD RISK ASSESSMENT UNNAMED WATERCOURSE CROSSING (WCX 116) FLOOD RISK DATA APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project/Work No.	B2325300-JAC-000-ENV-DRG-001154
Drawing number	Figure C98 Sheet 1 of 1
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Appendix D. Construction Compound and Logistics Hub Assessment



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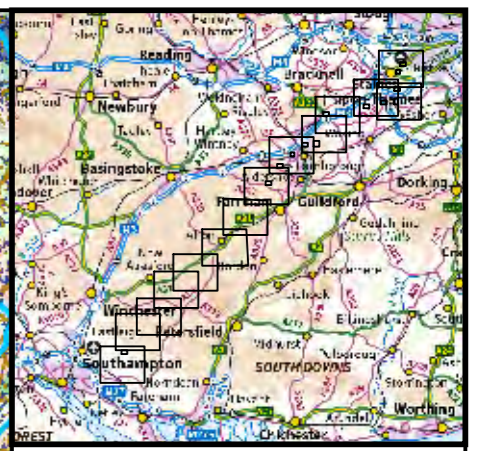
SLP Flood Risk Assessment - Compounds and Logistics Hubs Assessment - Likelihood, Severity and Risk of Flooding

Compound Name	Section	Type	Given Name of Compound	Area (m ²)	Address	Fluvial				Surface Water				Groundwater				Reservoir				Justification	Overall Risk	Main Source	Mitigation	Severity	Risk
						Likelihood	Justification	Severity	Risk	Likelihood	Justification	Severity	Risk	Likelihood	Justification	Severity	Risk	Likelihood	Justification	Severity	Risk						
Construction Compound 1	A	Construction Compound	Maddoxford Lane Compound	2027	Maddoxford Lane, Eastleigh SO32 2DB	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Low	Potential for groundwater flooding of property situated below ground level	Very low	Low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 2	A	Construction Compound	Gregory Lane Compound South	3026	Winchester SO32 2BS	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 3	A	Construction Compound	Gregory Lane Compound North	2077	Winchester SO32 2BS	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 4	A	Construction Compound	Wintershill Compound	2384	Wintershill, Durley Street SO32 2AH	Very low	Flood Zone 1	Very low	Very low	Medium	3.33%	Large	High	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	High	Surface Water	Refer to mitigation reference W3, G127 and G28	Very low	Low
Construction Compound 5	A	Construction Compound	Winchester Road Compound	2137	Winchester Road, Winchester SO32 2AJ	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 6	A	Construction Compound	Stakes Lane Compound	2677	Stake's Lane, Winchester SO32 1HQ	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 7	A	Construction Compound	Kilmeaton Road Compound South	2029	Kilmeaton Road, Winchester SO24 0NS	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 8	A	Construction Compound	Kilmeaton Road Compound North	2005	Kilmeaton Road, Winchester SO24 0NS	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 9a	A	Construction Compound	Riversdown Road Compound East	2043	Riversdown Road, Winchester SO24 0LG	Very low	Flood Zone 1	Very low	Very low	Very low	0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 9b	A	Construction Compound	Riversdown Road Compound West	2037	Riversdown Road, Winchester SO24 0LF	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 10	A	Construction Compound	A272 Compound South	2060	A272, Winchester SO24 0LJ	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Low	Potential for groundwater flooding of property situated below ground level	Very low	Low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 11	B	Construction Compound	A272 Compound North	2060	A272, Winchester SO24 0LJ	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Low	Potential for groundwater flooding of property situated below ground level	Very low	Low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 12	B	Construction Compound	Petersfield Road Compound	2060	Petersfield Road, East Hampshire SO24 0ES	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 13	B	Construction Compound	Hawthorn Road Compound	1207	Hawthorn Road, East Hampshire GU34 5AT	Very low	Flood Zone 1	Very low	Very low	Very low	0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 14	B	Construction Compound	A32 Compound	2006	A32, East Hampshire GU34 1SH	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
A31 Ropley Dean Construction Logistics Hub	B	Construction Logistics Hub	A31 Ropley Dean	22680	Ropley Business Park, The Dene, Winchester SO24 0BG	Very low	Flood Zone 2	Very low	Very low	Very low	<0.1%	Low	Low	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
A31/A32	B	Construction Logistics Hub	A31/A32	52428	A31, East Hampshire, GU34 5BH	Very low	Flood Zone 2	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 15	C	Construction Compound	Selborne Road Compound	3071	Selborne Road, East Hampshire GU34 3HL	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 16	C	Construction Compound	Caker's Lane Compound	2026	Caker's Lane, East Hampshire GU34 3AB	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 17	C	Construction Compound	Binsted Road Compound	1736	Binsted Road, East Hampshire GU34 4NS	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 18	C	Construction Compound	Alton Pumping Station Compound	8153	Alton Pumping Station, A31, East Hampshire GU34 4JD	Very low	Flood Zone 1	Very low	Very low	Very low	0.1%	Low	Low	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 20	C	Construction Compound	Froyle Road Compound	3025	Froyle Road, East Hampshire GU34 4NA	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 21	D	Construction Compound	Dippenhall Street Compound	2040	Dippenhall Street, Hart GU10 5PE	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 22	D	Construction Compound	Ewshot Hill Compound	3060	Ewshot Hill, Hart GU10 5BA	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 23	D	Construction Compound	Ewshot Lane Compound	2050	Hart GU10 5BP	Very low	Flood Zone 1	Very low	Very low	Medium	3.33%	Large	High	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	High	Surface Water	Refer to mitigation reference W3, G127 and G28	Very low	Low
Construction Compound 24	D	Construction Compound	Naishes Lane Compound	2018	Shaw Copse, Naishes Lane, Hart GU10 5BP	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 25	D	Construction Compound	Quetta Park Compound	3038	Quetta Park, Hart GU52 8DU	Very low	Flood Zone 1	Very low	Very low	Very low	0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low

Compound Name	Section	Type	Given Name of Compound	Area (m ²)	Address	Fluvial				Surface Water				Groundwater				Reservoir				Justification	Overall Risk	Main Source	Mitigation	Severity	Risk
						Likelihood	Justification	Severity	Risk	Likelihood	Justification	Severity	Risk	Likelihood	Justification	Severity	Risk	Likelihood	Justification	Severity	Risk						
Construction Compound 26	D	Construction Compound	Bourley Road Compound	2175	Bourley Road, Rushmoor GU52 8AD	Very low	Flood Zone 1	Very low	Very low	Very low	0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 27	D	Construction Compound	Norris Bridge Compound	929	Old Ively Road cycle path, Rushmoor GU14 0LP	Very low	Flood Zone 1	Very low	Very low	Medium	3.33%	Large	High	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	High	Surface Water	Refer to mitigation reference W3, G127 and G28	Very low	Low
Construction Compound 28	D	Construction Compound	Ively Road Compound	1170	Ively Road cycle path, Rushmoor GU14 0LL	Very low	Flood Zone 1	Very low	Very low	Very low	0.1%	Low	Low	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Hartland Park Logistics Hub	D	Construction Logistics Hub	Hartland Park Logistics Hub	91329	Constant Road, Hart GU14 0LP	Very low	Flood Zone 1	Very low	Very low	Low	1%	Low	Low	Low	Potential for groundwater flooding of property situated below ground level	Very low	Low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 29	E	Construction Compound	Cove Brook Compound	1558	Ively Road cycle path, Southwood, Rushmoor GU14 0LJ	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 30	E	Construction Compound	Cove Brook Path Compound	1548	Cove Brook Path, Rushmoor GU14 8QS	Very low	Flood Zone 2	Large	Medium	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Low	Between 0.3m and 2m	Moderate	Medium	Equipment/Personnel at risk within compounds	Medium	Fluvial	Refer to mitigation reference G127 and G28	Very low	Very low
Construction Compound 31	E	Construction Compound	Queen Elizabeth Park Compound	543	Rushmoor GU14 8NY	Very low	Flood Zone 1	Very low	Very low	Very low	0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 33	E	Construction Compound	Frimley Green Road Compound	1425	Surrey Heath GU16 9AP	Medium	Flood Zone 3	Large	High	Low	1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	High	Fluvial	Refer to mitigation reference W3, G127 and G28	Very low	Low
Construction Compound 34	E	Construction Compound	Balmoral Drive Compound	1411	Surrey Heath GU16 9YB	Very low	Flood Zone 1	Very low	Very low	Low	1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 35	E	Construction Compound	St Catherines Road Compound	1526	St Catherines Road, Surrey Heath GU16 8NS	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 55	E	Construction Compound	Frimley Compound	20335	Coombe Close, Surrey Heath GU16 7DZ	Very low	Flood Zone 2	Large	Medium	Very low	0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Medium	Fluvial	Refer to mitigation reference G127 and G28	Very low	Very low
MOD Deepcut Bridge Road Logistics Hub	E	Construction Logistics Hub	MOD Deepcut Bridge Road Logistics Hub	19132	Mindenhurst - Tomlinscote, Surrey Heath GU16 6GB	Very low	Flood Zone 1	Very low	Very low	Medium	3.33%	Large	High	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	High	Surface Water	Refer to mitigation reference W3, G127 and G28	Very low	Low
M3 Junction 3 New Road Logistics Hub	F	Construction Logistics Hub	M3 Junction 3 New Road Logistics Hub	33844	New Road, Surrey Heath GU19 5NH	Very low	Flood Zone 2	Large	Medium	Medium	3.33%	Large	High	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	High	Surface Water	Refer to mitigation reference W3, G127 and G28	Very low	Low
Construction Compound 36	F	Construction Compound	The Maultway Compound	826	The Maultway, Surrey Heath GU15 1QB	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 37	F	Construction Compound	Guildford Road Compound	2126	Guildford Road, Surrey Heath GU18 5SG	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 38	F	Construction Compound	Halebourne Lane Compound	2189	Halebourne Lane, Surrey Heath GU24 8SL	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Low	Potential for groundwater flooding of property situated below ground level	Very low	Low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 39	F	Construction Compound	Windsor Road Compound	2035	Windsor Road, Surrey Heath GU24 8QY	Very low	Flood Zone 1	Very low	Very low	Very low	0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 40a	F	Construction Compound	Flir Clump Compound West	686	Bee Garden, Staple Hill, Surrey Heath GU24 8TU	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Low	Potential for groundwater flooding of property situated below ground level	Very low	Low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 40b	F	Construction Compound	Flir Clump Compound East	636	Bee Garden, Staple Hill, Surrey Heath GU24 8TU	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Low	Potential for groundwater flooding of property situated below ground level	Very low	Low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 41a	F	Construction Compound	Gracious Pond Compound South	3063	Gracious Pond Road, Surrey Heath GU24 8HL	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Very low	No Flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 41b	F	Construction Compound	Gracious Pond Compound North	1464	Runnymede GU21	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Low	Potential for groundwater flooding of property situated below ground level	Very low	Low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 42	F	Construction Compound	Accommodation Road Compound	3015	Runnymede KT16 0EQ	Very low	Flood Zone 1	Very low	Very low	Medium	3.33%	Large	High	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	High	Surface Water	Refer to mitigation reference W3, G127 and G28	Very low	Low
Construction Compound 43	F	Construction Compound	Longcross Road Compound	678	Longcross Road, Runnymede KT16 0AZ	Very low	Flood Zone 1	Very low	Very low	Low	1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 44	F	Construction Compound	Hardwick Lane Compound	3086	Hardwick Lane, Runnymede KT16 0AA	Very low	Flood Zone 1	Very low	Very low	Very low	<0.1%	Low	Low	Low	Potential for groundwater flooding of property situated below ground level	Very low	Low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 45	F	Construction Compound	Salesian School Compound	2014	Guildford Road, Runnymede KT16 9LX	Very low	Flood Zone 2	Large	Medium	Very low	<0.1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Medium	Fluvial	Refer to mitigation reference G127 and G28	Very low	Very low
Construction Compound 46	G	Construction Compound	Pannells Farm Compound	1523	The Knoll, Runnymede KT16 9LJ	Very low	Flood Zone 1	Very low	Very low	Low	1%	Low	Low	Very low	No Record or Limited potential for groundwater flooding to occur	Very low	Very low	Very low	No flooding	Very low	Very low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 47	G	Construction Compound	Mead Lane Compound	2095	Mead Lane, Runnymede KT16 8LS	Medium	Flood Zone 3	Large	High	Very low	<0.1%	Low	Low	Low	Potential for groundwater flooding of property situated below ground level	Very low	Low	Low	Between 0.3m and 2m	Moderate	Medium	Equipment/Personnel at risk within compounds	High	Fluvial	Refer to mitigation reference W3, G127 and G28	Very low	Low

Compound Name	Section	Type	Given Name of Compound	Area (m ²)	Address	Fluvial				Surface Water				Groundwater				Reservoir				Justification	Overall Risk	Main Source	Mitigation	Severity	Risk
						Likelihood	Justification	Severity	Risk	Likelihood	Justification	Severity	Risk	Likelihood	Justification	Severity	Risk	Likelihood	Justification	Severity	Risk						
Brett Aggregates Littleton Lane Logistics Hub	H	Construction Logistics Hub	Brett Aggregates Littleton Lane Logistics Hub	12086	Littleton Lane, Spelthorne TW17 0JJ	Very low	Flood Zone 2	Large	Medium	Very low	0.1%	Low	Low	Low	Potential for groundwater flooding of property situated below ground level	Very low	Low	Low	Between 0.3m and 2m	Low	Low	Equipment/Personnel at risk within compounds	Medium	Fluvial	Refer to mitigation reference G127 and G28	Very low	Very low
Construction Compound 48	H	Construction Compound	Shepperton Road Compound South	2029	Shepperton Road, Spelthorne TW17 0JW	Very low	Flood Zone 2	Large	Medium	Very low	<0.1%	Low	Low	Low	Potential for groundwater flooding of property situated below ground level	Very low	Low	Low	Between 0.3m and 2m	Moderate	Medium	Equipment/Personnel at risk within compounds	Medium	Fluvial	Refer to mitigation reference G127 and G28	Very low	Very low
Construction Compound 49	H	Construction Compound	Shepperton Road Compound North	2029	Shepperton Road, Spelthorne TW17 0JW	Medium	Flood Zone 3	Large	High	Low	1%	Low	Low	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Low	Between 0.3m and 2m	Moderate	Medium	Equipment/Personnel at risk within compounds	High	Fluvial	Refer to mitigation reference W3, G127 and G28	Very low	Low
Construction Compound 51	H	Construction Compound	Woodthorpe Road Compound	9653	Woodthorpe Road, Spelthorne TW15 3JX	Very low	Flood Zone 2	Large	Medium	Very low	0.1%	Low	Low	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Low	Over 2m	Large	Medium	Equipment/Personnel at risk within compounds	Medium	Fluvial	Refer to mitigation reference G127 and G28	Very low	Very low
Construction Compound 52	H	Construction Compound	Staines Road Compound South	1533	Staines Road, Spelthorne TW15 3AQ	Very low	Flood Zone 1	Very low	Very low	Very low	0.1%	Low	Low	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Very low	Flooding <0.3m	Low	Low	Equipment/Personnel at risk within compounds	Low	Surface Water	No mitigation required	Low	Low
Construction Compound 53	H	Construction Compound	Staines Road Compound North	1511	Staines Road, Spelthorne TW16	Very low	Flood Zone 1	Very low	Very low	Very low	0.1%	Low	Low	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Low	Over 2m	Large	Medium	Equipment/Personnel at risk within compounds	Medium	Reservoir	Refer to mitigation reference G127 and G28	Very low	Low
Construction Compound 54	H	Construction Compound	Short Lane Compound	1551	Short Lane, Spelthorne TW19 7BQ	Very low	Flood Zone 1	Very low	Very low	Very low	0.1%	Low	Low	Medium	Potential for groundwater flooding to occur at surface	Very low	Low	Low	Over 2m	Large	Medium	Equipment/Personnel at risk within compounds	Medium	Reservoir	Refer to mitigation reference G127 and G28	Very low	Low

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Legend

- Order Limits
- Construction compound
- Logistics hub
- Section break
- Main River
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3

0	09/04/2019	For Issue	LM	FW	SM	SH
Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Checked	Rev'd	Appr'd
Author						

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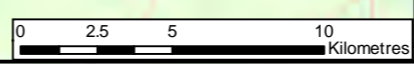
Client
 Esso Petroleum Company, Limited
 Ermyn House,
 Ermyn Way,
 Leatherhead,
 Surrey,
 KT22 8UX

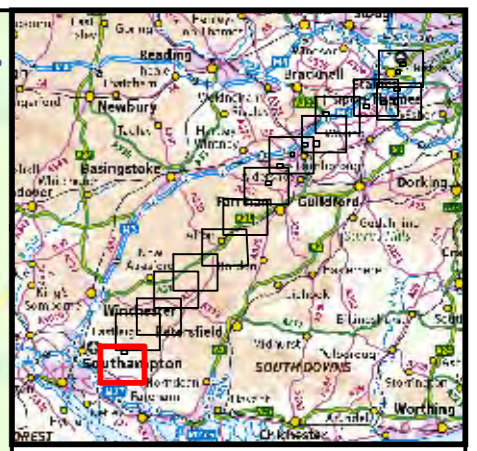
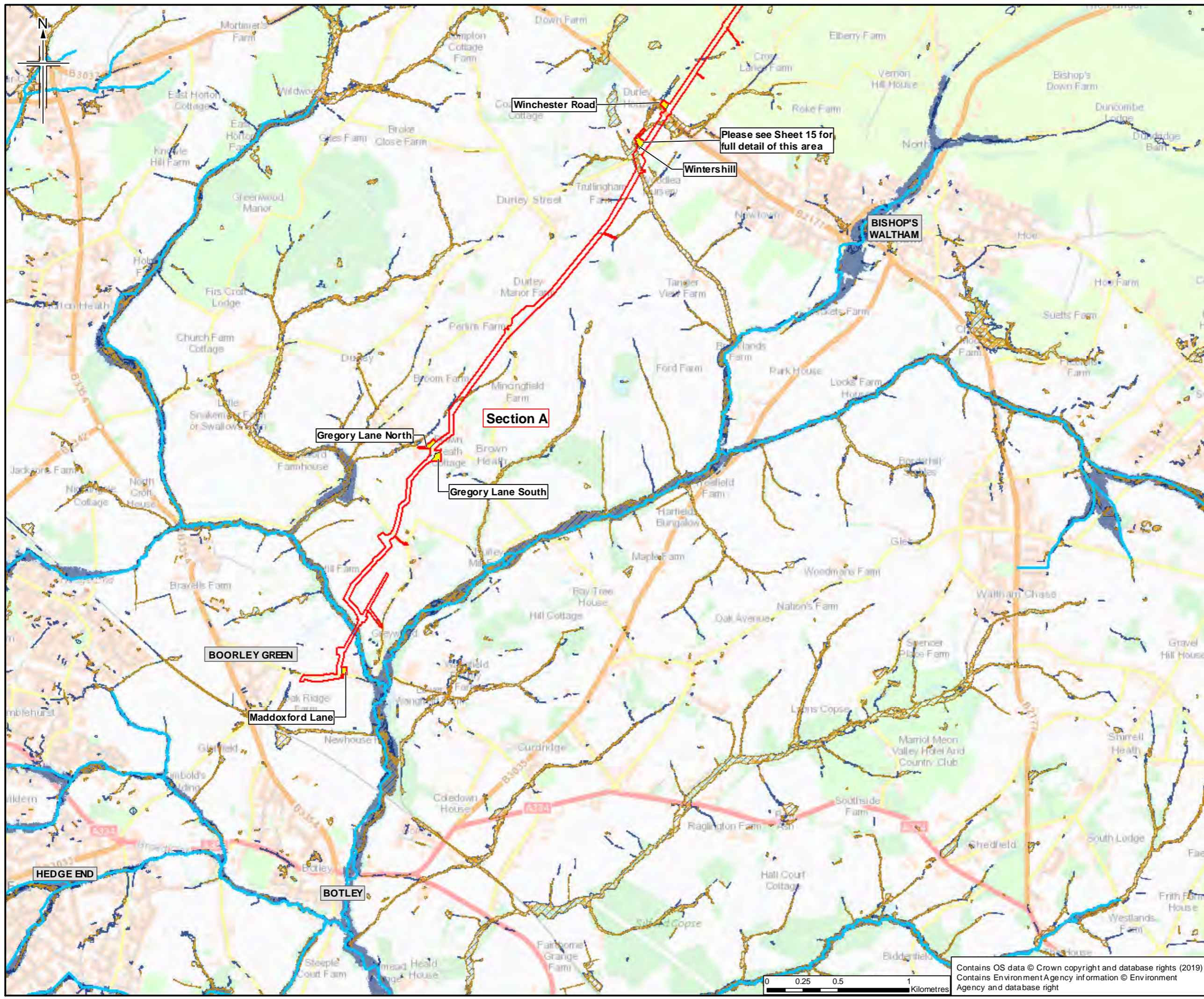
Project
Southampton to London Pipeline Project

Drawing title
**FLOOD RISK ASSESSMENT
 CONSTRUCTION COMPOUND
 AND FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status: For Issue
 Scale: 1:250,000 @ A3 DO NOT SCALE
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 Drawing number: **Figure D1 Key Plan** Rev: 0

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Legend

- Order Limits
- Construction compound
- Section break
- Main River
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3

Sheet displays part of Section A

Rev.	Date	Purpose of revision	Orig/Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

Author: **JACOBS**
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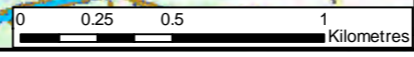
Client: Esso Petroleum Company, Limited
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 KT22 8UX

Project: **Esso** Southampton to London Pipeline Project

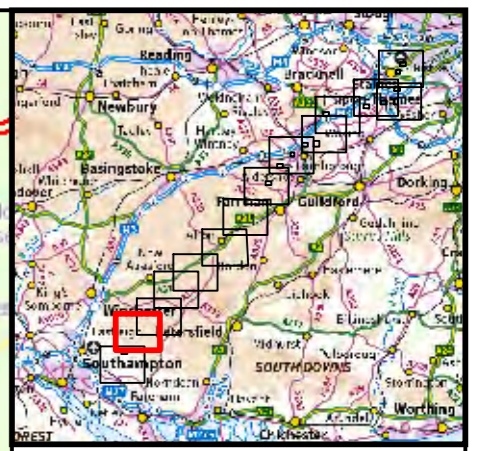
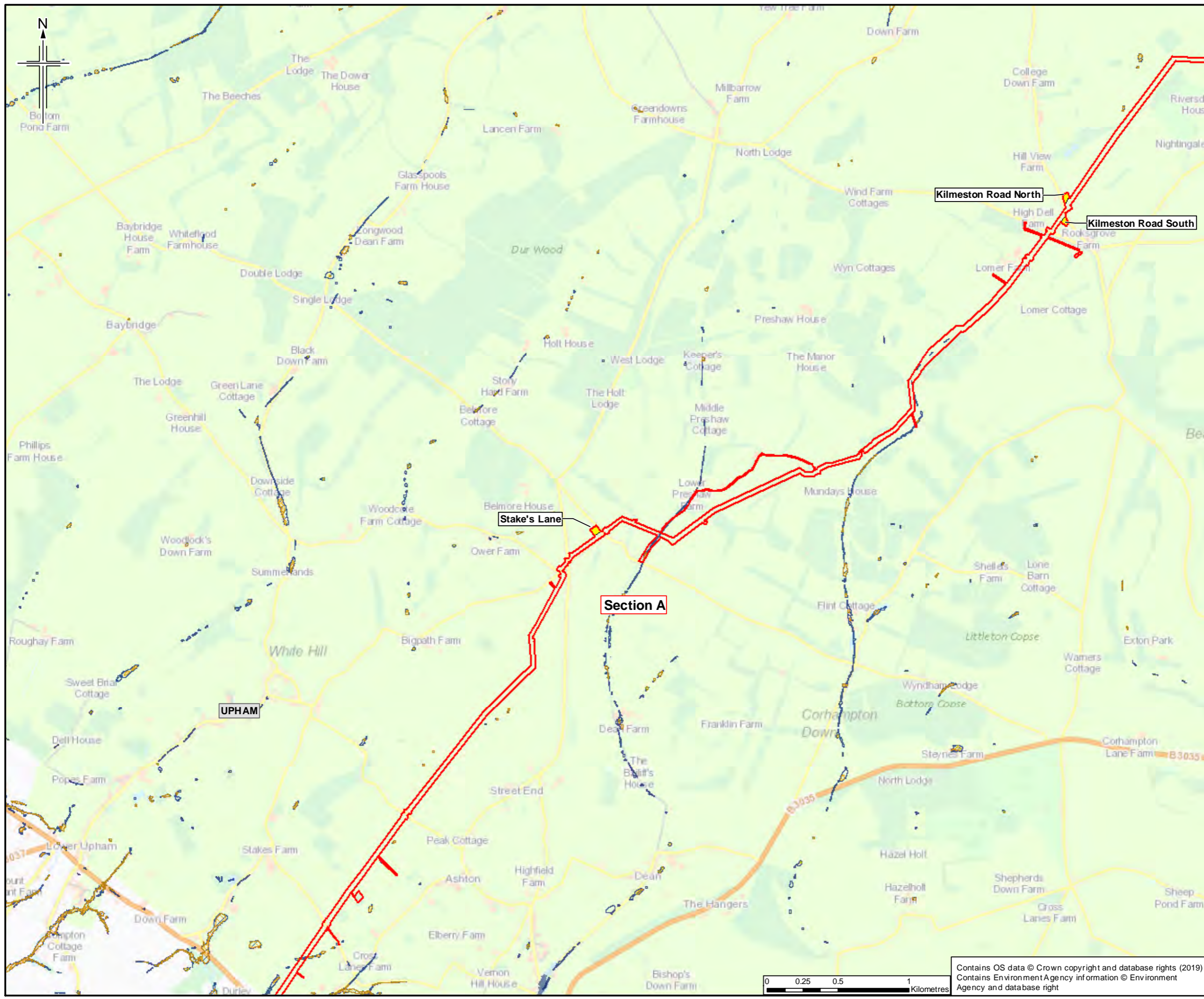
Drawing title: **FLOOD RISK ASSESSMENT CONSTRUCTION COMPOUND AND FLOOD RISK DATA APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
Scale	1:25,000 @ A3	DO NOT SCALE
Jacobs No.	B2325300	
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Drawing number	Figure D1 Sheet 1 of 27	Rev 0

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Legend

- Order Limits
- Construction compound
- Section break
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3

Sheet displays part of Section A

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue				

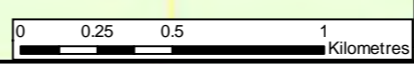


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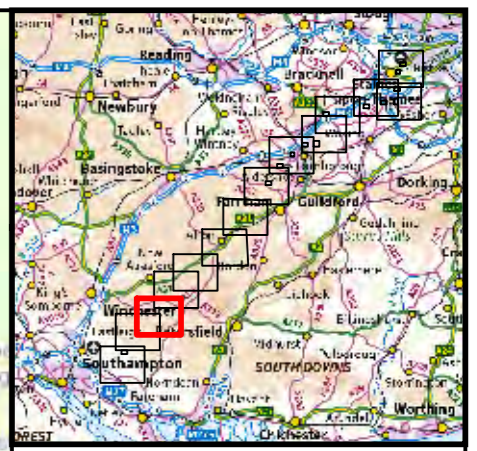
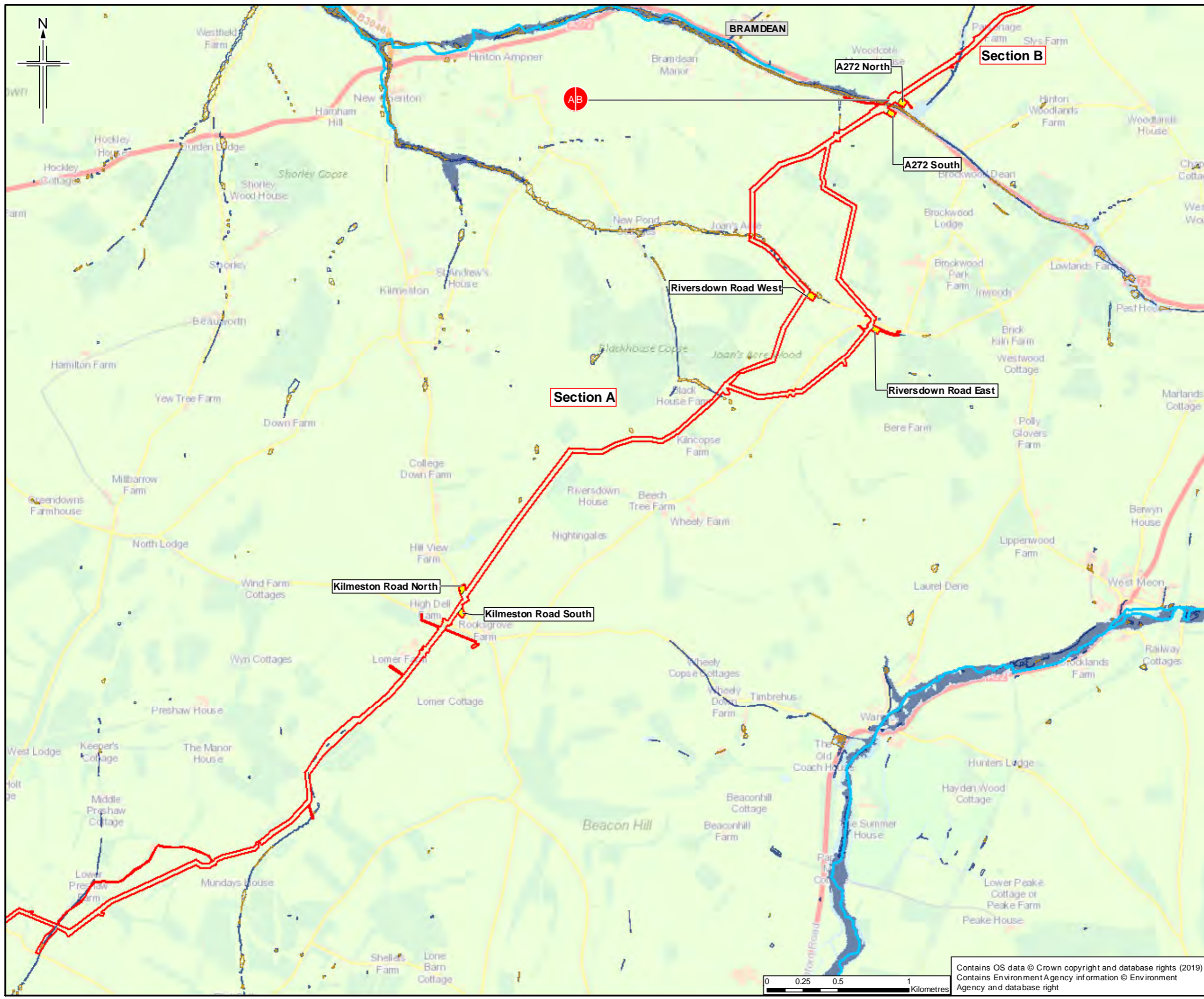


Drawing title
**FLOOD RISK ASSESSMENT
CONSTRUCTION COMPOUND
AND FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
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- Legend**
- Order Limits
 - Construction compound
 - Section break
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3

Sheet displays parts of Section A and Section B

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Project

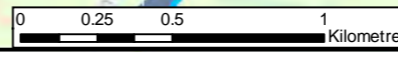
Southampton to London Pipeline Project

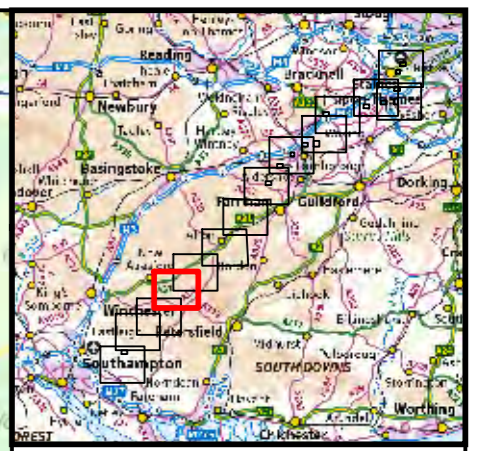
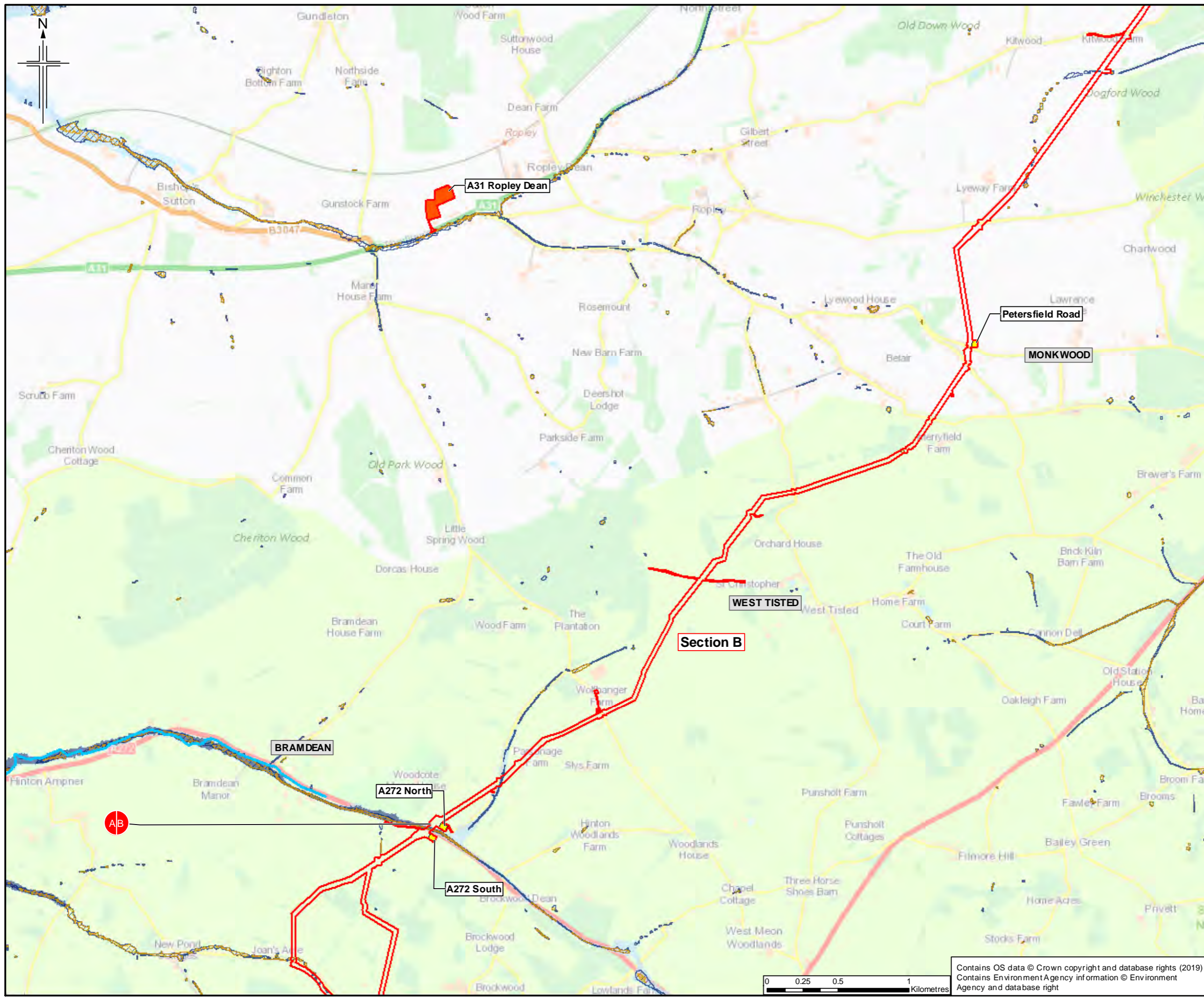
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**FLOOD RISK ASSESSMENT
 CONSTRUCTION COMPOUND
 AND FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
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Jacobs No.	B2325300
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Drawing number	Figure D1 Sheet 3 of 27
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Legend

- Order Limits
- Construction compound
- Logistics hub
- Section break
- Main River
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3

Sheet displays parts of Section A and Section B

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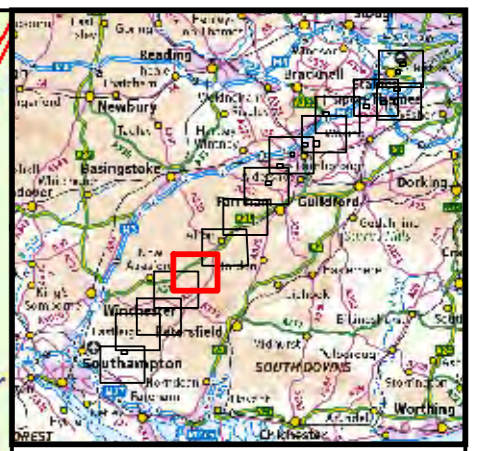
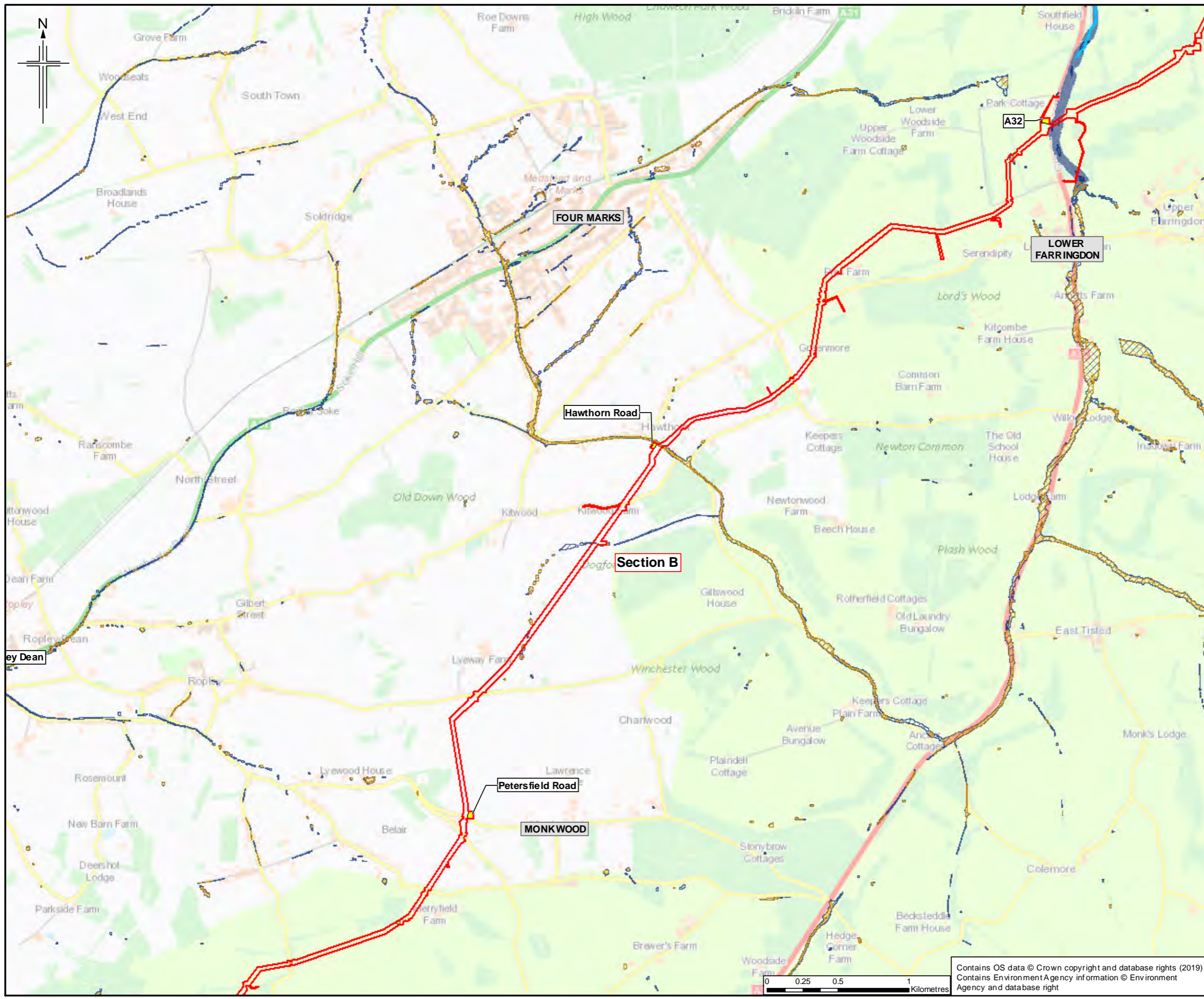
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Drawing title
**FLOOD RISK ASSESSMENT
 CONSTRUCTION COMPOUND
 AND FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	Scale	DO NOT SCALE
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Jacobs No.	B2325300		
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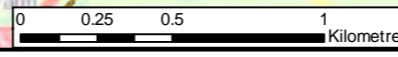
Legend

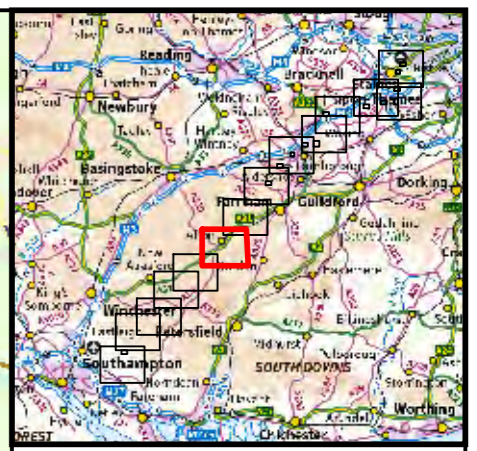
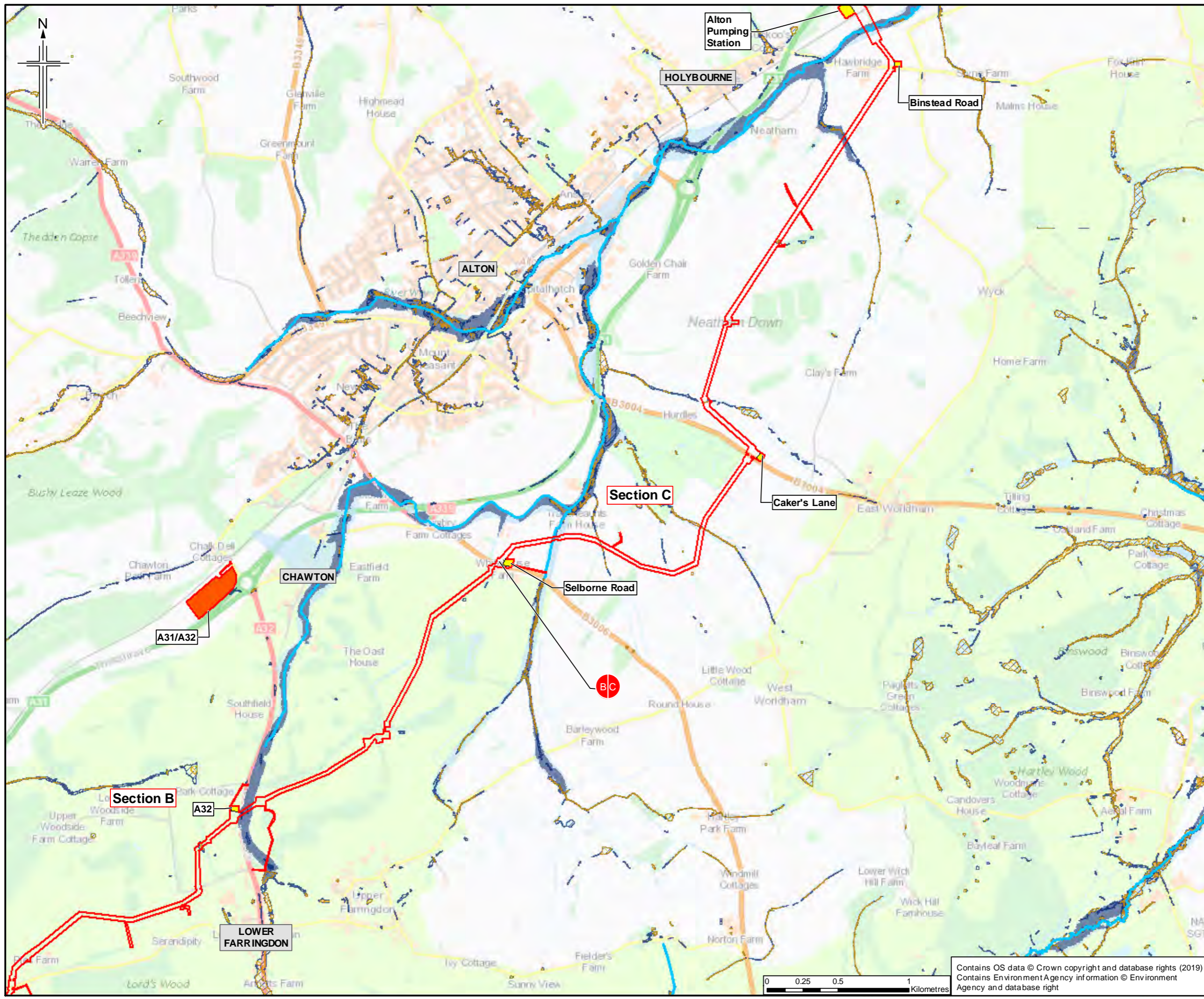
- Order Limits
- Construction compound
- Section break
- Main River
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3

Sheet displays part of Section B

0	09/04/2019	For Issue	LM	FW	SM	SH
Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Appr'd
<p style="font-size: small; margin: 0;">1180 Eastlake Road, Wokingham, RG40 3TU, UK Tel: +44 (0) 1344 77000 Fax: +44(0) 1344 77001 www.jacobs.com</p>						
<p>Client Esso Petroleum Company, Limited Ermyn House, Ermyn Way, Leatherhead, Surrey, KT22 8UX</p>						
<p>Project Southampton to London Pipeline Project</p>						
<p>Drawing title</p> <p>FLOOD RISK ASSESSMENT CONSTRUCTION COMPOUND AND FLOOD RISK DATA APFP Reg. (2009) 5(2)(l)</p>						
Drawing Status			For Issue			
Scale	1:25,000 @ A3		DO NOT SCALE			
Jacobs No.	B2325300					
Project/Work No.	B2325300-JAC-000-ENV-DRG-001239					
Drawing number	Figure D1 Sheet 5 of 27					Rev 0

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Legend

- Order Limits
- Construction compound
- Logistics hub
- Section break
- Main River
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3

Sheet displays parts of Section B and Section C

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0	09/04/2019	For Issue	LM	FW	SM	SH

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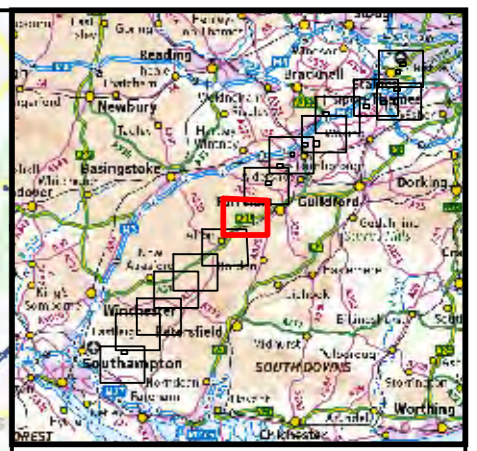
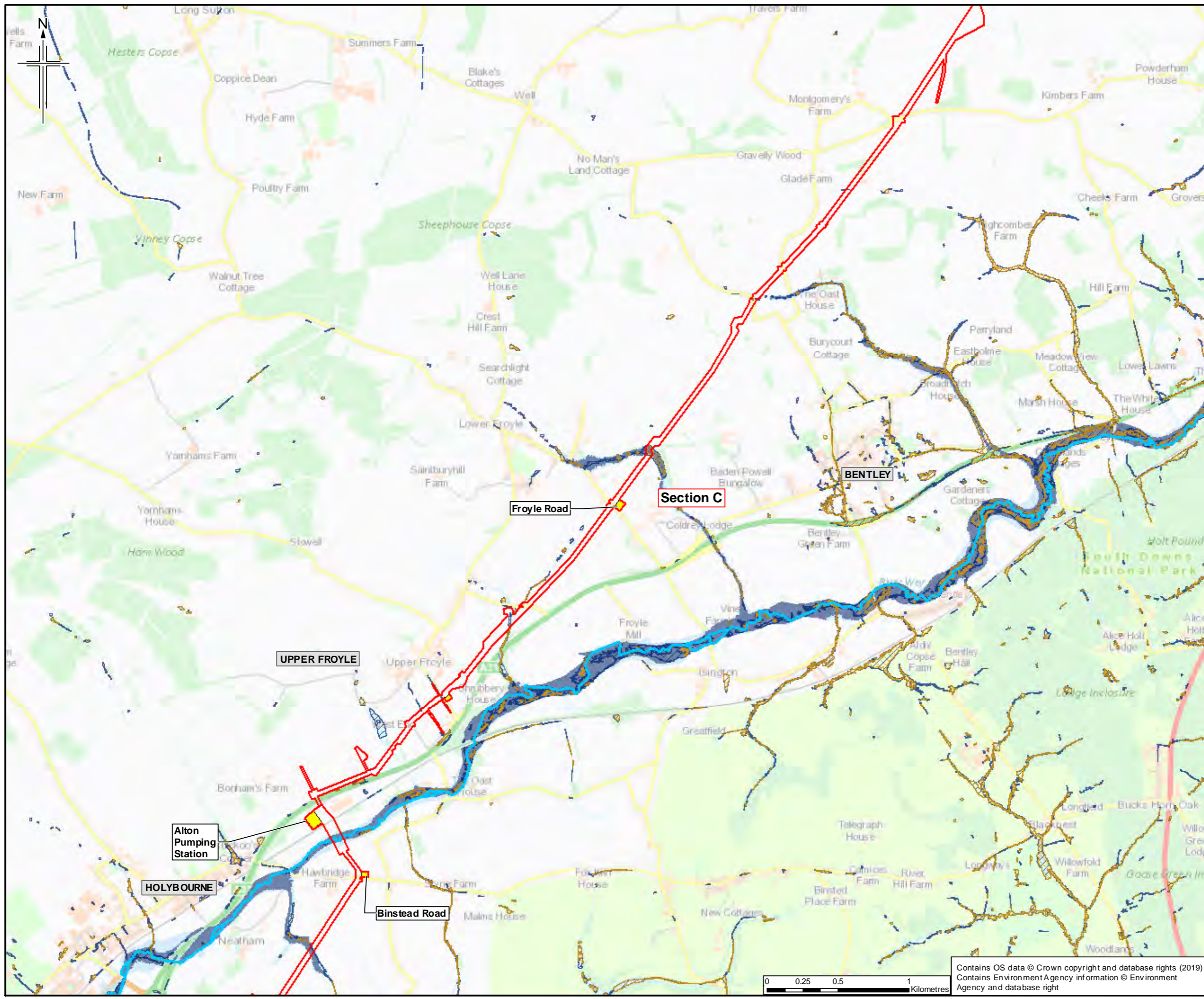
Project: Southampton to London Pipeline Project

Drawing title: **FLOOD RISK ASSESSMENT CONSTRUCTION COMPOUND AND FLOOD RISK DATA APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue
Scale	1:25,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project/Work No.	B2325300-JAC-000-ENV-DRG-001239
Drawing number	Figure D1 Sheet 6 of 27
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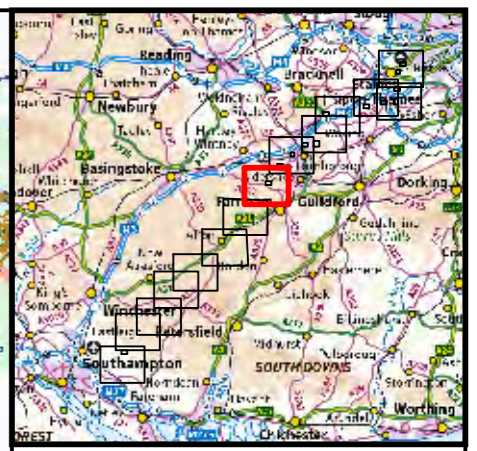
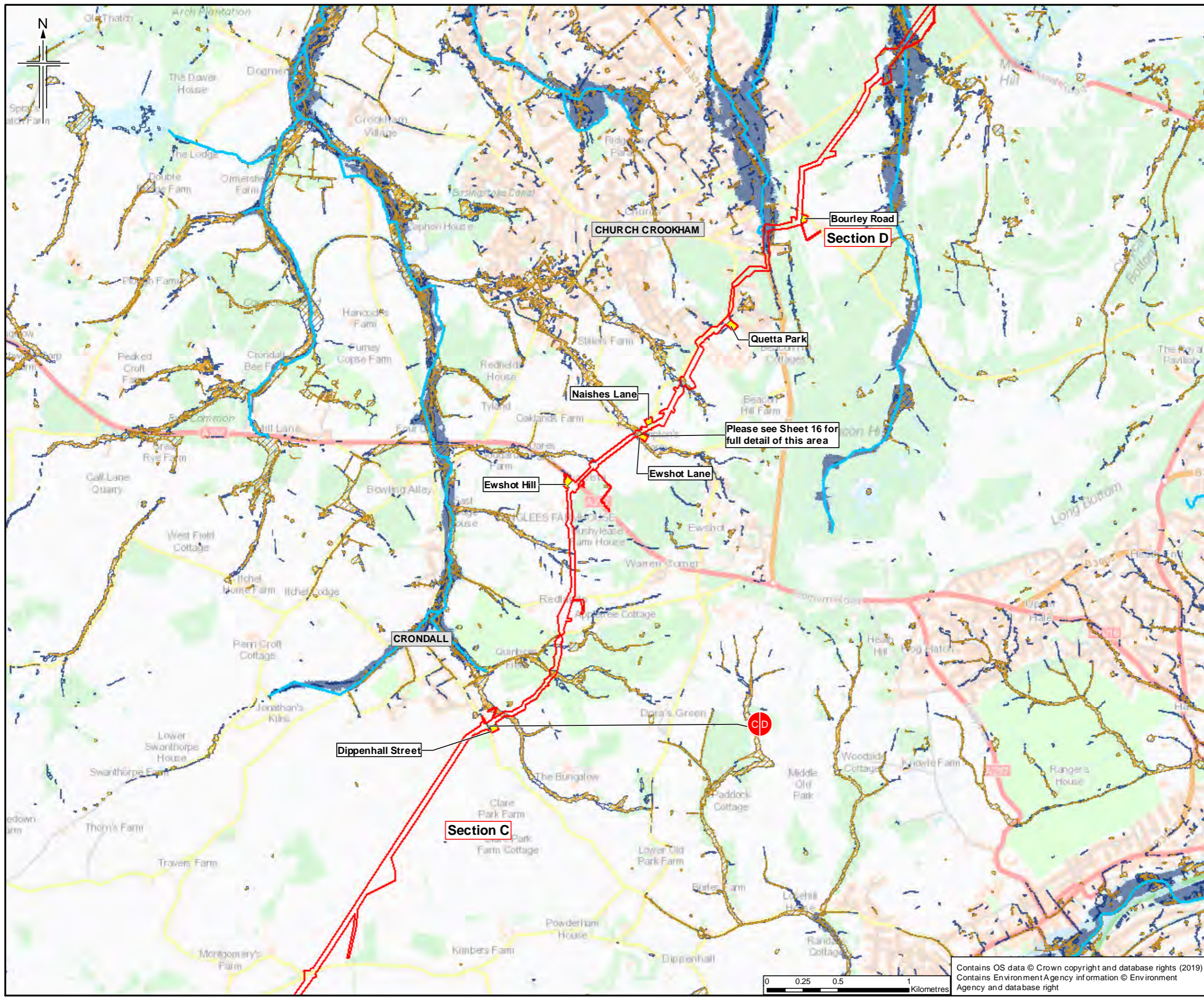
Legend

- Order Limits
- Construction compound
- Section break
- Main River
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3

Sheet displays part of Section C

0	09/04/2019	For Issue	LM	FW	SM	SH
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Client Esso Petroleum Company, Limited Ermyn House, Ermyn Way, Leatherhead, Surrey, KT22 8UX						
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FLOOD RISK ASSESSMENT CONSTRUCTION COMPOUND AND FLOOD RISK DATA APFP Reg. (2009) 5(2)(l)						
Drawing Status			For Issue			
Scale	1:25,000		@ A3		DO NOT SCALE	
Jacobs No.	B2325300					
Project Wise No.	B2325300-JAC-000-ENV-DRG-001239					
Drawing number						Rev
Figure D1 Sheet 7 of 27						0

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- Legend**
- Order Limits
 - Construction compound
 - Section break
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3

Sheet displays parts of Section C and Section D

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Appr'd
0	09/04/2019	For Issue	LM	FW	SM	SH



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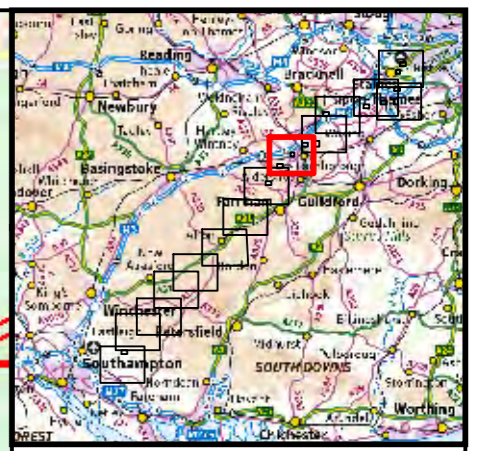


Drawing title
**FLOOD RISK ASSESSMENT
CONSTRUCTION COMPOUND
AND FLOOD RISK DATA**
APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:25,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project/Work No.	B2325300-JAC-000-ENV-DRG-001239
Drawing number	Figure D1 Sheet 8 of 27
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- Legend**
- Order Limits
 - Construction compound
 - Logistics hub
 - Section break
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3

Sheet displays parts of Section D and Section E

Rev.	Rev. Date	Purpose of revision	Orig/Dwn	Checked	Rev'd	Apprv'd
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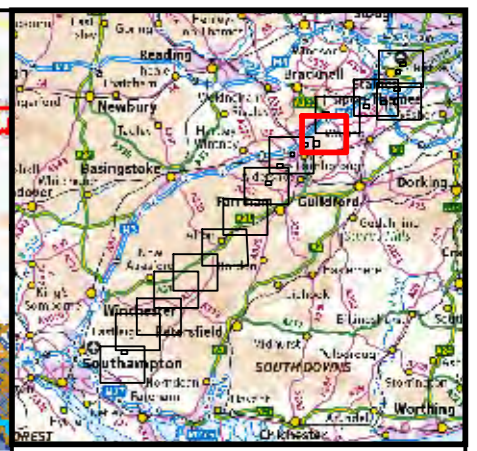
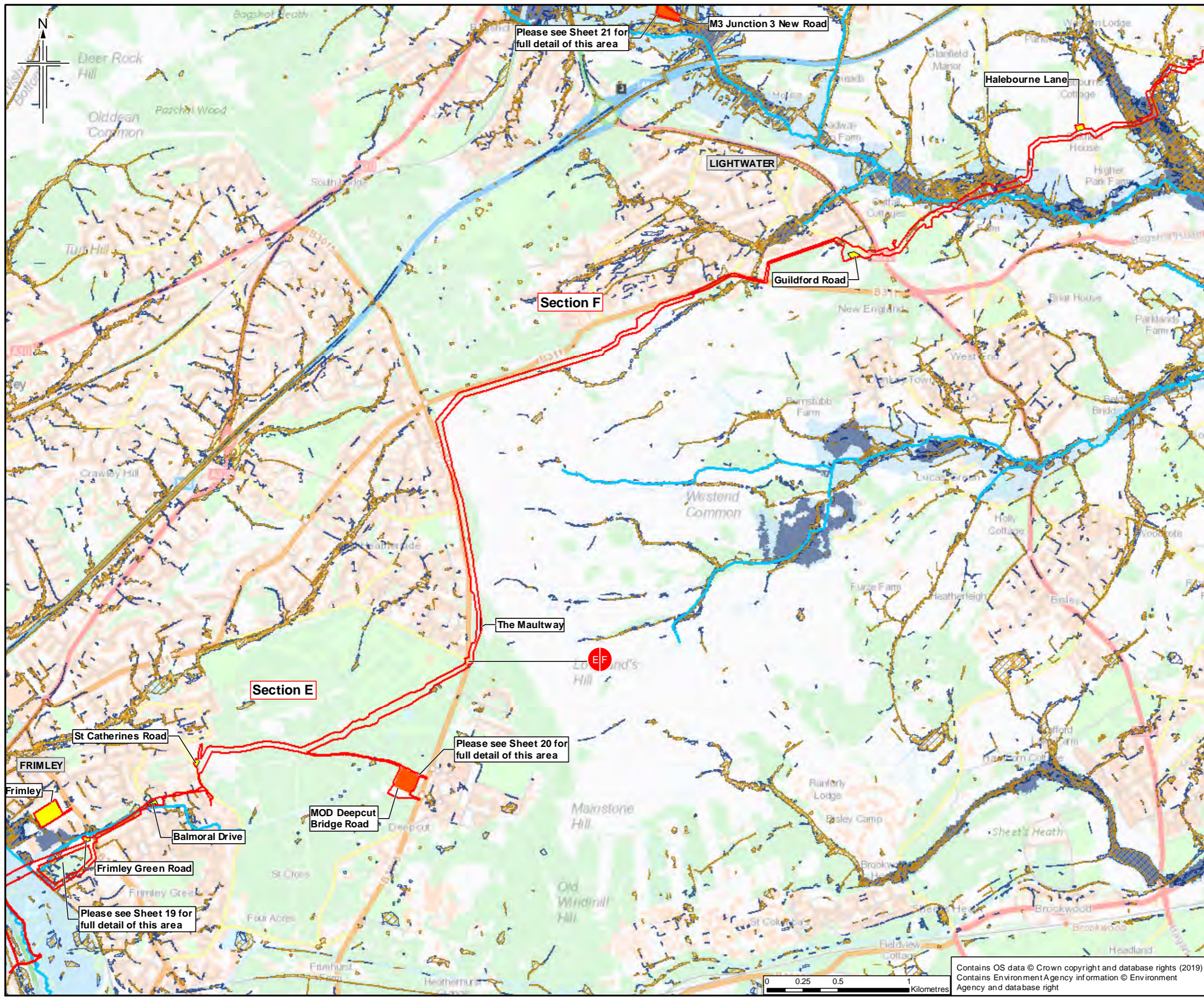
Project
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Drawing title
**FLOOD RISK ASSESSMENT
 CONSTRUCTION COMPOUND
 AND FLOOD RISK DATA**
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue	
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Legend

- Order Limits
- Construction compound
- Logistics hub
- Section break
- Main River
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3

Sheet displays parts of Section E and Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
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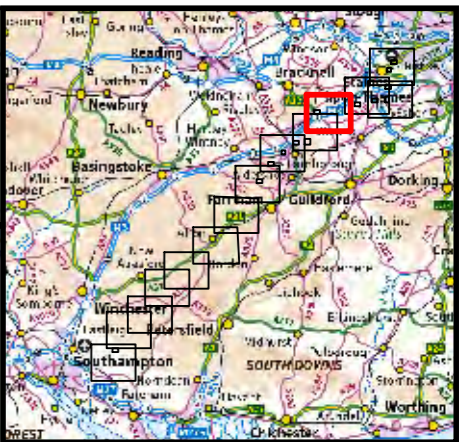


Drawing title
**FLOOD RISK ASSESSMENT
CONSTRUCTION COMPOUND
AND FLOOD RISK DATA**
APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:25,000 @ A3 DO NOT SCALE
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- Legend**
- Order Limits
 - Construction compound
 - Logistics hub
 - Section break
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3

Please see Sheet 21 for full detail of this area

M3 Junction 3 New Road

Section F

Halebourne Lane

LIGHTWATER

Guildford Road

CHOBHAM

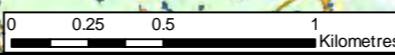
Gracious Pond North

Gracious Pond South

Fir Clump West

Windsor Road

Fir Clump East



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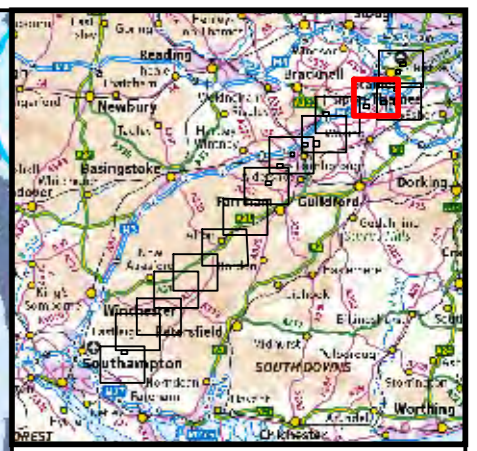
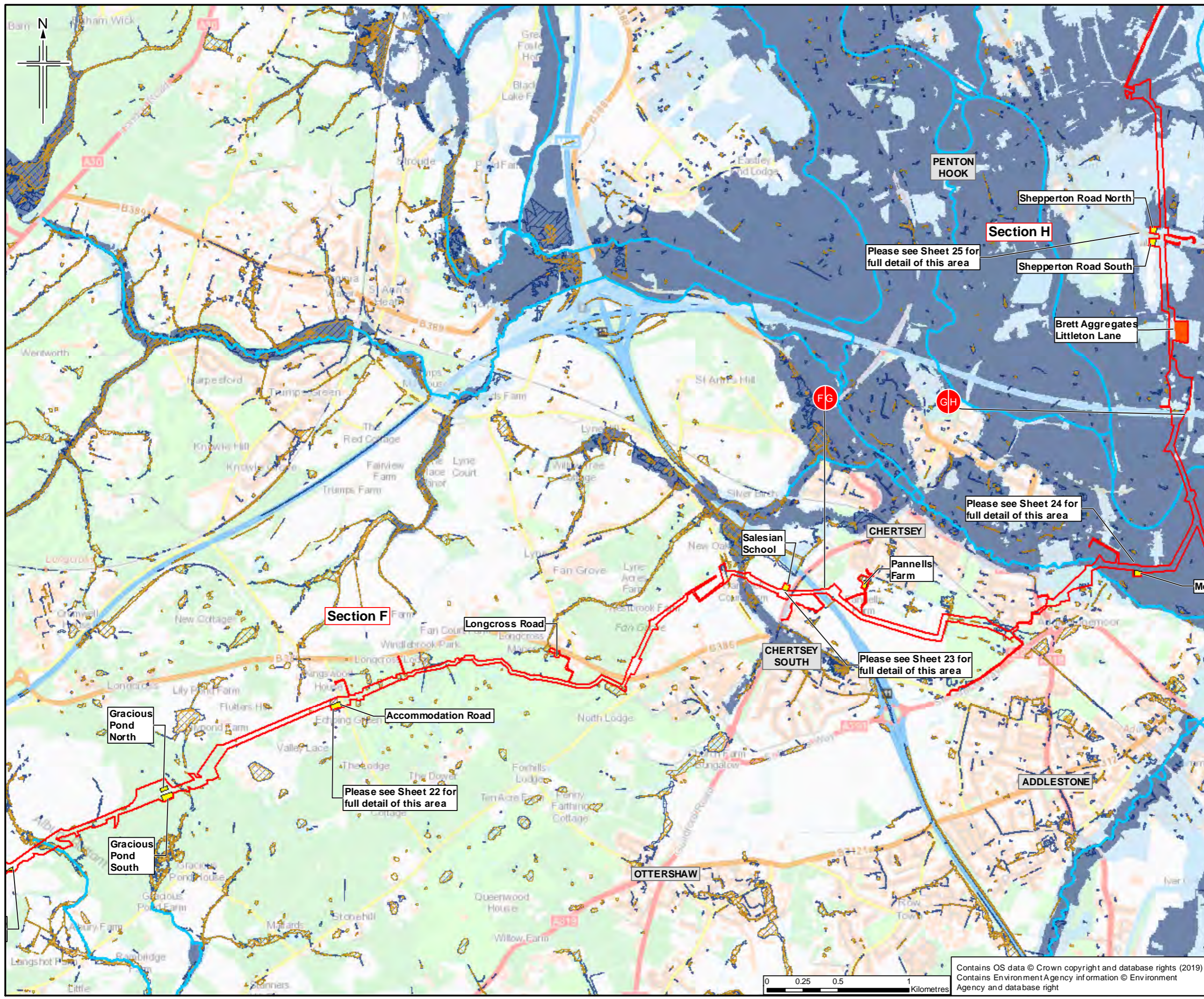
Client
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Project
 Southampton to London Pipeline Project

Drawing title
**FLOOD RISK ASSESSMENT
 CONSTRUCTION COMPOUND
 AND FLOOD RISK DATA**
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue	
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Project Wise No.	B2325300-JAC-000-ENV-DRG-001239	
Drawing number	Figure D1 Sheet 11 of 27	Rev 0

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Legend

- Order Limits
- Construction compound
- Logistics hub
- Section break
- Main River
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3

Sheet displays parts of Section F, Section G and Section H

Rev.	Rev. Date	Purpose of revision	OrigDwn	Checked	Rev'd	Apprv'd
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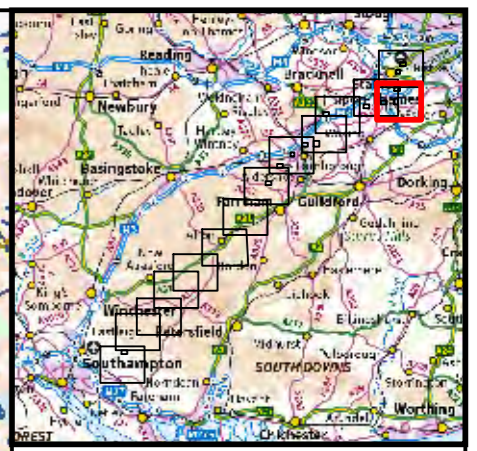
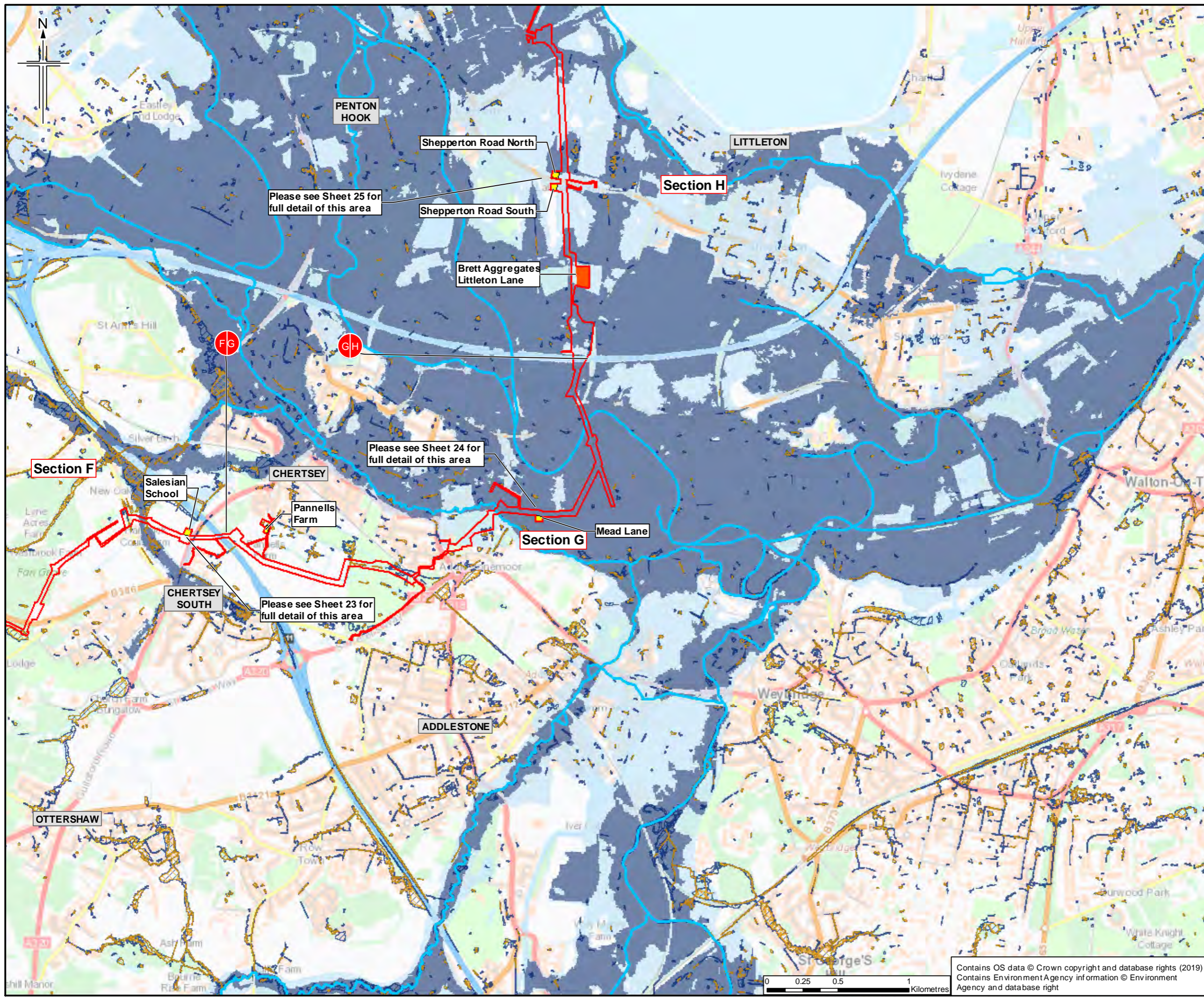
Project
Esso Southampton to London Pipeline Project

Drawing title
**FLOOD RISK ASSESSMENT
CONSTRUCTION COMPOUND
AND FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
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Jacobs No.	B2325300	
Project/Draw No.	B2325300-JAC-000-ENV-DRG-001239	
Drawing number	Figure D1 Sheet 12 of 27	Rev 0

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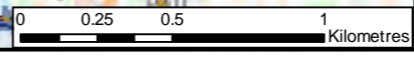
Legend

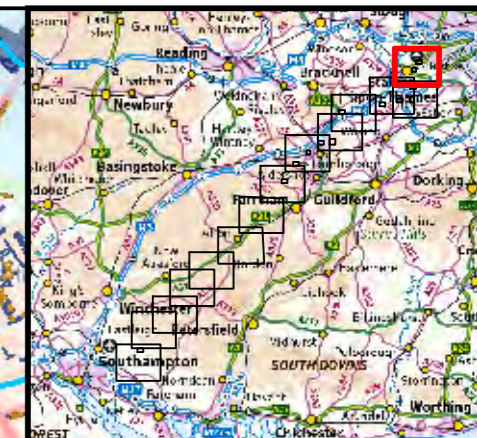
- Order Limits
- Construction compound
- Logistics hub
- Section break
- Main River
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3

Sheet displays parts of Section F, Section G and Section H

0	09/04/2019	For Issue	LM	FW	SM	SH	
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Client Esso Petroleum Company, Limited Ermyn House, Ermyn Way, Leatherhead, Surrey, KT22 8UX							
Project Southampton to London Pipeline Project							
Drawing title FLOOD RISK ASSESSMENT CONSTRUCTION COMPOUND AND FLOOD RISK DATA APFP Reg. (2009) 5(2)(l)							
Drawing Status For Issue							
Scale		1:25,000		@ A3		DO NOT SCALE	
Jacobs No.		B2325300		Project Wise No.		B2325300-JAC-000-ENV-DRG-001239	
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- Legend**
- Order Limits
 - Construction compound
 - Section break
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3

Sheet displays part of Section H

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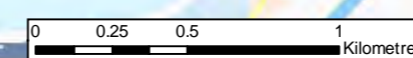
Client
 Esso Petroleum Company, Limited
 Ermyn House,
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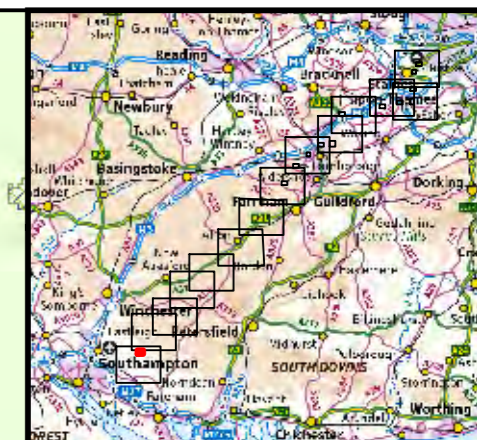
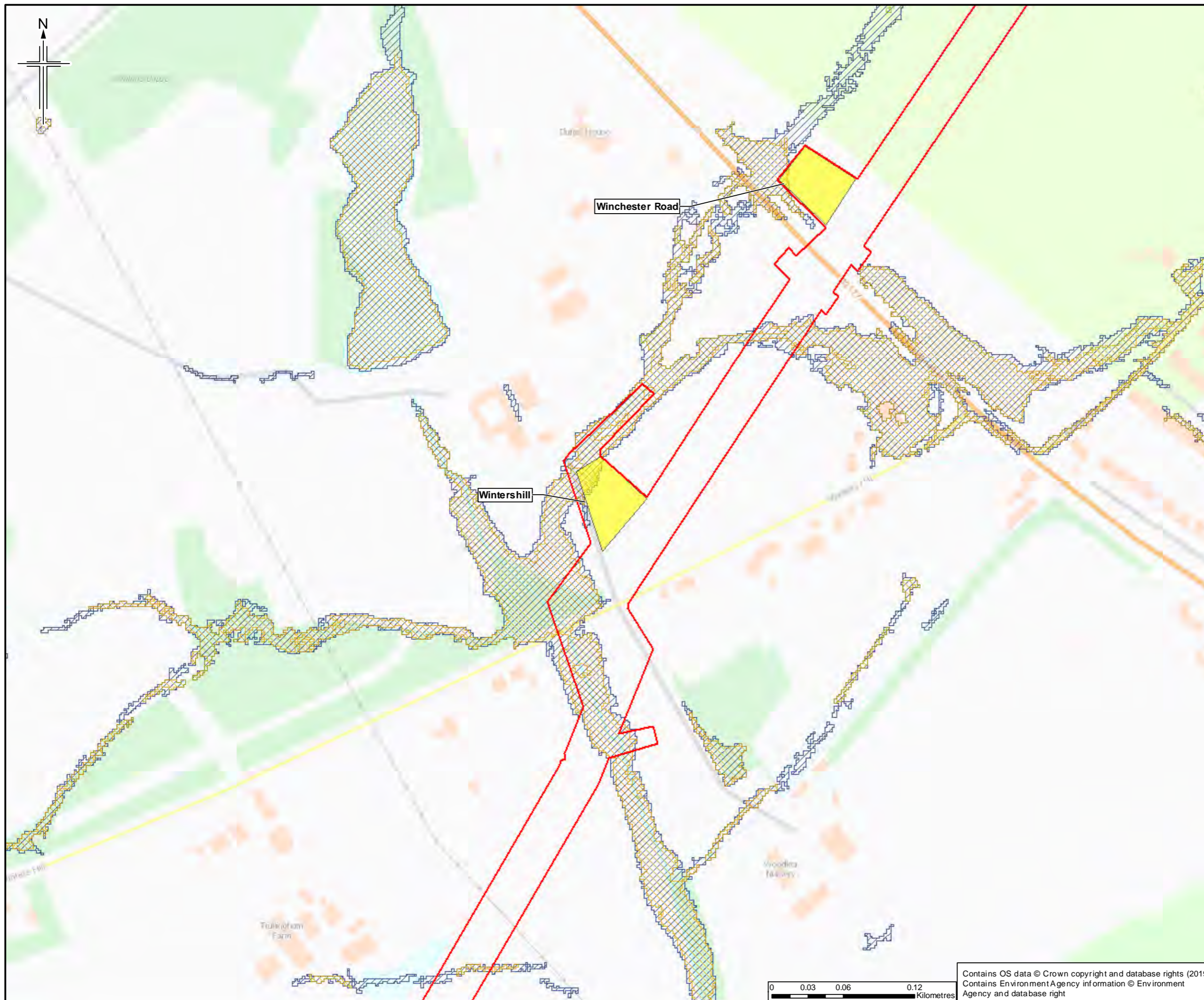
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 CONSTRUCTION COMPOUND
 AND FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

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Drawing number	Figure D1 Sheet 14 of 27
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Eastley and Lodge
PENTON HOOK



- Legend**
- Order Limits
 - Construction compound
 - Section break
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)

Sheet displays part of Section A

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

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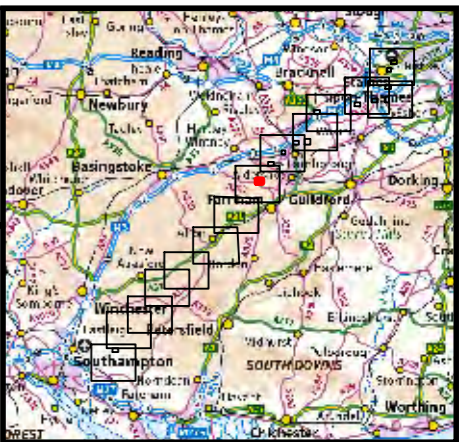
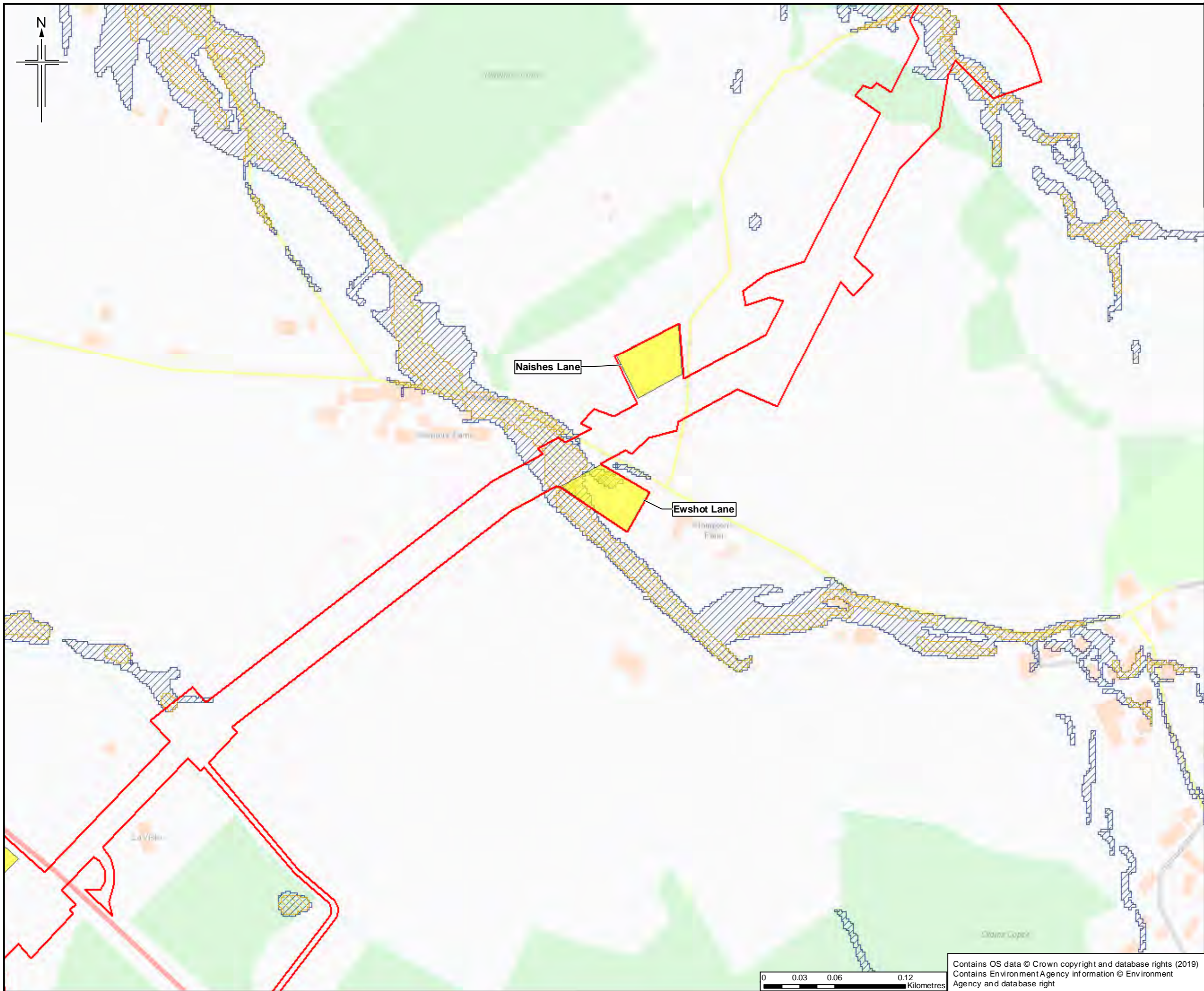
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Drawing title
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 CONSTRUCTION COMPOUND
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 APFP Reg. (2009) 5(2)(l)**

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- Legend**
- Order Limits
 - Construction compound
 - Section break
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)

Sheet displays part of Section D

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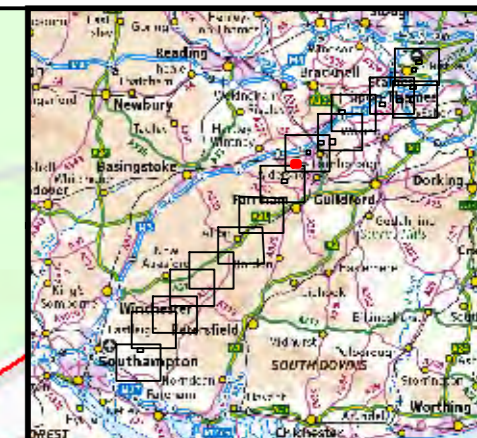
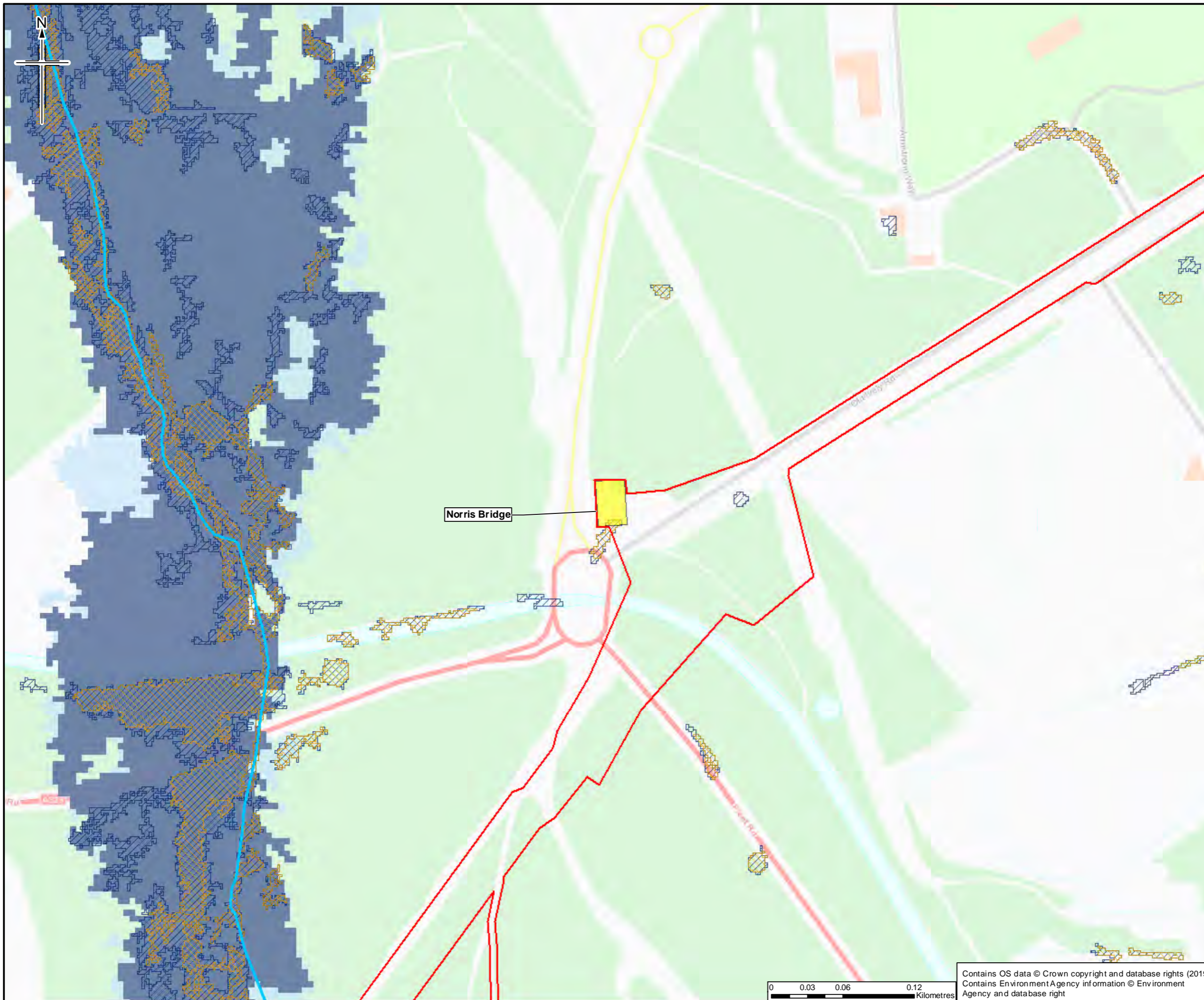
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- Legend**
- Order Limits
 - Construction compound
 - Section break
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3

Norris Bridge

Sheet displays part of Section D

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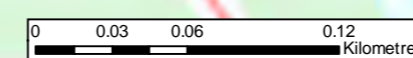


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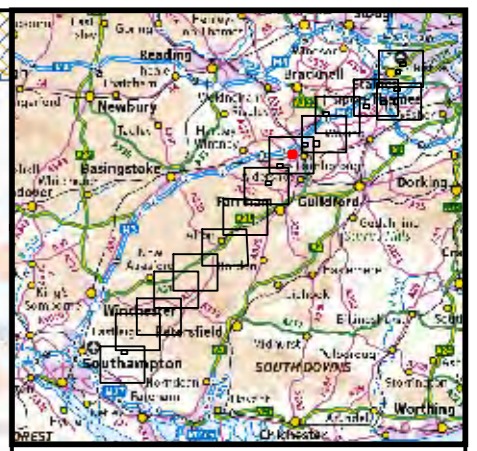
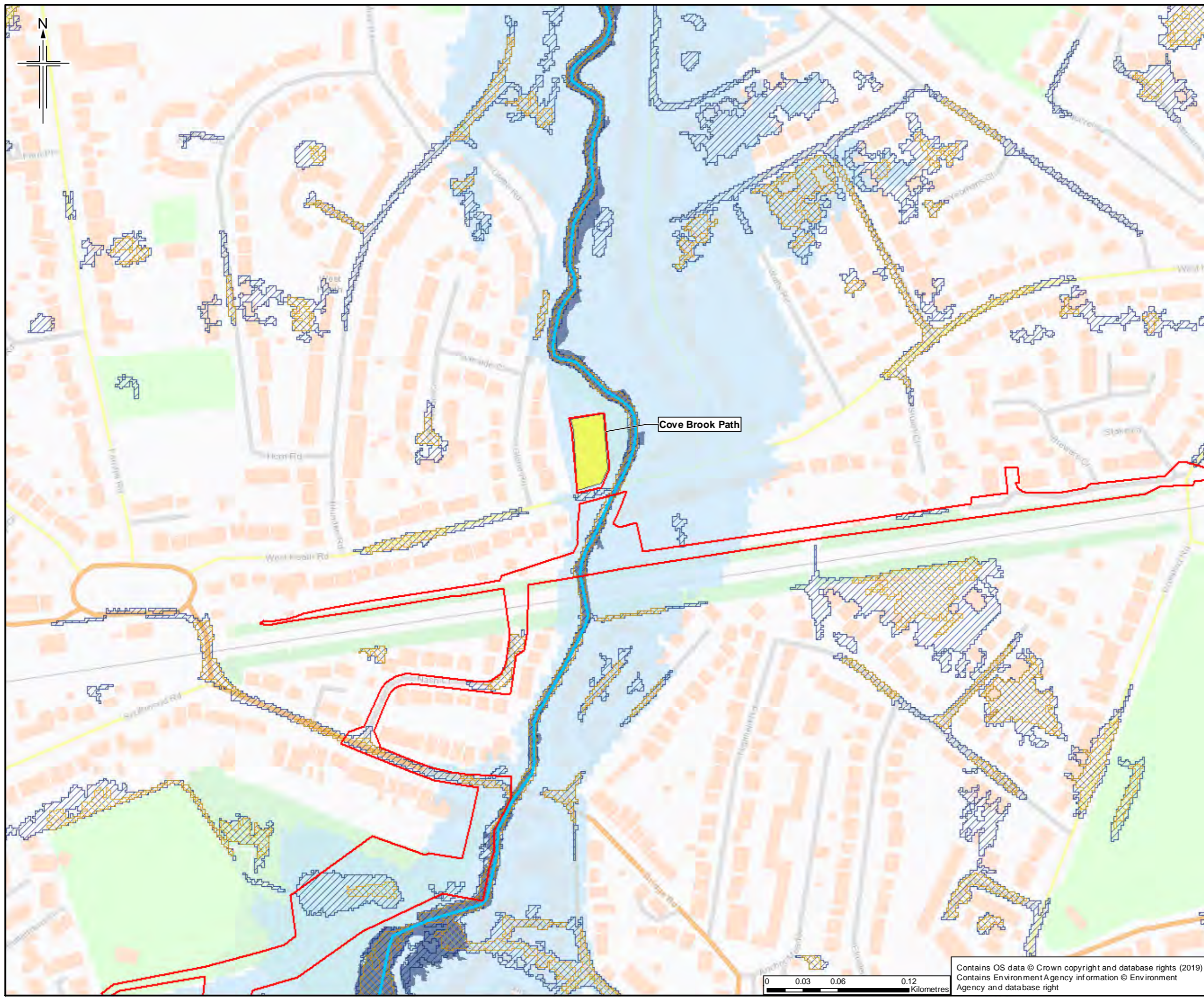
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CONSTRUCTION COMPOUND
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APFP Reg. (2009) 5(2)(l)

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- Legend**
- Order Limits
 - Construction compound
 - Section break
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3

Sheet displays part of Section E

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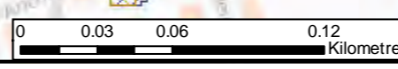
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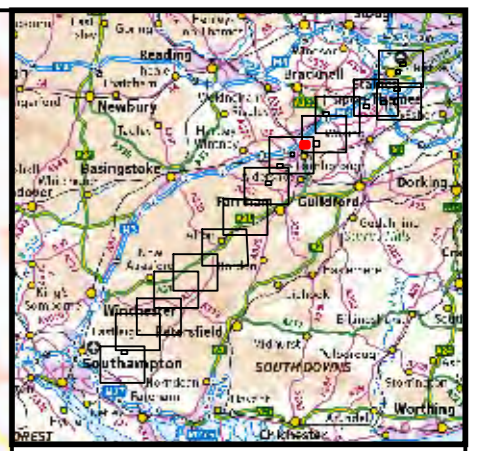
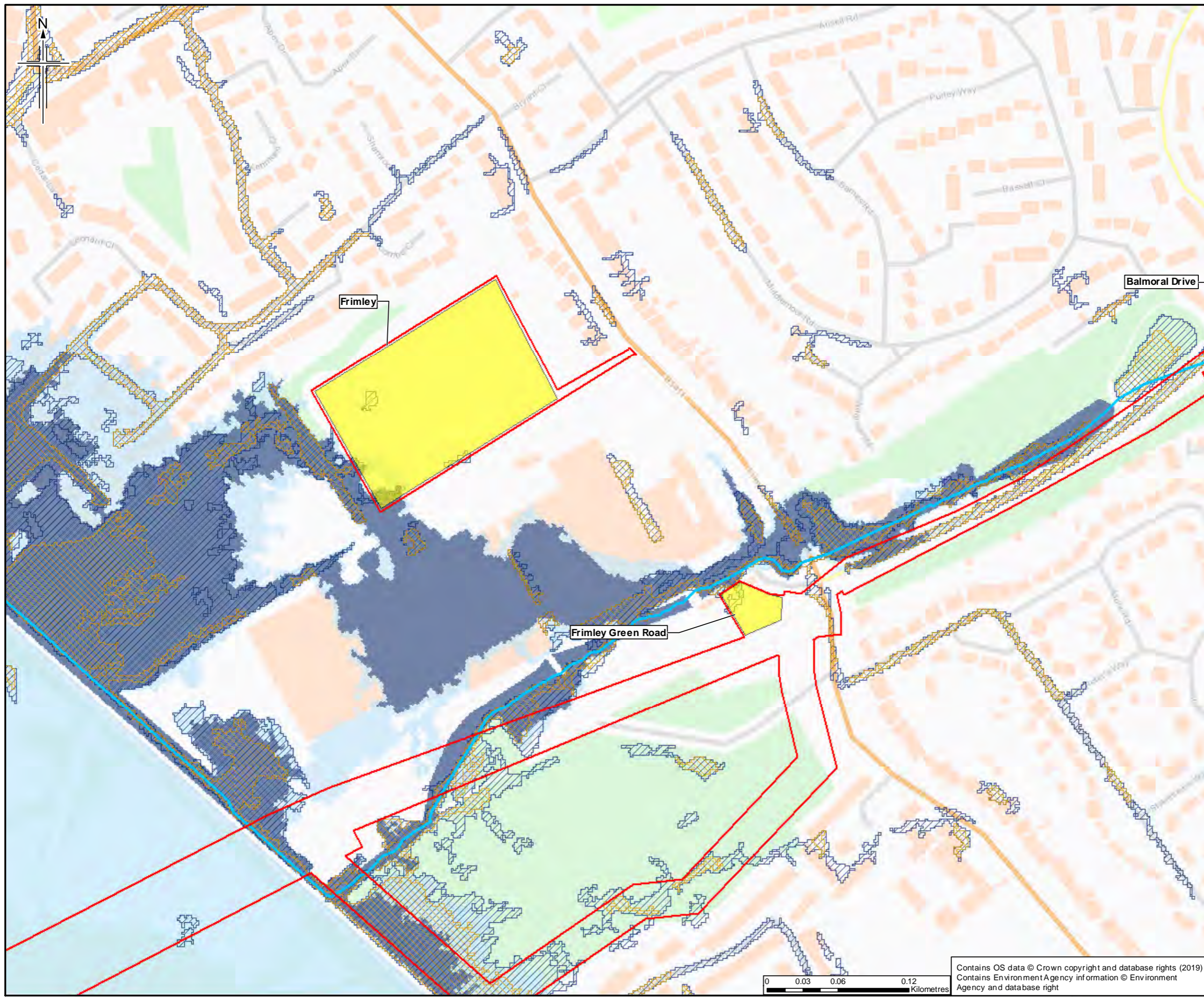
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Drawing title
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 AND FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

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Legend

- Order Limits
- Construction compound
- Section break
- Main River
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3

Sheet displays part of Section E

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

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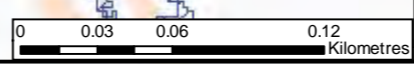
Project

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Drawing title

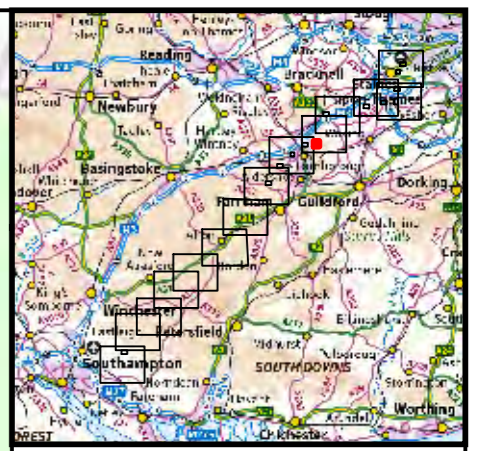
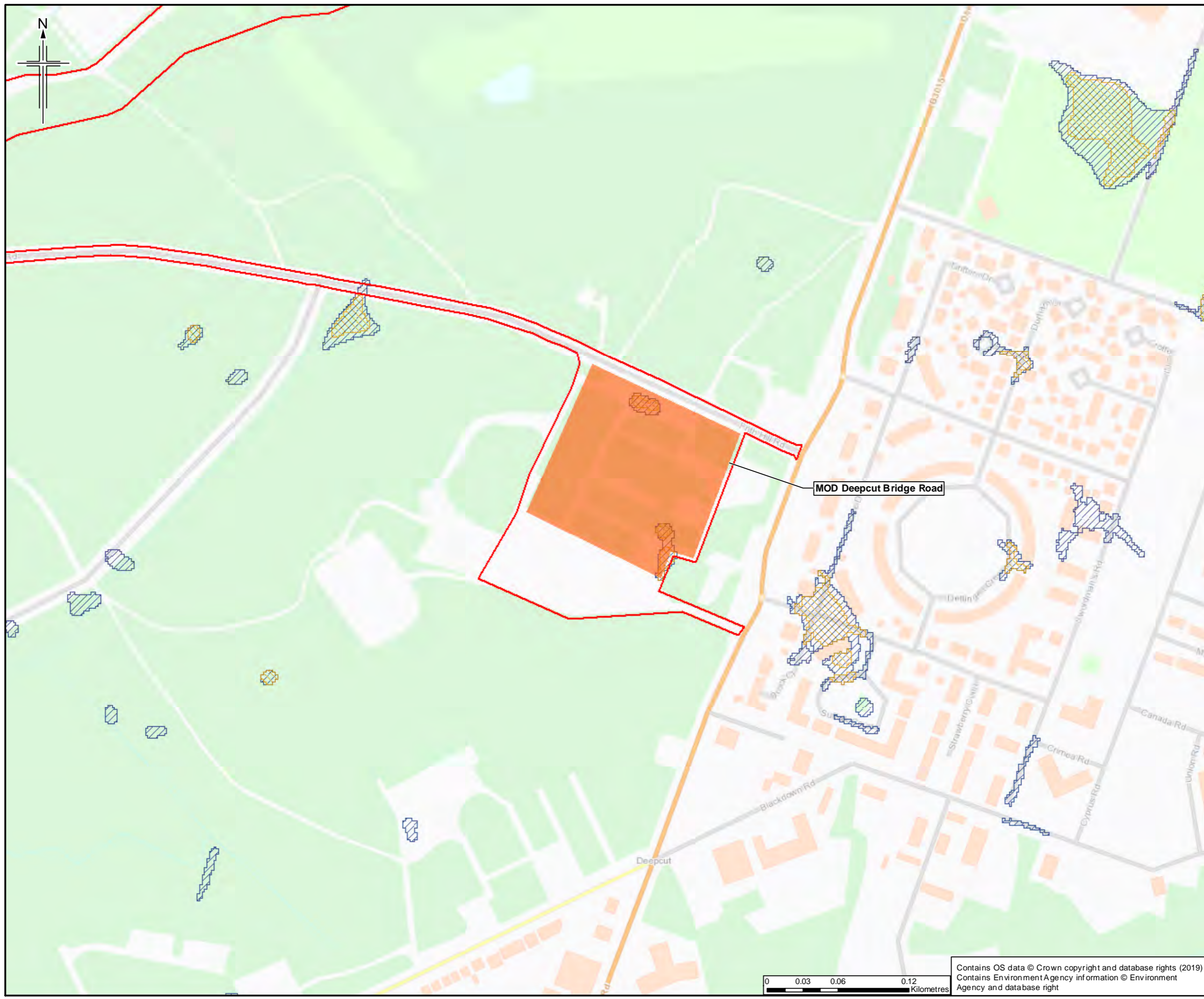
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 AND FLOOD RISK DATA
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- Legend**
- Order Limits
 - Logistics hub
 - Section break
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)

Sheet displays part of Section E

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

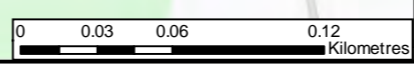
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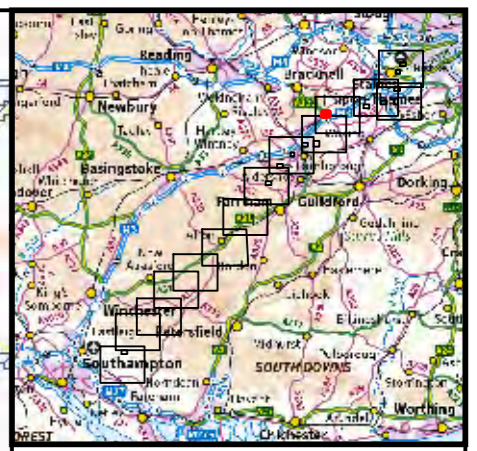
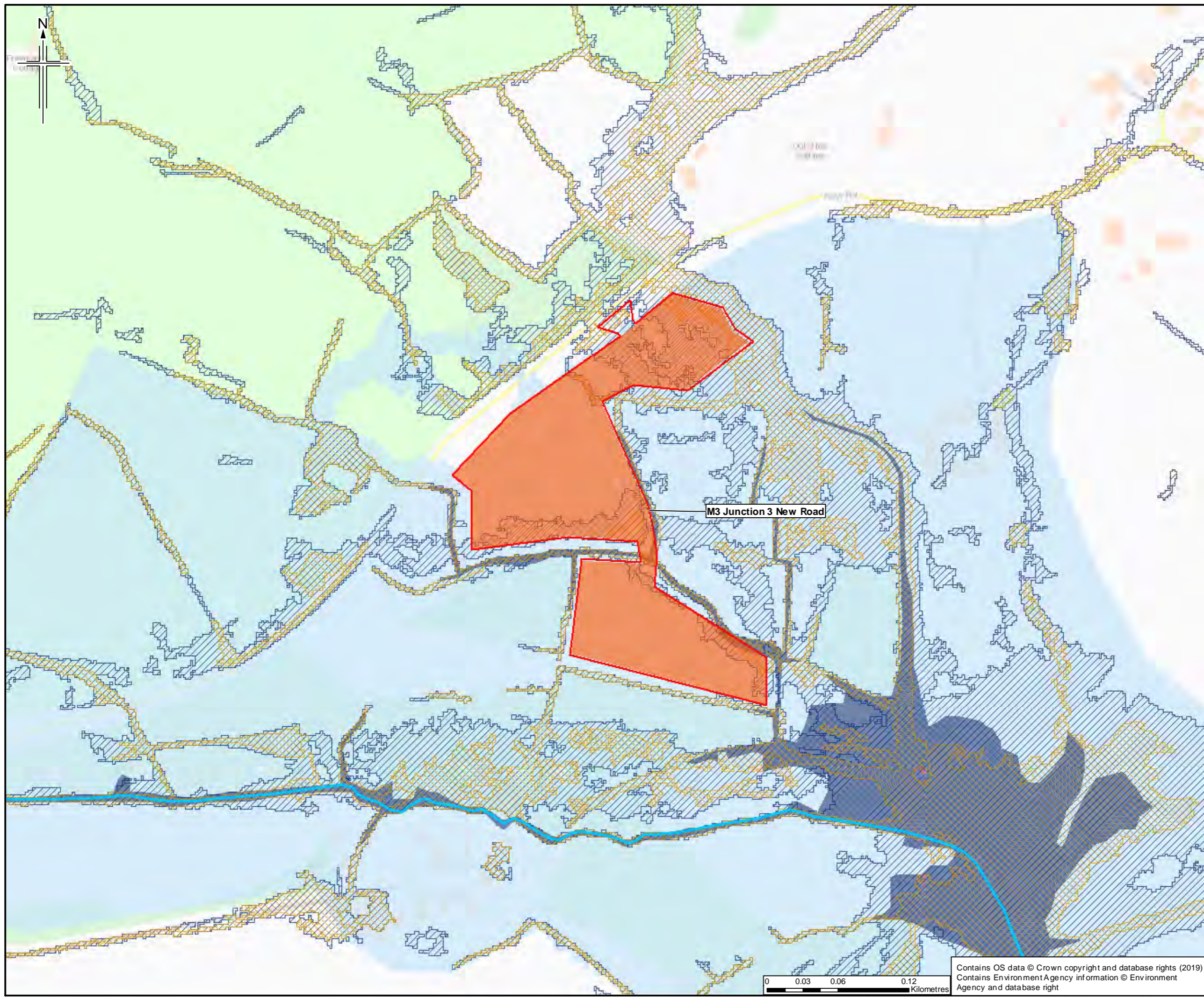
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 AND FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
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- Legend**
- Order Limits
 - Logistics hub
 - Section break
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3

Sheet displays part of Section F

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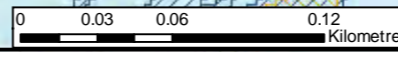
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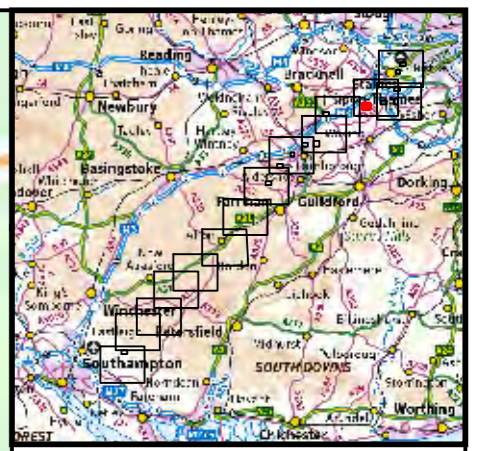
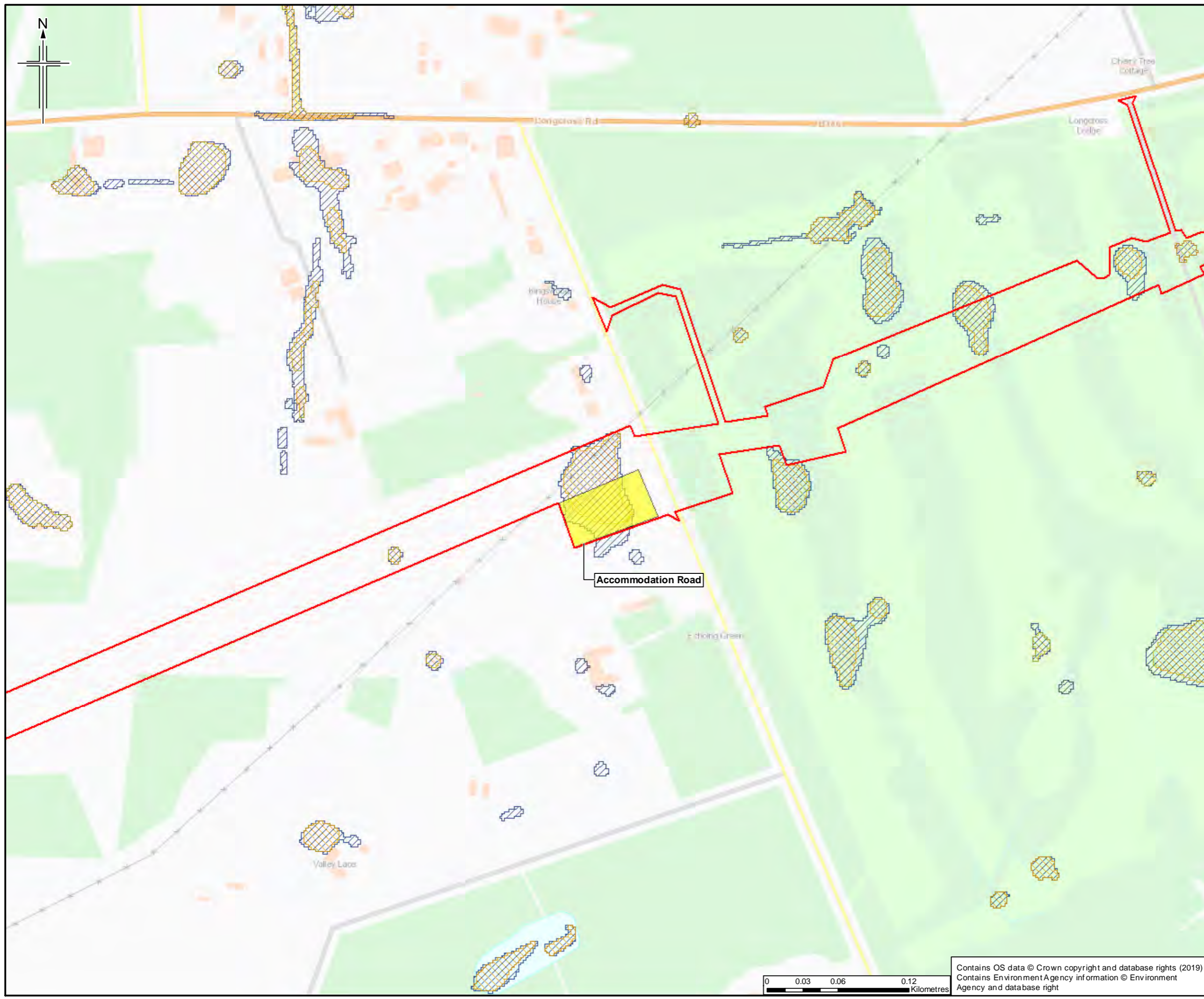
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**FLOOD RISK ASSESSMENT
 CONSTRUCTION COMPOUND
 AND FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status		For Issue	
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Drawing number	Figure D1 Sheet 21 of 27		Rev 0

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- Legend**
- Order Limits
 - Construction compound
 - Section break
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)

Sheet displays part of Section F

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue	LM	FW	SM	SH

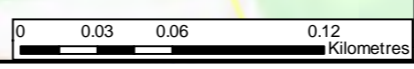


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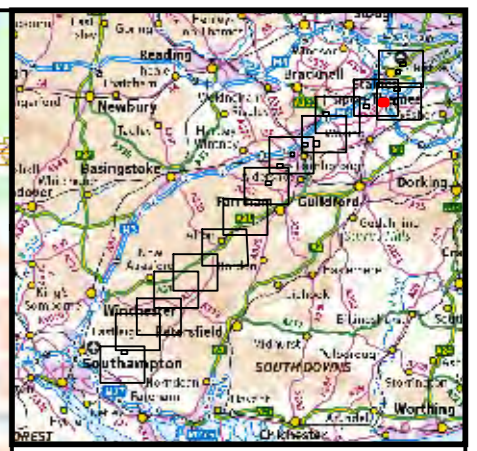
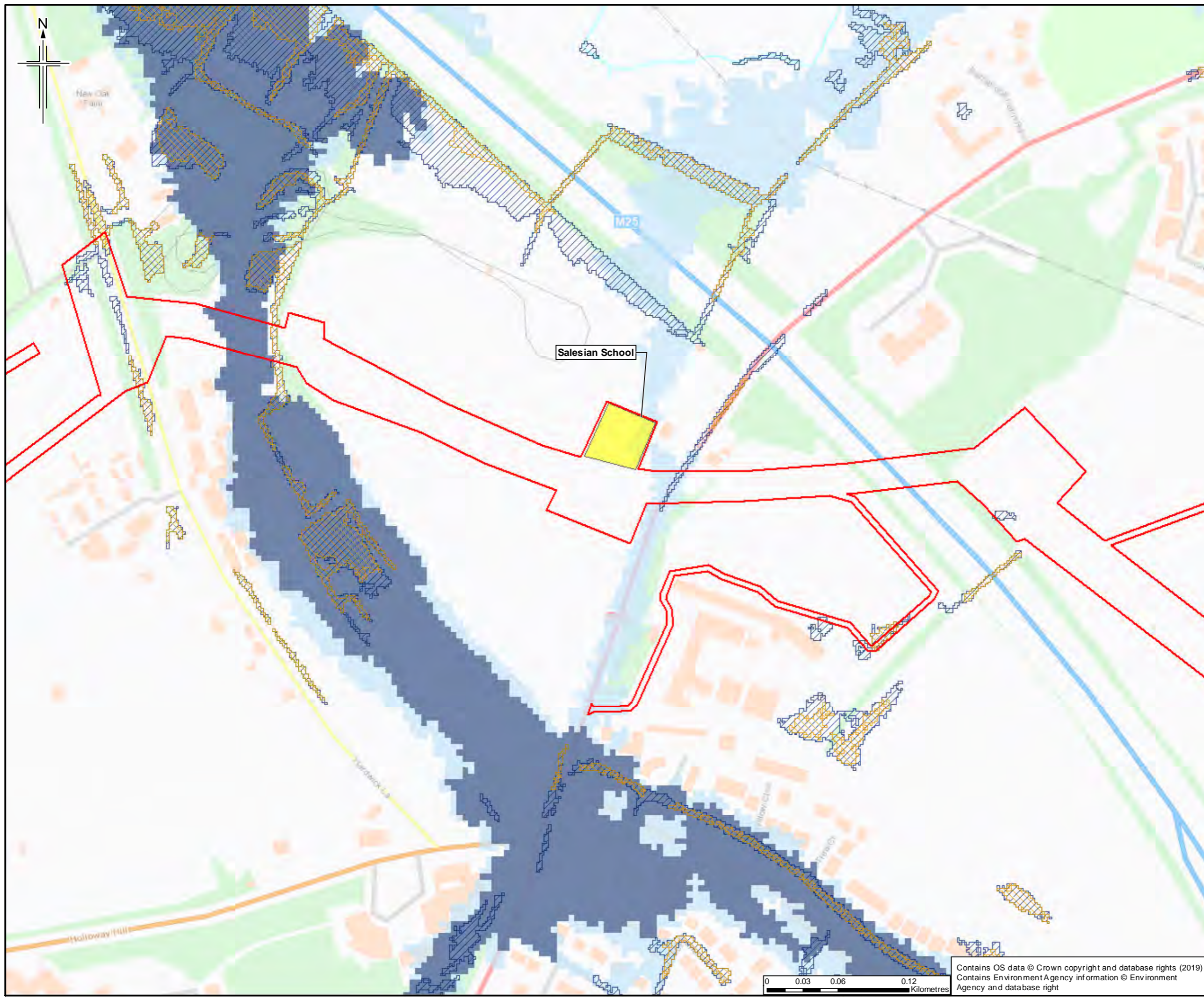
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FLOOD RISK ASSESSMENT
CONSTRUCTION COMPOUND
AND FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue	
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Legend

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- Construction compound
- Section break
- Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
- Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
- Flood Zone 2
- Flood Zone 3

Sheet displays parts of Section F and Section G

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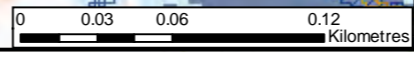
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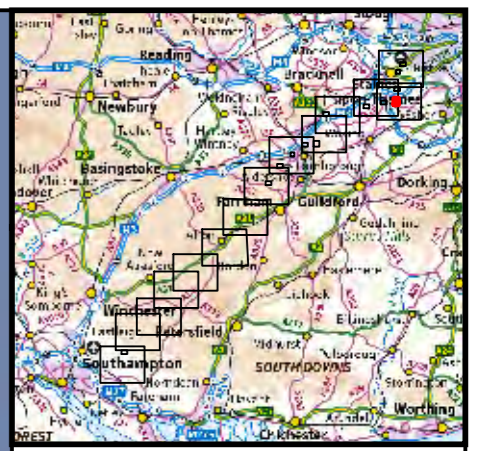
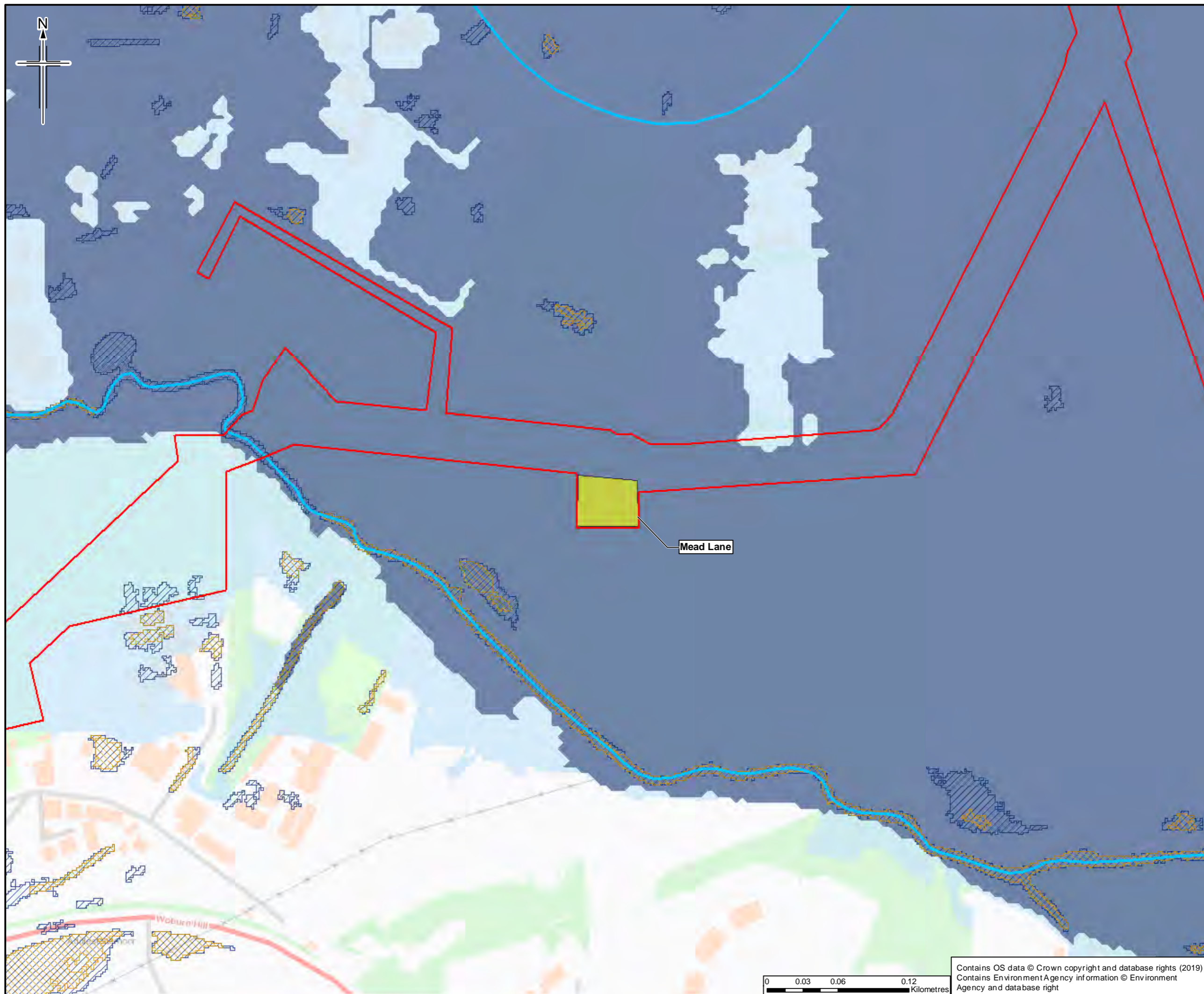
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**FLOOD RISK ASSESSMENT
 CONSTRUCTION COMPOUND
 AND FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

Drawing Status	For Issue	
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- Legend**
- Order Limits
 - Construction compound
 - Section break
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3

Sheet displays part of Section G

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
0	09/04/2019	For Issue			LM	FW SM SH

Author

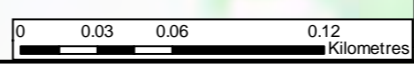
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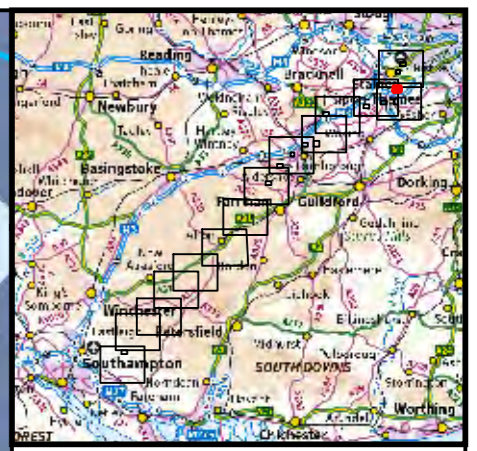
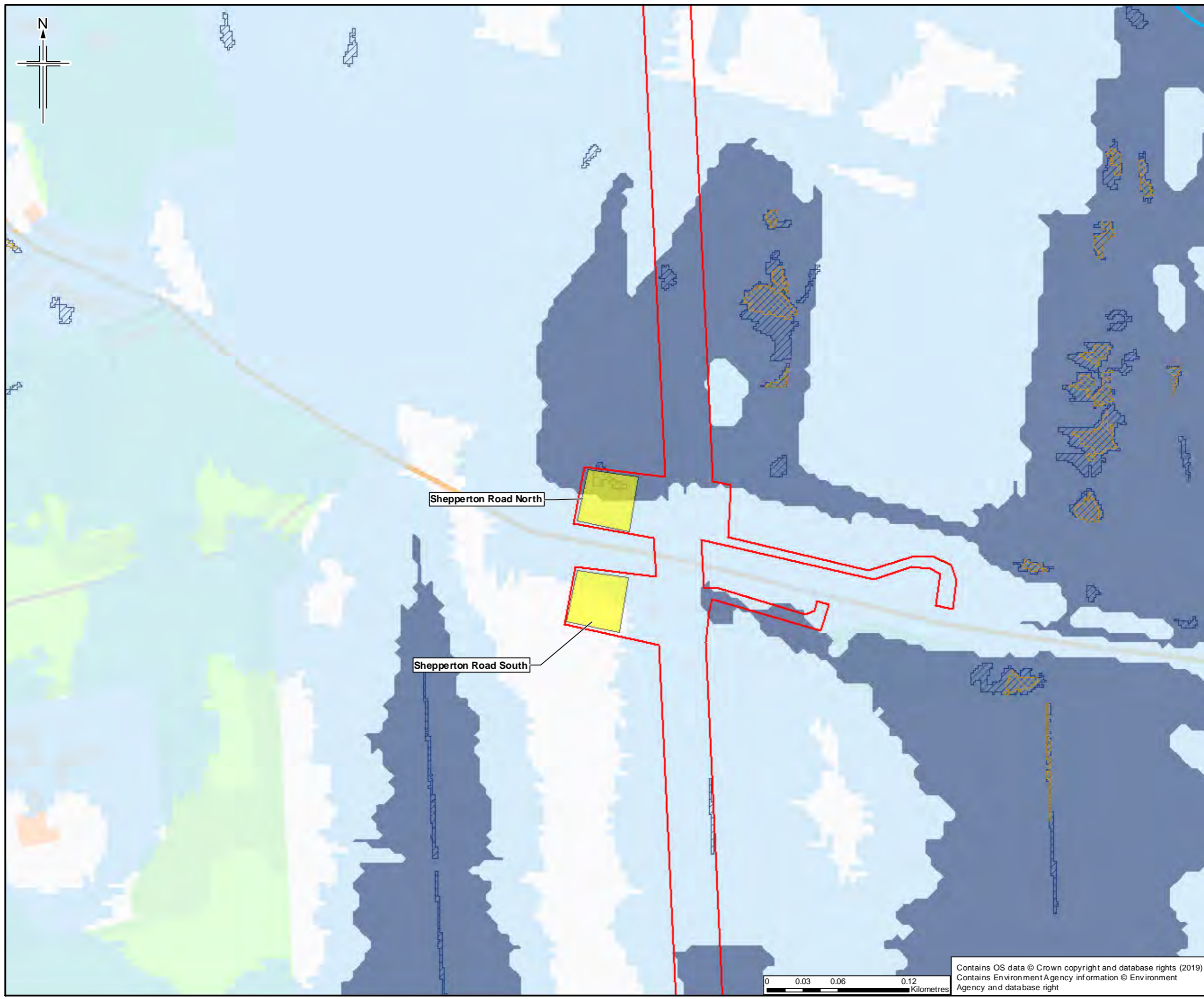
Drawing title
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 AND FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue	
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- Legend**
- Order Limits
 - Construction compound
 - Section break
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3

Sheet displays part of Section H

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
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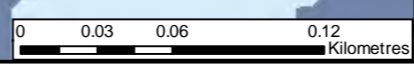
Author: **JACOBS**
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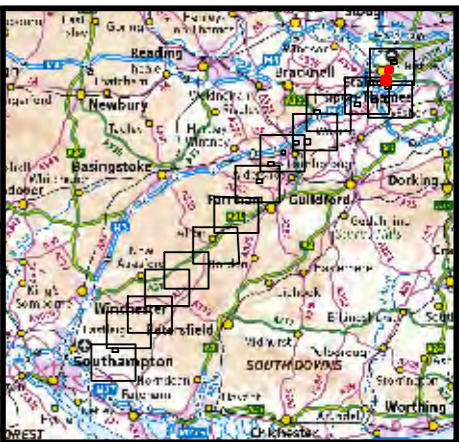
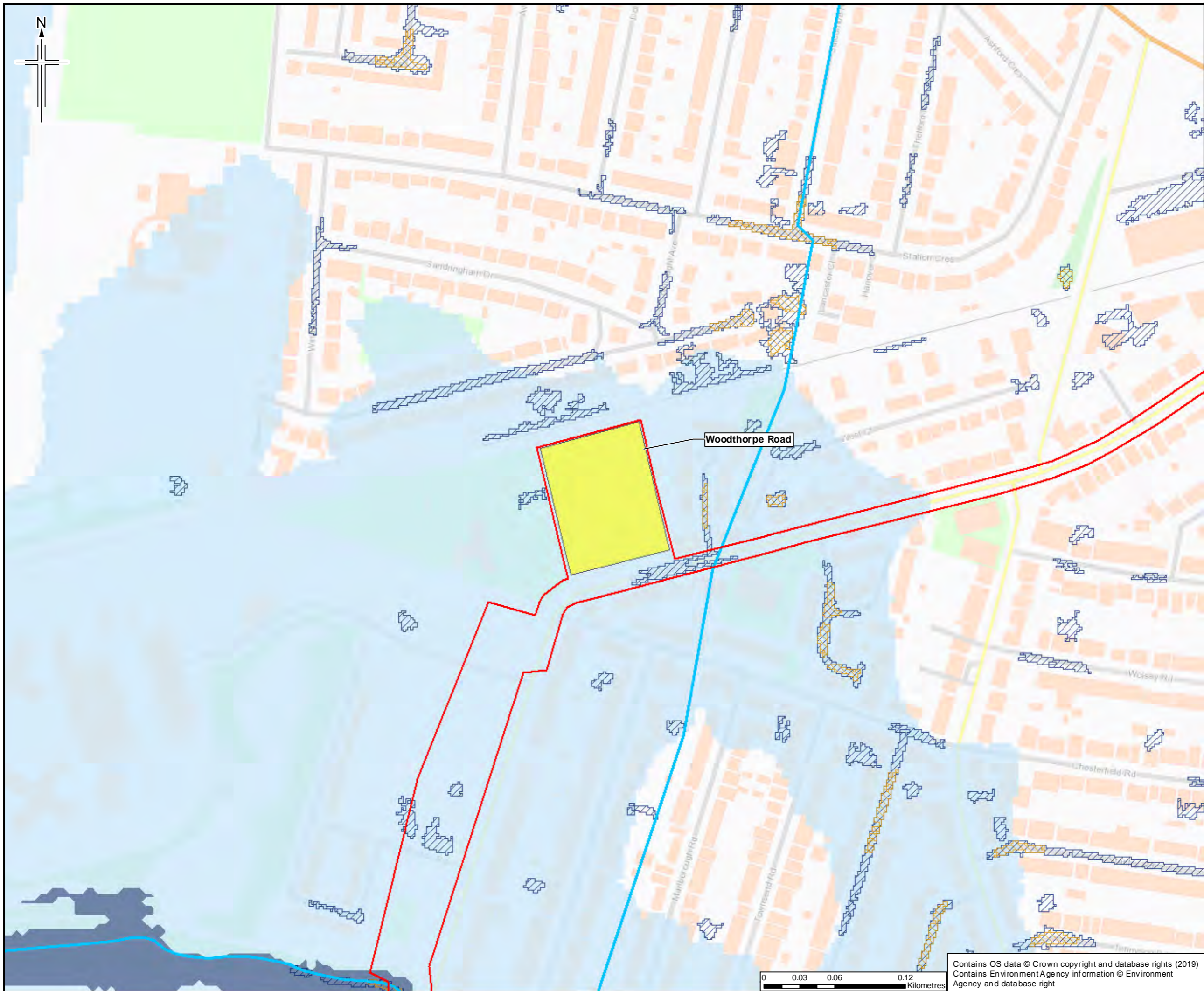
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- Legend**
- Order Limits
 - Construction compound
 - Section break
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Flood Zone 2
 - Flood Zone 3

Sheet displays part of Section H

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Apprv'd
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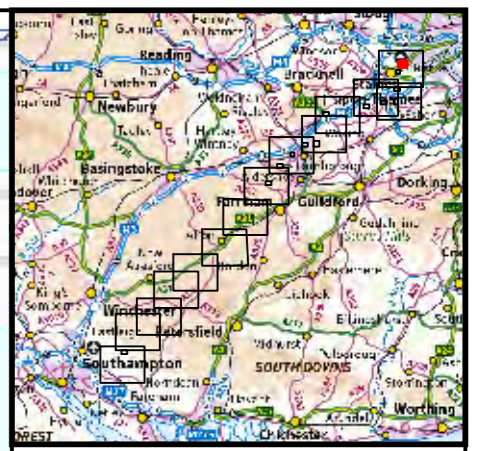
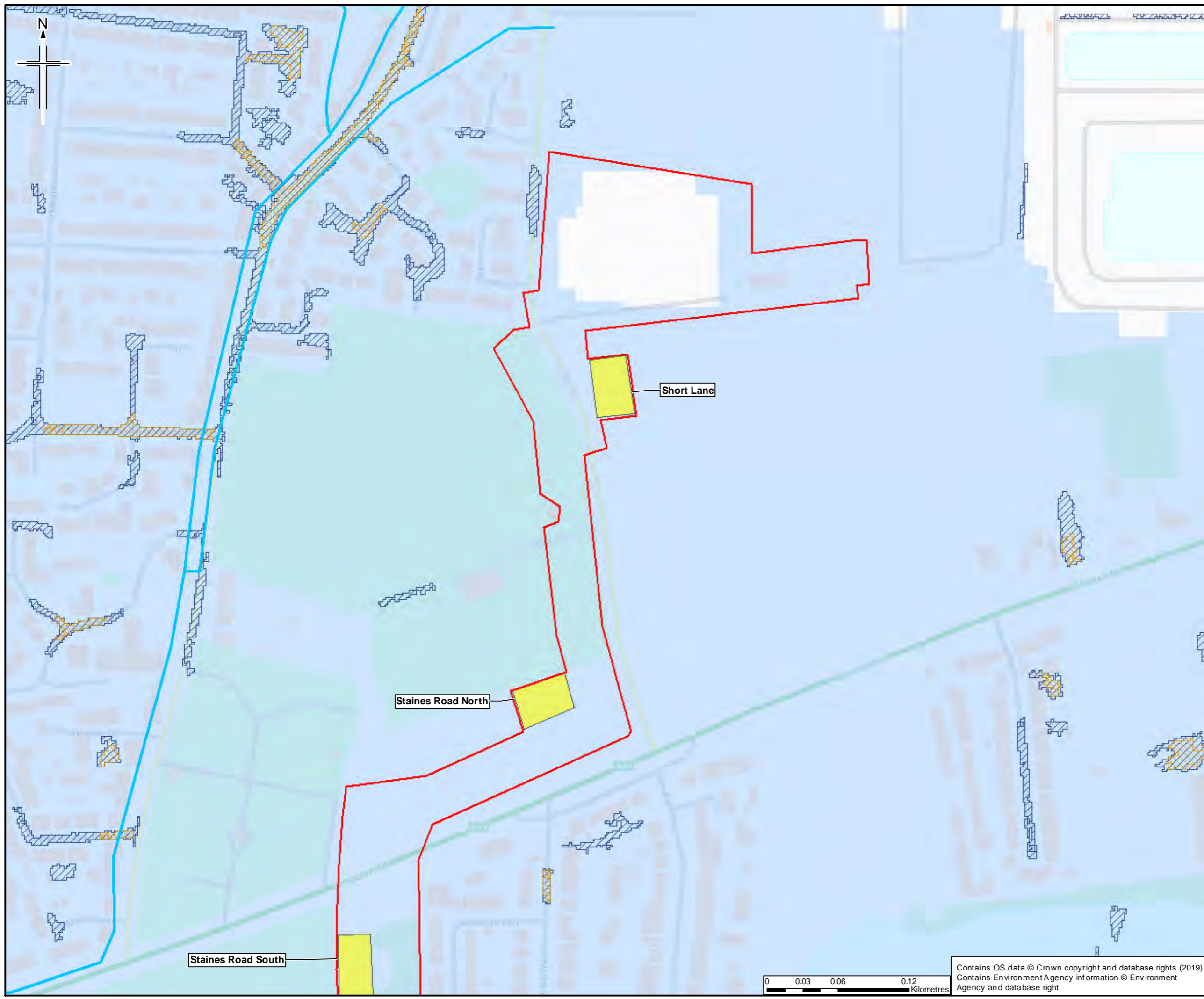
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CONSTRUCTION COMPOUND
AND FLOOD RISK DATA
APFP Reg. (2009) 5(2)(l)

Drawing Status	For Issue
Scale	1:3,000 @ A3 DO NOT SCALE
Jacobs No.	B2325300
Project Wise No.	B2325300-JAC-000-ENV-DRG-001239
Drawing number	Figure D1 Sheet 26 of 27
Rev	0

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- Legend**
- Order Limits
 - Construction compound
 - Section break
 - Main River
 - Risk of flooding from surface water (RoFSW) extent 3.3% Annual Exceedance Probability (AEP)
 - Risk of flooding from surface water (RoFSW) extent 1% Annual Exceedance Probability (AEP)
 - Risk of flooding from reservoirs - maximum extent

Sheet displays part of Section H

Rev.	Rev. Date	Purpose of revision	Orig'Dwn	Checked	Rev'd	Appr'd
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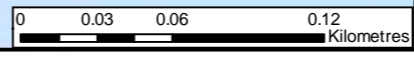
Project

Southampton to London Pipeline Project

Drawing title

**FLOOD RISK ASSESSMENT
 CONSTRUCTION COMPOUND
 AND FLOOD RISK DATA
 APFP Reg. (2009) 5(2)(l)**

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Glossary

Term	Definition
ABD	Areas Benefiting (from flood) Defences
AEP	Annual Exceedance Probability e.g. 1% AEP is equivalent to 1% (1 in 100) probability of flooding occurring in any one year (or, on average, once in every 100 years).
AStGWF	Areas Susceptible to Groundwater Flooding is a strategic scale map showing groundwater flood areas on a 1km square grid. It was developed specifically by the Environment Agency for use by Lead Local Flood Authorities (LLFAs) for use in Preliminary Flood Risk Assessment as required under the Flood Risk Regulations 2009.
BGS	British Geological Survey
CP	Cathodic Protection
Climate Change	Long-term variations in global temperature and weather patterns caused by natural and human actions.
CoCP	Code of Construction Practice
DCO	Development Consent Order
Development	The carrying out of building, engineering, mining or other operations, in, on, over or under land, or the making of any material change in the use of a building or other land.
EA	Environment Agency
EIA	Environmental Impact Assessment
ES	Environmental Statement
Esso	Esso Petroleum Company, Limited
Flood and Water Management Act 2010	Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 floods, the aim of which (partly) is to clarify the legislative framework for managing surface water and groundwater flood risk in England. The Act, which applies to England and Wales, aims to create a simpler and more effective means of managing the risk of flood and coastal erosion. The Act also aims to help improve the sustainability of our water resources and protect against potential droughts.
Flood Zone Map	Nationally consistent delineation of 'high', 'medium' and 'low' probability of fluvial flooding, published on a quarterly basis by the Environment Agency.
Flood Zone 1 low probability	NPPF Flood Zone, defined as areas outside of Zone 2 medium probability. This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).
Flood Zone 2 medium probability	NPPF Flood Zone comprising land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%).
Flood Zone 3a high probability	NPPF Flood Zone comprising land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%).
FRA	Flood Risk Assessment
FSA	Flood Storage Area
Functional Floodplain (Flood Zone 3b)	NPPF Flood Zone, defined as areas in which water <i>has</i> to flow or be stored in times of flood.
GWDTE	Groundwater Dependent Terrestrial Ecosystem
HDD	Horizontal directional drilling



Term	Definition
Main River	A watercourse shown as such on the Main River Map, and for which the Environment Agency has responsibilities and powers. N.B., Main River designation is not an indication of size, although it is often the case that they are larger than Ordinary Watercourses.
mBGL	Metres Below Ground Level
NGR	National Grid Reference
NPPF	The National Planning Policy Framework. National Planning Policy, updated and published by the Government in July 2018.
NSIP	Nationally Significant Infrastructure Project
Order Limits	The outer limits for the project, including the route and any temporary working areas that would be required to install the pipeline, such as access routes, and working compounds. This would also include the easement strip that would be protected along the pipeline following installation.
Ordinary Watercourse/Non-Main River	All watercourses that are not designated Main River, and which are the responsibility of Local Authorities or, where they exist, Internal Drainage Boards. Note that Ordinary Watercourse does not imply a “small” river, although it is often the case that Ordinary Watercourses are smaller than Main Rivers.
OW	Ordinary Watercourse. A watercourse where regulatory powers for works lie with the Lead Local Flood Authority
PEI Report	Preliminary Environmental Information Report
PIG	Pipeline Inspection Gauge
QMRI	Queen Mary Reservoir Intake
REAC	Register of Environmental Actions and Commitments
Residual Risk	A measure of the outstanding flood risks and uncertainties that have not been explicitly quantified and/or accounted for as part of the design process.
RoFSW	Risk of Flooding from Surface Water map published by the Environment Agency identifying zones of high, medium, low and very low risk of surface water flooding in England and Wales.
SFRA	Strategic Flood Risk Assessment – Part of the evidence base for the Local Plan, developed by the Local Planning Authority to provide information to apply the Sequential Test for future development. It also defines the extent of Flood Zone 3b for the authorities’ area.
SRA	Staines Reservoir Aqueduct
Supplementary Planning Document (SPD)	Documents adding further detail to the policies in the Local Plan. They can be used to provide further guidance for development on specific sites, or on particular issues, such as design. Supplementary planning documents are capable of being a material consideration in planning decisions but are not part of the development plan. (<i>NPPF definition</i>) SPDs are not subject to independent examination before adoption by a local planning authority.
SWMP	Surface Water Management Plan