Stonestreet Green Solar

Environmental Statement
Volume 4: Appendices
Chapter 10: Water Environment
Appendix 10.2: Flood Risk Assessment

PINS Ref: EN010135
Doc Ref. 5.4
Version 1
June 2024

APFP Regulation 5(2)(a)
Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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1 Executive Summary

1.1.1 This Flood Risk Assessment '(FRA') has been prepared by SLR Consulting Limited ('SLR') on behalf of EPL 001 Limited in relation to the Development Consent Order ('DCO') Application for Stonestreet Green Solar (the 'Project'). Land within the Order limits is known as the 'Site'.

1.1.2 Environment Agency ('EA') mapping indicates that the majority of the Site is within Flood Zone 1 (low probability of flood risk). Some Fields within the Site are located in areas designated as Flood Zones 2 and 3 (medium and high probability) associated with fluvial flooding along the East Stour River.

1.1.3 EA surface water flood mapping indicates that the majority of the Site is at very low risk of flooding. This mapping does however also identify areas of High, Medium, Low surface water flood risk in parts of the Site.

1.1.4 A flood risk screening undertaken indicates that the Site is at very low risk of flooding from tidal sources, sewers, reservoirs, canals and other artificial sources and infrastructure failure. The assessment infers that the Site is at low risk of groundwater flooding however this is not brought forward for further analysis given that groundwater flooding on the Site would only occur in conjunction with fluvial or surface water flooding locally (i.e., water levels are controlled by fluvial channels). Any subsurface development (underground cables, foundations) will be flood resilient and not impacted by shallow groundwater.

1.1.5 The flood screening assessment highlighted the potentially high risk of flooding from fluvial and surface water sources at the Site. These were therefore brought forward for further assessment.

1.1.6 SLR have undertaken hydraulic modelling of the East Stour River to better understand the prevailing flood risk to the Site and how this might be impacted by any development. The Project layout has been developed in accordance with the findings of the hydraulic modelling report and Surface Water flood mapping to ensure that no PV Arrays are located in areas with flood depths greater than 0.8m and all other sensitive infrastructure is located out of the floodplain. The Project design therefore ensures that the development will remain safe throughout its lifetime.

1.1.7 The residual risk posed to the construction and demolition of the Project and staff involved in the construction, operation and demolition of the facility will be managed through the preparation and implementation of Emergency Flood Response Plans ('EFRP'). Outline details of EFRPs are provided in the **Outline Construction Environmental Management Plan ('Outline CEMP') (Doc Ref. 7.8)** the **Outline Operational Management Plan ('Outline OMP') (Doc Ref. 7.11)** and the **Outline Demolition Environmental Management Plan ('Outline DEMP') (Doc Ref. 7.14)**.

1.1.8 The Project design has also been developed to ensure that the development does not exacerbate flood risk. This includes avoiding uplift in ground levels within the floodplain and the provision of compensation storage to offset the small loss of flood storage arising from the legs of PV panels located in the floodplain. Modelling confirms that with these measures and considering changes in flood conveyance arising from PV panels, fences and hedges, the impact of the Project on flood levels within and downstream of the Site will be negligible.

1.1.9 The principles of how storm water runoff will be managed within the Site such that flood risk is not exacerbated are set out in the **Outline Operational Surface Water Drainage Strategy ('Outline OSWDS') (Doc Ref. 7.14)**.

1.1.10 Whilst the risks of flooding are mitigated as far as reasonably practicable, there are still residual risks associated with fluvial and surface water sources, as well as the potential of failure from large, raised reservoirs (Aldington Flood Storage Area ('AFSA')). The likelihood of failure from the AFSA is however very low.

2 Introduction

2.1 Introduction

2.1.1 This Flood Risk Assessment ('FRA') has been prepared by SLR Consulting Limited ('SLR') on behalf of EPL 001 Limited ('the Applicant') in relation to the Development Consent Order ('DCO') application ('Application') for Stonestreet Green Solar ('the Project'). This FRA has been prepared to consider the risk of flooding to the Project in line with national planning policy and practice. The FRA also considers the impact of the Project on the risk of flooding elsewhere.

2.1.2 This FRA has been prepared under the direction of a Technical Director of Hydrology at SLR who specialises in flood risk and associated planning matters.

2.1.3 Reporting has been completed in accordance with policy/guidance presented within the relevant section of the Overarching National Policy Statement ('NPS') for Energy (EN-1)[1] as well as the National Planning Policy Framework ('NPPF')[2] and its associated Planning Practice Guidance[3] ('PPG'). Due account is also taken of current best practice documents relating to the assessment of flood risk published by the British Standards Institution ('BSI') BS 8533[4] and local planning policies.

2.2 The Project

2.2.1 The Project comprises the construction, operation, maintenance, and decommissioning of solar photovoltaic ('PV') arrays and energy storage, together with associated infrastructure and an underground cable connection to the existing National Grid Sellindge Substation.

2.2.2 The Project will include a generating station (incorporating solar arrays) with a total capacity exceeding 50 megawatts ('MW'). The agreed grid connection for the Project will allow the export and import of up to 99.9 MW of electricity to the grid. The Project will connect to the existing National Grid Sellindge Substation via a new 132 kilovolt ('kV') substation constructed as part of the Project and cable connection under the Network Rail and High Speed 1 ('HS1') railway. Further details of the Project are provided in **Section 6** of this FRA.

2.2.3 The location of the Project is shown on **ES Volume 3, Figure 1.1: Site Location Plan (Doc Ref. 5.3)**. The Project will be located within the Order limits (the land shown on the **Works Plans (Doc Ref. 2.3)** within which the Project can be carried out). The Order limits plan is provided as **ES Volume 3, Figure 1.2: Order limits (Doc Ref. 5.3)**. Land within the Order limits is known as the 'Site'. Further details of the Site are provided in **Section 5** of this FRA.

2.2.4 With reference to the *Flood Map for Planning*[5], parts of the Site are shown to have a high probability of fluvial flooding. In addition, the *Check your long term flood risk*[6] mapping indicates the Site is at risk of surface water flooding. Therefore, the DCO Application for the Project is accompanied by an FRA.

2.3 Consultation

2.3.1 An initial FRA was undertaken at the Site by Wardell Armstrong titled 'Flood Risk Assessment for PEIR' which was provided as Appendix 9.1 of the PEIR. This report provides a full FRA using hydraulic modelling data prepared by SLR Consulting and addresses the comments in relation to flood risk provided in the Consultation section of **ES Volume 2, Chapter 10: Water Environment (Doc Ref. 5.2)**.

2.3.2 Further meetings and correspondence with the EA, detailed in the Consultation section of **ES Volume 2, Chapter 10: Water Environment (Doc Ref. 5.2),** were used to confirm the scope of the modelling used to inform this FRA.

2.3.3 Draft versions of the hydrology and hydraulic modelling reports (final versions of which are included as **Annex B: East Stour Hydraulic Modelling Report** of this FRA) were shared with the EA for comment in January 2024. In response to the draft modelling reports, the EA confirmed on 23 April 2024 they had undertaken a basic review (i.e. a review of the hydrology and hydraulic model reports, but not the model files) and did not have specific comments on the reports. The EA also stated that the model *'appears to provide a suitable basis for assessing the flood risk'* and that *'from the information so far provided we are unlikely to raise an objection to a formal application on flood risk grounds.'*

2.3.4 Relevant correspondence is included in **Annex E: EA Response to Draft HMR** of this FRA.

2.4 Competence

2.4.1 This FRA has been prepared under the direction of a Technical Director of Hydrology at SLR who specialises in flood risk and associated planning matters.

3 Planning Policy and Guidance

3.1 National Planning Policy

Overarching National Planning Policy Statement ('NPS') for Energy (EN-1)

3.1.1 The Overarching National Policy Statement ('NPS') for Energy EN-1[1] sets out the Government's planning policy for the development of nationally significant energy infrastructure.

3.1.2 Section 5.8 of NPS EN-1 refers to flood risk, with paragraph 5.8.13 outlining the need for an FRA for all energy projects within Flood Zones 2 and 3.

3.1.3 Paragraphs 5.8.9 to 5.8.11 of NPS EN-1 comment on the application of the Sequential and Exception Tests, stating that the Exception Test can be applied if following application of the Sequential Test, it is not possible to locate a project in an area of lower flood risk. To pass the Exception Test it should be demonstrated that:

- the project would provide wider sustainability benefits to the community that outweigh flood risk; and
- the project will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible will reduce flood risk overall.

3.1.4 The Sequential and Exception Tests for the Project are addressed in Appendix 2 of the **Planning Statement (Doc Ref. 7.6)**.

3.1.5 Paragraph 5.8.14 of NPS EN-1 states that the *'assessment should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account.'*

3.1.6 Paragraph 5.8.15 lists the minimum requirements of an FRA:

- *'be proportionate to the risk and appropriate to the scale, nature and location of the project;*
- *consider the risk of flooding arising from the project in addition to the risk of flooding to the project;*
- *take the impacts of climate change into account, across a range of climate scenarios, clearly stating the development lifetime over which the assessment has been made;*
- *be undertaken by competent people, as early as possible in the process of preparing the proposal;*

- *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 and exceedance;*

- *consider the vulnerability of those using the site, including arrangements for safe access and escape;*

- *consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and include information on flood likelihood, speed-of-onset, depth, velocity, hazard and duration;*

- *identify and secure opportunities to reduce the causes and impacts of flooding overall, making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management;*

- *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 these risks can be safely managed, ensuring people will not be exposed to hazardous flooding;*

- *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. Information should include:*

  i. *Describe the existing surface water drainage arrangements for the site*

  ii. *Set out (approximately) the existing rates and volumes of surface water run-off generated by the site. Detail the proposals for restricting discharge rates*

  iii. *Set out proposals for managing and discharging surface water from the site using sustainable drainage systems and accounting for the predicted impacts of climate change. If sustainable drainage systems have been rejected, present clear evidence of why their inclusion would be inappropriate*

  iv. *Demonstrate how the hierarchy of drainage options has been followed.*

  v. *Explain and justify why the types of SuDS and method of discharge have been selected and why they are considered appropriate.*

vi. Explain how sustainable drainage systems have been integrated with other aspects of the development such as open space or green infrastructure, so as to ensure an efficient use of the site

vii. Describe the multifunctional benefits the sustainable drainage system will provide

viii. Set out which opportunities to reduce the causes and impacts of flooding have been identified and included as part of the proposed sustainable drainage system

ix. Explain how run-off from the completed development will be prevented from causing an impact elsewhere

x. Explain how the sustainable drainage system has been designed to facilitate maintenance and, where relevant, adoption. Set out plans for ensuring an acceptable standard of operation and maintenance throughout the lifetime of the development

- *detail those measures that will be included to ensure the development will be safe and remain operational during a flooding event throughout the development's lifetime without increasing flood risk elsewhere;*
- *identify and secure opportunities to reduce the causes and impacts of flooding overall during the period of construction; and*
- *be supported by appropriate data and information, including historical information on previous events.'*

3.1.7 Paragraphs 5.8.18 -19 of NPS EN-1 encourage applicants to engage with the EA and other bodies where relevant including the Lead Local Flood Authority, Internal Drainage Boards and sewerage undertakers to identify the likelihood and possible extent and nature of flood risk, scope the FRA and identify the information that will be required. Paragraph 5.8.20 encourages applicants to address concerns and take all reasonable steps to agree ways in which proposals may be amended or additional information provided.

3.1.8 Paragraphs 5.8.21-22 of NPS EN-1 provide commentary on the Sequential Test and technology-specific circumstances where it may not be applicable.

3.1.9 Paragraph 5.8.36 of NPS EN-1 sets out the following criteria for the Secretary of State to be satisfied in their decision making:

- *'the application is supported by an appropriate FRA*
- *the Sequential Test has been applied and satisfied as part of site selection*
- *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 proposal is in line with any relevant national and local flood risk management strategy*

- *SuDS (as required in the next paragraph on National Standards) have been used unless there is clear evidence that their use would be inappropriate*

- *in flood risk areas the project is designed and constructed to remain safe and operational during its lifetime, without increasing flood risk elsewhere (subject to the exceptions set out in paragraph 5.8.42)*

- *the project includes safe access and escape routes where required, as part of an agreed emergency plan, and that any residual risk can be safely managed over the lifetime of the development*

- *land that is likely to be needed for present or future flood risk management infrastructure has been appropriately safeguarded from development to the extent that development would not prevent or hinder its construction, operation or maintenance.'*

3.1.10 Details of how this flood risk assessment satisfies the requirements of paragraph 5.8.15 of NPS EN-1 is provided in **Annex A:** NPS Compliance of this FRA.

NPS for Renewable Energy Infrastructure (EN-3)[7]

3.1.11 NPS EN-3 covers 'significant onshore renewable energy infrastructure projects', specifically addressing solar PV generation. Paragraph 2.4.11 requires applicants to consider how solar photovoltaic plant will be resilient to increased risk of flooding.

3.1.12 Paragraph 2.10.84 of NPS EN-3 refers to the need for FRAs for solar projects to consider the impact of drainage within solar developments. Paragraph 2.10.85 provides further detail, requiring permeable tracks for access, and for localised SuDS to control drainage runoff.

3.1.13 Paragraphs 2.10.86 -88 state that given the temporary nature of solar PV farms, sites should be configured or selected to avoid the need to impact on existing drainage systems and watercourses, culverting should be avoided, and where culverting is unavoidable, applicants should demonstrate that no reasonable alternatives exist and where necessary, culverting will only be in place temporarily for the construction period.

3.1.14 NPS for Electricity Networks Infrastructure (EN-5[8]) Paragraph 2.10.154 recognises the value that solar projects can bring through the delivery of drainage and flood attenuation where previous management of the site has involved intensive agricultural practice.

3.1.15 The NPS -5[9] addresses policy for electricity networks infrastructure, including associated infrastructure such as substations. Paragraph 2.3.2 states that as

climate change is likely to increase risks to the resilience of some infrastructure, including from flooding, applicants should set out to what extent the proposed development is expected to be vulnerable and how it has been designed to be resilient to:

- flooding, particularly for substations that are vital to the network; and especially in light of changes to groundwater levels resulting from climate change; and
- earth movement or subsidence caused by flooding or drought (for underground cables).

National Planning Policy Framework

3.1.16 The NPPF[2] provides policy on flood risk and climate change. Section 14 of the NPPF, entitled Meeting the challenge of climate change, flooding and coastal change (paragraphs 157-179), sets out the requirements to assess flood risk and climate change for developments. Paragraph 175 states that *'Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate.'* Where development is necessary in high risk areas, the NPPF aims to ensure that the development is safe without increasing flood risk through the application of the Exception Test.

3.1.17 The national Planning Practice Guidance ('PPG')[3] accompanies the NPPF and provides further guidance in relation to flood risk. **Table 3.1** of this FRA defines the levels of Flood Risk in England extracted from the PPG[3].

Table 3.1: Flood Zones

Flood Zone	Definition
Zone 1 - Low Probability	Land having a less than 0.1% annual probability of river or sea flooding.
Zone 2 - Medium Probability	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding.
Zone 3a - High Probability	Land having a 1% or greater annual probability of river flooding; or Land having a 0.5% or greater annual probability of sea.
Zone 3b - The Functional Floodplain	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: ▪ land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or ▪ land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the EA.

3.1.18 The PPG states that a site-specific FRA is required for all new development proposals located in Flood Zones 2 and 3, and for any proposal of 1 hectare or greater regardless of its flood zone classification. This is as stated in paragraph 5.8.13 of NPS EN-1. The flood zones as described above are shown on the EA Flood Map for Planning.

3.1.19 Table 2 of the PPG classifies development types based on their vulnerability to flooding (Annex 3: Flood risk vulnerability classification of PPG), ranging from 'Essential Infrastructure' which has to be operational in times of flood, through 'Highly Vulnerable' (e.g. emergency service stations), 'More Vulnerable' (e.g. residential dwellings and establishments), 'Less Vulnerable' (e.g. offices/retail), to 'Water Compatible' development (e.g. open space, docks, marinas, and wharves).

3.1.20 Based on Table 2 of the PPG, the built components of the Project are classified as 'Essential Infrastructure'. This is defined by Annex 3: Flood risk vulnerability classification of NPPF as: *'Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for electricity supply including generation, storage and distribution systems; including electricity generating power stations, grid and primary substations storage; and water treatment works that need to remain operational in times of flood.'*

3.1.21 Table 2 of the PPG indicates which 'vulnerability classes' are acceptable in each of the Flood Zones, and when the Exception Test should be applied. This is reproduced as **Table 3.2** of this FRA.

Table 3.2: Flood Risk Vulnerability and Flood Zone 'incompatibility'

Flood Risk Vulnerability Classification (PPG Table 2)		*Essential Infrastructure*	*Highly Vulnerable*	*More Vulnerable*	*Less Vulnerable*	*Water Compatible*
Flood Zone (PPG Table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	Exception Test Required	✓	✓	✓
	Zone 3a	Exception Test Required	×	Exception Test Required	✓	✓
	Zone 3b (functional floodplain)	Exception Test Required	×	×	×	✓

Key: ✓ Development is appropriate
× Development should not be permitted

Application of Sequential Test and Exception Test

Sequential Test

3.1.22 Paragraph 5.8.36 of the NPS EN-1 advises that the Secretary of State should be satisfied, in determining an application for development consent, that the Sequential Test has been applied and satisfied as part of the site selection.

3.1.23 NPPF Paragraph 168 advises that the aim the Sequential Test is to *'steer new development to areas with the lowest risk of flooding from any source'*.

3.1.24 It is appropriate to refer to the redefined Flood Zones / modelled flood outlines shown on **Figure 10.2.7: Hydraulic Modelling Report Flood Extent Mapping** of this FRA as these have been derived from the best currently available information on flooding.

3.1.25 **Figure 10.2.7: Hydraulic Modelling Report Flood Extent Mapping of this FRA** also shows the Flood Zones superimposed on the Project layout and shows that the majority of PV panels and the Project Substation are located in Flood Zone 1.

3.1.26 A key constraint in locating solar farms is the proximity to a suitable grid connection, which in this case has been secured at the National Grid Sellindge

Substation. Given the location of the Sellindge Substation, there are no reasonably available sites appropriate for the Project in areas with a lower risk of flooding. It is also noted that it is only part of the Project located in Flood Zones 2, 3a and 3b and that the layout of infrastructure has been developed and adapted to preferentially site sensitive infrastructure in Flood Zone 1.

3.1.27 A Sequential and Exception Test Report has been undertaken for the DCO Application and is provided as Appendix 2 of the **Planning Statement (Doc Ref. 7.6)**. The Sequential and Exception Test Report provides an assessment of the area within 5km of the Point Of Connection to the Sellindge Substation. AA 5km Buffer from the Grid Connection Point is shown on **ES Volume 3, Figure 5.1: Potentially Developable Land Locations and Cumulative Schemes (Doc Ref. 5.3)**. Appendix 2 of the **Planning Statement (Doc Ref. 7.6)** demonstrates that there are no more suitable or available alternative sites within this study area that would meet the Project requirements.

3.1.28 On this basis, it is concluded that Sequential Test has been passed for this Project.

Exception Test

3.1.29 As set out at Paragraph 169 of the NPPF[2]:

'If it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied.'

3.1.30 The exception test is then defined at Paragraph 170 of the NPPF (and also Paragraph 031 of the PPG[3]):

'-To pass the exception test it should be demonstrated that:

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

b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.'

3.1.31 Paragraph 171 of NPPF states *'Both elements of the exception test should be satisfied for development to be allocated or permitted.'*

3.1.32 With reference to Part a) of the exception test, the Project will provide a source of renewable energy to the National Grid which will be distributed via the network providing sustainability benefits to the local community and beyond.

3.1.33 It is therefore considered that the Project passes Part a) of the Exception Test.

3.1.34 With reference to Part b), **Section 9** of this FRA provides details of the measures that will be employed to ensure that the development will be safe

for its lifetime taking account of the vulnerability of its users. **Section 10** of this FRA considers the potential impact of the Project on the flood risk elsewhere and describes the measures to be included in the Project to reduce the flood risk overall.

3.1.35 It is therefore considered that the Project passes Part b) of the exception test.

National Planning Practice Guidance

3.1.36 This report has been completed in accordance with the guidance presented in the NPPF and with reference to PPG, taking due account of current best practice documents relating to the assessment of flood risk published by the British Standards Institution BS8533[4] and local planning policies.

3.2 Local Planning Policy

3.2.1 The Site is within the administrative area of the Ashford Borough Council ('ABC') Local Plan[10] which was adopted in February 2019 ('Adopted ABC Local Plan'). The Adopted ABC Local Plan aims to provide a policy and delivery framework which will guide matters relating to planning and land use in line with the Council's aims from 2011 to 2030. Relevant policy in relation to flood risk is stated below:

'Policy ENV6 – Flood Risk

Proposals for new development should contribute to an overall flood risk reduction.

Development will only be permitted where it would not be at an unacceptable risk of flooding on the site itself, and there would be no increase to flood risk elsewhere.

The sequential test and exception tests established by the National Planning Policy Framework will be strictly adhered to across the Borough, with new development preferably being located in Flood Zone 1. Where it is demonstrated development is unable to take place in an area of lower flood risk, essential transport or utility infrastructure, or other development may be allowed as per an exception test if the development is designed to be compatible with potential flood conditions, and:

Suitable flood protection and mitigation measures are incorporated into the development appropriate to the nature and scale of risk;

Comprehensive management and maintenance plans are in place for its effective operation during the lifetime of the development (taking account of climate change allowances);

Adoption arrangements are secured (where applicable) with the relevant public authority or statutory undertaker;

The development would make a significant contribution to the overall sustainable development objectives of the Local Plan, such that the wider sustainability benefits of the development outweigh the flood risk; and,

It can be demonstrated to the satisfaction of the Council and the Environment Agency that adequate resistance and resilience measures have been put in place to avoid any increase in flooding either on site or elsewhere.

A site-specific Flood Risk Assessment (FRA), endorsed by the Environment Agency, appropriate to the scale and nature of the development and the risks involved will be required in line with Planning Practice Guidance and in particular where the Strategic Flood Risk Assessment or Surface Water Management Plan, indicates there are records of historic flooding or other sources of flooding.

In all cases, development that would harm the effectiveness of existing flood defences or prejudice their maintenance or management will not be permitted.'

3.2.2 The following sections of this FRA demonstrate how the Project meets the requirements of Policy ENV6. Other local guidance and policy exists relating to the management of storm water. This local guidance and planning policy is considered in the **Outline Operational Surface Water Drainage Strategy ('Outline OSWDS') (Doc Ref. 7.14)**.

4 Methodology

4.1 Baseline

4.1.1 **Section 5** of this FRA sets out the baseline context of the Site as relevant to flood risk, describing key aspects of the topography, geology and hydrology as necessary to understand flood risk on and around the Site.

4.1.2 The following tasks were undertaken to ensure that the baseline data provides sufficient information to assess the risk of flooding arising from the Project in addition to the risk of flooding to the Project, taking into account the impacts of climate change;

- Review of Ordnance Survey ('OS')[11] maps to identify surface water features and springs within and adjacent to the Site;
- Review of EA and publicly available LiDAR Survey Data[12] published by Defra to assess the Site's topographic setting;
- Collation of information on climate (including long term average monthly rainfall figures) (Environment Agency)[13], surface hydrology (National River Flow Archive)[14] and EA flood risk mapping[6]; and
- Identification of hydrogeological conditions and groundwater resources (including groundwater vulnerability and productivity) (British Geological Survey[15], Magic Map[16]) together with secondary information relating to:
- bedrock and superficial geology mapping; and
- soil mapping.

4.1.3 A site walkover was undertaken on 24 and 25 July 2023 along the East River Stour corridor. This walkover included visual inspection of the Site to validate the understanding of the hydrological conditions at the Site obtained from a desk-based study, and to establish an understanding of the AFSA and flood defence infrastructure located adjacent to the north-eastern part of the Site. A record of this survey is provided in **Annex A** of **ES Volume 4, Appendix 10.3: Water Framework Directive Assessment (Doc Ref. 5.4)**.

4.1.4 Further site visits to survey the location of existing and proposed watercourse crossings were undertaken on 11 and 23 January 2024, and 7 February 2024. Photographs and findings from those visits are provided in **ES Volume 4, Appendix 10.5: Schedule of Watercourse Crossings (Doc Ref. 5.4).**

4.2 Assessment

4.2.1 **Section 8** of this FRA presents a screening assessment of flood risks which are relevant to the Project. This seeks to determine which types of flood risk sources are important at the Site and warrant further detailed assessment.

4.2.2 **Section 9** of this FRA provides a more detailed review of the flood sources that were screened into the assessment. The approach for managing and mitigating these risk in the context of the project is discussed in **Section 10** of this FRA with the corresponding approach for managing and mitigating flood impacts arising from the Project addressed in **Section 11** of this FRA.

4.2.3 The FRA is informed by a Hydraulic Modelling Report ('HMR') which is presented as **Annex B: East Stour Hydraulic Modelling Report (Doc Ref. 5.4)** of this FRA. **Annex B** sets out the approach to the construction of the hydraulic model that has been used to quantify flood risk.

4.2.4 Residual risk of flooding arising from the Project in addition to the risk of flooding to the Project, taking into account the impacts of climate change are considered in **Section 12** of this FRA.

5 Baseline Site Appraisal

5.1 Site Location and Extent

5.1.1 As shown in **Figure 10.2.1: Site Location Plan,** the Site is located approximately 6.5km to the south east of Ashford Town Centre and approximately 13.7km to the west of Folkestone Town Centre, in the county of Kent. The Site is situated on land located to the north and west of the village of Aldington, centred at Ordnance Survey ('OS') National Grid Reference ('NGR') TR 05898 37766.

5.1.2 The land encompassed by the Order limits shown by **ES Volume 3, Figure 1.2: Site Location (Doc Ref. 5.3)** extends to approximately 192 hectares ('ha').

5.1.3 The Site is bound to the north by the High Speed 1 ('HS1') / Network Rail railways and to the east, west and south by arable fields.

5.1.4 The Site is described using numbered field parcels and the following terms, as shown on **ES Volume 3, Figure 2.1: Field Boundaries and Site Area Plan (Doc Ref. 5.3)**:

- South Western Area (Fields 1 to 9);
- Central Area (Fields 10 to 19 and 23 to 25);
- South Eastern Area (Fields 20 to 22);
- Northern Area (Fields 26 to 29);
- Project Substation (location of the Project Substation, in the north western section of Field 26);
- 'Cable Route Corridor' (export of electricity from the Project at 132 kilovolt ('kV') via underground cables (the 'Grid Connection Cable') to the Sellindge Substation) and 'Cable Route Crossing' (use of an existing cable duct under the High Speed 1 / Channel Tunnel Rail Link ('HS1') railway or through Horizontal Directional Drilling ('HDD') beneath HS1 for the Grid Connection Cable); and
- Sellindge Substation (location of the existing Sellindge Substation).

5.1.5 The East Stour River and the Aldington Flood Storage Area ('AFSA') are located partly within the Site. These features are discussed further in **Section 5.4** of this FRA.

5.2 Topography

5.2.1 A topographic survey was completed at the Site by Sensat on the 28 January 2022 and is provided as **Annex C: Topographic Survey** of this FRA. Site walkovers undertaken in 2023 and 2024 confirm that no earthworks or significant changes in landform have occurred since the survey was undertaken.

5.2.2 This topographic survey data has been supplemented by aerial photo grammatic ('LiDAR') data downloaded from the data.gov.uk website[17].The elevation data presented is from a Digital Terrain Model ('DTM') which is a bare earth model and thus excludes features such as built development and vegetation. Ground levels in the vicinity of the Site derived from the DTM are shown on **Annex C: Topographic Survey** and **Figure 10.2.3: Site Topography** of this FRA.

5.2.3 Ground levels are dominated by the local hydrology, particularly the East Stour River which flows in a westerly direction through the Site. The highest ground levels are in the south and west of the Site along the line of a topographic ridge.

5.2.4 Topographically, the Site is lowest at approximately 44m above Ordnance Datum ('AOD') within Field 19 in the north east and is highest on Goldwell Lane Site entrance at 76m AOD.

5.2.5 The water level in the East Stour River adjacent to Field 9 was recorded during the topographic survey (**Annex C: Topographic Survey** of this FRA) as 43.4mAOD.

5.3 Land Use

5.3.1 The Site is located in a largely rural area immediately to the north of the village of Aldington and south of the M20. The majority of the existing land within the Site is used for agriculture and arable farming.

5.3.2 Arial imagery of the site is provided in **Figure 10.2.2: Satellite Imagery**. This shows that the majority of the Site comprises natural landscape, avoiding existing developments and buildings. The only parts of the Site which comprise impermeable areas include sections of public highway, access tracks and part of Sellindge Substation.

5.4 Hydrology

5.4.1 Watercourses are designated as main rivers or ordinary watercourses. Main rivers are identified on the statutory main river map and are maintained by the Environment Agency ('EA'). Ordinary watercourses are regulated by the LLFA or River Stour (Kent) Internal Drainage Board ('IDB') depending on their

location. There is one main river and a number of ordinary watercourses within the Site and study area for the FRA. These are shown in **Figure 10.2.4: Local Hydrology** of this FRA.

5.4.2 Key watercourses of relevance to the FRA are described below, but in addition to these, there are a number of minor drains and channels along field boundaries. The majority of these minor channels fall within areas overseen by the River Stour IDB but are considered as 'riparian drains'. This means that they are not actively managed and the responsibility for maintaining their function rests with the riparian land owners.

East Stour River

5.4.3 The East Stour River is an EA Main River[18] which flows from east to west through the Site to join the Great Stour approximately 5.7km north west of the Site in Ashford. Upstream of the Site, the East Stour River drains a catchment area[19] of approximately 33.68km^2.

5.4.4 The East Stour River drains predominantly arable land (53%)[20] and grassland (34%) with only a small urban extent (<5%). The channel is formed by springs from high permeability Chalk bedrock and flows downstream across varying outcrops of permeable Chalk, followed by an outcrop of less permeable Mudstone confining the permeable Chalk outcrops to the north and permeable Sandstone outcrops to the south. Downstream of the Sandstone outcrop, the channel flows across an outcrop of less permeable Mudstone to the immediate north of the Site. The East Stour River on its approach to the Site, is joined by a number of unnamed tributaries.

Unnamed Tributary 1 (Pleasuance Dyke)

5.4.5 Unnamed Tributary 1 rises in Brabourne, 3.7km north of the Site. The channel flows in a south westerly direction towards the Site to discharge into the East Stour River via a culvert beneath the HS1 / Network Rail railway, to the west of Sellindge Substation. Upstream of the confluence, the channel drains a catchment area[19] of approximately 8.18km^2 of predominantly arable land and grassland with some rural settlements including Brabourne and Brabourne Lees.

5.4.6 This watercourse is actively managed and maintained by the IDB and their reference for the channel is IDB_NO 015.

Unnamed Tributary 2 (Horton Priory Dyke)

5.4.7 Unnamed Tributary 2 flows in a south westerly direction towards the Site and discharges into the East Stour River via a culvert beneath HS1 / Network Rail mainline railway immediately south east of Sellindge Substation. Upstream of the confluence, Unnamed Tributary 2 drains a catchment area[19] of approximately 13.1km^2 of predominantly grassland and arable land with some smallholdings present throughout.

5.4.8 This watercourse is actively managed and maintained by the IDB and their reference for the channel is IDB_NO 017.

Unnamed Tributary 3 (Aldington Dyke)

5.4.9 Unnamed Tributary 3 rises from a small woodland area (Burch's Rough) approximately 2km south east of the Site and flows in a north westerly direction through the AFSA towards the East Stour River, joining at a confluence approximately 200m downstream of the Evegate Mill impoundment. The Evegate Mill House impoundment is a small body of water sourced via an offtake from the East Stour River. This was likely used historically to support the local agricultural smallholding (Evegate Mill House).

5.4.10 Unnamed Tributary 3 drains a total catchment area[19] of approximately 4.94km^2 which is predominantly undeveloped arable land, woodland areas and some small farm holdings.

5.4.11 This watercourse is actively managed and maintained by the IDB and their reference for the channel is IDB_NO 014.

AFSA

5.4.12 The AFSA is formed by an embankment raised to a crest level of 51.3mAOD with the overflow spillway crest level of 50.2mAOD. The AFSA embankment is designed to impound the East Stour River in times of flood to reduce the risk of flooding downstream to Ashford. The embankment is shown on **Figure 10.2.4: Local Hydrology** of this FRA and runs broadly north south along the eastern side of Fields 23, 24 and 25.

5.4.13 Upstream of the embankment (i.e. to the east), the AFSA provides approximately 1,280,000 m^3 of storage below the spillway crest level of 50.2mAOD covering an area of approximately 0.74 km^2. The AFSA was originally designed to reduce the flood flows in the East Stour River from a peak of 19m^{3}s^{-1} for what was considered the 1% Annual Exceedance Probability ('AEP')[i] event at the time, to just in excess of 4 m^{3}s^{-1} by means of a vortex flow control device (Hydrobrake), installed on Unnamed Tributary 3 to the south of the East Stour as it passes beneath the embankment.

5.4.14 The East Stour flows through the AFSA embankment via a fish pass with a 300mm diameter orifice restricting flows to the maximum design discharge rate of 0.34 m^{3}s^{-1}. Immediately upstream of the embankment flows from the East Stour are diverted into Unnamed Tributary 3 via a side weir when flows along the East Stour River exceed 0.12m^{3}s^{-1}.

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i Annual Exceedance Probability. The probability that an event of a given magnitude will occur in any one year. Often referred to as the return period expressed in years.

5.5 Geology and Hydrogeology

Geology

5.5.1 The National Soils Resources Institute, Soilscapes website[21], indicates that soils across the Site comprise of '*Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils'; 'Loamy and clayey floodplain soils with naturally high groundwater*' and '*Freely draining slightly acid but base-rich soils'.*

5.5.2 British Geology Survey ('BGS') mapping[22] indicates that the area is predominantly underlain by the Weald Clay Formation (Mudstone). Outcrops of the Hythe Formation (Sandstone and Limestone) are present in the west, east and south of the Site bound by the Atherfield Clay Formation. Superficial deposits of Alluvium are identified along the course of the East Stour River underlying the loamy and clayey floodplain soils.

5.5.3 The bedrock and superficial geology are shown on **Figure 10.2.5: Bedrock Geology** and **Figure 10.2.6: Superficial Geology** of this FRA.

Hydrogeology

5.5.4 The Hythe Formation is classified as a 'Principal' [23] aquifer system, these are defined by the EA as *'layers of rock or drift deposits that have high intergranular and/or fracture permeability, which usually provide a high level of water storage and therefore may support water supply and/or river base flow on a strategic scale'.*

5.5.5 The remaining bedrock types local to the Site are classified as 'unproductive aquifers' which are rocks which have negligible significance for water supply.

5.5.6 The superficial Alluvium deposits are designated as a 'Secondary A' aquifer, defined by the EA as '*permeable layers capable of supporting water supplies at a local rather than regional scale, and in some cases form an important source of baseflow to rivers'.*

5.5.7 The Site is not located in a Source Protection Zone associated with groundwater abstractions and none are present within 250m of the Site.

6 The Project

6.1 Description of the Project

6.1.1 The Project comprises the construction, operation and decommissioning of solar PV arrays and energy storage, together with associated infrastructure and an underground cable connection to the existing National Grid Sellindge Substation.

6.1.2 The Project will include a generating station (incorporating solar arrays) with a total capacity exceeding 50 MW. The agreed grid connection for the Project will allow the export and import of up to 99.9 MW of electricity to the grid. The Project will connect to the existing National Grid Sellindge Substation via a new 132 kV substation constructed as part of the Project and cable connection under the Network Rail and HS1 railway.

6.1.3 The Site boundary includes all land required for the construction, operation and maintenance, and decommissioning of the Project.

6.1.4 It is anticipated that the Project will be operational for a 40-year period, and this has been assessed in the EIA and reported in the ES. Construction of the Project is expected to commence in 2026 and be completed over a period of 12 months. Once the Project ceases to operate it would be decommissioned over a period of 12 months with the removal of all physical infrastructure constructed as part of the Project (with the exception of elements of Work No. 4 that are within the Sellindge Substation, any repairs, upgrades or replacements of/to the existing bridge / drain crossings, PRoW footbridges and highway improvements)).

6.1.5 The Project is divided into works packages that are defined by Schedule 1 of the **Draft Development Consent Order (Doc Ref. 3.1)** which defines the precise and complete wording. A summary of the work packages is set out below.

- Work No. 1: ground mounted solar photovoltaic generating station;
- Work No. 2: balance of system and battery energy storage system ('BESS');
- Work No. 3: project substation and associated works;
- Work No. 4: works to lay high voltage electrical cables and extend Sellindge Substation to facilitate grid connection;
- Work No. 5: associated works;
- Work No. 6: site access;

- Work No. 7: construction and decommissioning works;
- Work No. 8: works to create, enhance and maintain green infrastructure, boundary treatments and crossing structures; and
- Site Wide Works: further associated development in connection with the Project.

6.1.6 The extent of the proposed works is shown on the **Works Plans (Doc Ref. 2.3)**. A description of the design principles which will apply to the detailed design is provided in the **Design Principles (Doc Ref. 7.5)**. Reference should be made to **ES Volume 2, Chapter 3: Project Description (Doc Ref. 5.2)** for a full description of the Project, including construction, operation and decommissioning.

6.1.7 A summary of the key components of the Project is provided below.

- **Solar PV modules and mounting structures** - The PV panels will have a maximum height of 3.5m Above Ground Level ('AGL') and will be mounted with a minimum clearance of 0.8m AGL. The PV panels will be installed using a fixed tilt arrangement. The angle of elevation will be between 20-25 degrees and will be south facing. The maximum depth of piled foundations for mounting structures will be 3m Below Ground Level ('BGL'). A non-invasive mounting solution that uses pre-cast reinforced concrete blocks or similar to provide ballast to support the PV panels would be used where piled foundations are not appropriate. The distance between each row of PV panels will be between 2m and 5m. A distance of at least 3.2m will be provided between the edge of PV panels and the security fencing to allow for maintenance. There will therefore be a distance of at least 6.4m between PV panels and hedgerows and ditches.
- **Balance of System and BESS:** Inverter Stations are located across the Site and will contain electrical infrastructure including inverters, transformers and switchgear which, together, allow the electricity generated by the PV panels to be inverted and then exported to an Intermediate Substation. Up to 32 Inverter Stations will be required across the Site. Inverter Stations will be surrounded by acoustic barriers. The Project includes an energy storage system and BESS Units will be co-located with the Inverter Stations within bunded enclosures lined with a protective membrane. BESS Units will be distributed across the Site with up to four units at an Inverter Station. No BESS Units DC-DC Converters will be included within Field 9 or Fields 20 to 22. Foundations will have a depth of no greater than 2m BGL. Intermediate Substations are proposed in Fields 3, 15, 20 and 26.
- **Project Substation:** The Project Substation would be sited on a development platform which will be no greater than 56 mAOD and no lower than 55mAOD. The development platform will contain retaining structures. The total impermeable area within the Project Substation will not exceed 0.8ha. The Project Substation will be enclosed by palisade

fencing and acoustic barriers will be provided along the northern and eastern boundaries.

- **Grid Connection Cable:** The Project grid connection will be via a 132kV cable which will be installed underground approximately 2km underground from the Project Substation to Sellindge Substation. The Grid Connection Cable will be sited within the Cable Route Corridor as shown on the **Works Plans (Doc Ref. 2.3)**. The Grid Connection Cable will connect the Project Substation to an area adjacent to the eastern part of Sellindge Substation. The Cable Route Crossing to Sellindge Substation will be achieved either through existing cable ducts beneath HS1 / mainline railway and the East Stour River or new cable ducts will be installed using HDD methods. HDD will be used to install the Grid Connection Cable beneath the East Stour River at a minimum depth of 2m from the bed of the channel. Temporary vehicle bridge crossings will also be required.

- **Sellindge Substation Extension:** Limited extension works will be required at Sellindge Substation to allow the Project to connect. UKPN are expected to be responsible for these works. The Sellindge Substation Extension will use a maximum land area of no more than 0.05ha, with a maximum height of any building or infrastructure being no greater than the existing Sellindge Substation infrastructure. The Sellindge Substation Extension will be constructed at the same level as the existing Sellindge Substation. In line with the **Outline OSWDS (Doc Ref. 7.14)** drainage works will be tied into existing drainage systems within the Sellindge Substation.

- **Security Fencing/Boundary Treatments:** The PV panels will be set within security fencing comprising deer-proof fencing (wooden posts, metal fencing) with a maximum height of 2.5m AGL. The distance between the security fencing and hedgerows outside of the security fence would be at least 3.2m. Security fence gates will be provided for maintenance, habitat management, passage of mammals, security purposes and fire response access. Security fencing within Fields 19, 23 and 24 will have a minimum clearance space of 0.2m between the bottom of the security fence and the ground, and with minimum mesh spacing of 0.1m to prevent build-up of debris in a flood event.

- **Electrical Cabling:** Cabling will be installed below ground between PV Modules and the Inverter Stations and Intermediate Substations.

- **Water Tanks**: Water tanks for the storage of fire suppression water are proposed with a maximum diameter of 12m and a maximum height of 3.5m AGL. The **Illustrative Project Drawings - Not for Approval: Illustrative Project Layout (Doc Ref. 2.6)** shows five water tanks across the Site.

- **Internal Haulage Road:** An internal off-road haulage road is proposed between the Primary Construction Compounds and the remainder of the Site (excluding the South Eastern Area) to minimise the use of the local

road network during construction and decommissioning. The internal haulage road will be located within 8m of the toe of the AFSA for a short section (approximately 40m) between Fields 24 and 25. No excavation is proposed and the internal haulage road will comprise a permeable surface, such as ground protection mats.

- **Green Infrastructure and Boundary Treatments:** This includes landscape and biodiversity enhancements, local depressions / scrapes to increase flood storage and enhance ecology and mitigation planting.
- **Watercourse Crossings:** Temporary vehicle bridge crossings of watercourses will be required to facilitate construction and decommissioning. New PRoW footbridges will be installed to accommodate diverted PRoW. All bridges will be free span crossings with abutments set at least 1m back from the channel bank and soffit levels set 0.6m higher than the channel bank level. Approaches to the crossing will be at grade.
- **Primary Site Access:** The Primary Site Access to the Project from the public highway will be located via access off Station Road and is shown as Work No. 6 on the **Works Plans (Doc Ref 2.3)**. This access is already surfaced with tarmac to an existing gate.
- **Internal Access Tracks:** A series of internal access tracks are included to provide two-way access to the BESS Units for emergency response purposes. As stated in the **Design Principles (Doc Ref. 7.5)** the tracks will be at grade where they approach watercourses and will comprise 90% permeable grass-paving and will be at least 3.7m wide.
- **Site Wide Works:** Further associated development may be carried out comprising such other works as may be necessary or expedient for the purposes of or in connection with the authorised development and which are within the Site and fall within the scope of work assessed by the ES.

7 Supporting Information - Climate Change

7.1 Introduction

7.1.1 This section provides supporting information relevant to the impacts of climate change in the future which has been applied in the FRA. Paragraph 5.8.15 of NPS EN-1 requires that an FRA must *'take the impacts of climate change into account, across a range of climate scenarios, clearly stating the development lifetime over which the assessment has been made'.*

7.1.2 In May 2022, the EA published guidance referred to as *Flood risk assessments: climate change allowances*[24] which sets out when and how local planning authorities, developers and their agents should use climate change allowances in flood risk assessments.

7.1.3 This EA climate change allowances guidance sets out that peak rainfall intensity, sea level, peak river flow; offshore wind speed and extreme wave heights are all expected to increase in the future as a result of climate change. Consideration of changes to these parameters should use the allowances outlined below based on the anticipated lifetime of the development.

7.1.4 The Site is remote from the coast and therefore changes relating to sea level, wave heights and wind speed are not applicable. The Site is located across Flood Zones 1, 2 and 3 associated with the East Stour River but is also considered to have areas at high risk of surface water flooding.

7.1.5 Changes to peak rainfall intensity and peak river flows are therefore only appropriate in this assessment and these are set out below together with the operational lifetime of the Project, based on the latest EA climate change allowances for FRA[20] published in May 2022 (subsequently referred to in this FRA as the 'EA CCA Guidance').

7.2 Operational Lifetime of the Project

7.2.1 The Project is anticipated to have an operational lifetime of 40 years.

7.3 Peak River Flow Allowances

7.3.1 The Site is located within the Stour Management Catchment and an extract of the information provided by the EA CCA Guidance[24] for this catchment is reproduced as **Table 7.1** of this FRA.

7.3.2 EA Guidance[24] states that for essential infrastructure in relation to fluvial flows FRAs should assess the '*Upper End*' climate change. A climate change uplift of 55% is required to assess changes to peak fluvial flow over the lifetime of

development. This allowance has therefore been applied in the hydraulic modelling included in **Annex B: East Stour Hydraulic Modelling Report** of this FRA and in the assessment of future fluvial flood risk.

Table 7.1: Peak river flow climate change allowances for the Stour Management Catchment

Epoch	Central Allowance	Higher Central Allowance	Upper End Allowance
2020s (2015 – 2039)	18%	25%	40%
2050s (2040 – 2069)	20%	30%	55%
2080s (2070 – 2125)	38%	55%	101%

Source: EA CCA Guidance [24]

7.4 Peak Rainfall Intensity

7.4.1 An extract of the climate changes allowances for rainfall for the Stour Management Catchment is provided in **Table 7.2** of this FRA.

7.4.2 EA Guidance[24] states that FRAs should assess both the '*Central*' and '*Upper End*' climate change allowances to consider the range of potential impacts. As shown in **Table 7.2** of this FRA, for rainfall these equate to uplifts of 20% and 45% respectively for a 1% AEP rainfall event for the 2050s and 2070s. An allowance of 45% has therefore been allowed in the surface water drainage modelling and in the assessment of future surface water flood risk at the Site.

Table 7.2: Stour Management Catchment Peak Rainfall Allowances

Management Catchment	Allowance Category	AEP (%)	Total potential change anticipated for 2050s	Total potential change anticipated for 2070s
Stour	Upper End	3.3	40%	40%
	Central		20%	20%
	Upper End	1	45%	45%
	Central		20%	20%

Source: EA CCA Guidance[24]

8 Assessment of Potential Sources of Flooding

8.1 Introduction

8.1.1 This section sets out the potential sources of flood risk which include:

- Flooding from rivers or fluvial flooding;
- Flooding from sea or tidal flooding;
- Flooding from surface water or pluvial flooding;
- Flooding from groundwater;
- Flooding from sewers;
- Flooding from reservoirs, canals, and other artificial sources; and
- Flooding from infrastructure failure.

8.1.2 The flood risk to the Project from each of these potential sources is discussed in **Sections 7.2** to **7.8** of this FRA. The spatial extent of the flood risk sources screening study is limited to the Order limits (i.e. the Site) unless there is a clear identifiable flood flow route (i.e., from upgradient land) to the Site.

8.2 River or Fluvial Flooding

8.2.1 With reference to the EA *Flood Map for Planning*[5], the Site is shown to lie in Flood Zones 1, 2 and 3 associated with the floodplain of the East Stour River. The Flood Zones are defined by *Table 1: Flood Zones* of the PPG Flood risk and coastal change chapter, provided as **Table 3.1** of this FRA.

8.2.2 With reference to the *Reduction in Risk of Flooding from Rivers and Seas due to Defences*[25] mapping, the Site is shown to lie partially within an area that benefits from existing flood defences, in this case, the AFSA. Further details of the AFSA are provided in **Paragraphs 5.4.12** to **5.4.14** of this FRA.

8.2.3 An extract of *Flood Map for Planning*[5] and *Reduction in Risk of Flooding from Rivers and Seas due to Defences*[25] is shown on **Figure 10.2.8: Flood Map For Planning** and **Figure 10.2.9: Long Term Flood Risk – Risk of Flooding From Rivers or Sea** of this FRA.

8.2.4 The risk from river or fluvial flooding is considered High and is assessed in further detail in **Section 9.6** of this FRA.

8.3 Sea or Tidal Flooding

8.3.1 As discussed at **Section 5.2** of this FRA the lowest part of the Site is at an elevation of circa 44mAOD. Therefore, there is no significant risk of sea or tidal flooding and this risk has not been considered further.

8.4 Surface Water or Pluvial Flooding

8.4.1 With reference to the *Long Term Flood Risk*[6] mapping, the risk of surface water flooding to the majority of the Site is shown to be '*Very Low*' defined as '*a less than 0.1% AEP (1 in 1,000 chance) of flooding in any given year*'.

8.4.2 However, parts of the Site are shown to lie in areas considered to be at '*Low´, 'Medium'* and *'High'* risk of surface water flooding. The surface water flood risks are defined in **Table 8.1** of this FRA.

Table 8.1: Surface Water Flood Risk

Risk	Definitions
'Very Low'	less than 0.1% AEP (1 in 1,000 chance) of flooding in any given year
'Low'	between 1% AEP (1 in 100 chance) and 0.1% AEP (1 in 1,000 chance) of flooding in any given year
'Medium'	between 3.3% AEP (1 in 30 chance) and 1% AEP (1 in 100 chance) of flooding in any given year
'High'	a greater than 3.3% AEP (1 in 30 chance) of flooding in any given year

8.4.3 The flood risk from surface water flooding[6] is shown on **Figure 10.2.10: Long Term Flood Risk Surface Water** (based on the *Long Term Flood Risk*[6] mapping) and which identifies elevated surface water flood risk along the East Stour River corridor and along surface water flow pathways and tributary channels of the East Stour River.

8.4.4 The risks from surface water or pluvial flooding is assessed as High and is considered in further detail in **Section 9.5** of this FRA.

8.5 Flooding from Groundwater

8.5.1 As discussed in **Section 5.5** of this FRA, the Site is predominantly underlain by the Weald Clay Formation with outcrops of the Atherfield Clay Formation and Hythe Formation.

8.5.2 The Hythe Formation is classified as a '*Principal*' aquifer, indicating it has high intergranular permeability and therefore could provide a potential source of groundwater flooding. The Hythe Formation outcrops lie in local topographic high spots and any groundwater flows will be intercepted by local ditches along field boundary and conveyed down to lower parts of the Site. Further expression of groundwater from the Hythe Formation at the surface on the Site is considered highly unlikely. This formation therefore provides a low risk as a source of groundwater flooding.

8.5.3 The Weald Clay and Atherfield Clay Formations are considered aquicludes and therefore provide a low risk of providing a source of groundwater flooding.

8.5.4 The bedrock deposits are overlain by Alluvium deposits in the vicinity of the East Stour River. These alluvial deposits are considered a *'Secondary A'* aquifer. Following prolonged rainfall, groundwater in the Alluvium which is perched above clay bedrock may rise; providing a potential source of groundwater flooding. During extreme wet condition groundwater within the Alluvium could emerge from the surface if fluvial flooding was occurring along the East Stour River and restricting onward flow. On this basis, groundwater flooding was screened into the initial FRA included within the PEIR.

8.5.5 Following further review, it is considered it would not be possible to differentiate groundwater and fluvial, and instead areas of flooding would be attributed to fluvial flooding (i.e., the predominant source). The additional land impacted by flooding resulting from groundwater flow would be negligible.

8.5.6 The risk of groundwater flooding within the Site is therefore considered to be Low and is not considered further.

8.6 Flooding from Sewers

8.6.1 The Applicant has undertaken a comprehensive services search to inform its own understanding of the Site.

8.6.2 The utilities search indicates a rising main oriented northwest to southeast through Field 19 from a pumping station at the junction of Goldwell Lane and Callywell Lane. Burst of the rising main could result in flows surcharging onto Site, which would flow in line with the local topographic gradient to the north and into the East Stour River.

8.6.3 The utilities search also identifies a distribution main which is routed north through Fields 23, 24 and 25. This main will be diverted to run within a corridor adjacent to the road. In the event of a burst, flows would discharge overland in accordance with the local topography and into the East Stour River. On this basis the risk of flooding from sewers was screened in to the assessment undertaken within the PEIR.

8.6.4 Following further review, it is noted that due to the nature of the proposed infrastructure (i.e. PV panels raised 0.8m off the ground), shallow overland

flows through the Site will not impact the Project. Flooding from sewers is assessed as Very Low and therefore not considered further.

8.7 Flooding from Reservoirs, Canals and other Artificial Sources

8.7.1 With reference to the *Long Term Flood Risk*[6] mapping, the Site is at risk of flooding from the failure of the AFSA operated by the EA. On this basis the risk of flooding associated with infrastructure failure was screened in to the assessment undertaken for the PEIR.

8.7.2 There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers under the Reservoirs Act 1975. Reservoirs are inspected regularly and essential safety work is carried out which means that the probability of failure is near zero.

8.7.3 Reservoir flood maps are typically used for strategic emergency planning purposes and provide a 'worst case' scenario and they are therefore not generally suitable to inform a site-specific FRA.

8.7.4 As the AFSA falls within the scope of the Reservoirs Act 1975 and is maintained and operated by the EA, it is considered that the probability of a failure is negligible and therefore the risk associated with a breach is very low. Flooding as a result of overtopping of the AFSA embankment is however part of the risk of fluvial flooding which is assessed in **Section 9.6**.

8.7.5 There are no canals or other artificial sources of flood risk within the vicinity of the Site.

8.7.6 The flooding from reservoirs, canals and other artificial sources is therefore not considered further in the main body of the assessment. However, as the severity of flooding resulting from a breach of the AFSA embankment would be very high, this is acknowledged in **Section 12** as one of the residual flood risks associated with the Project.

8.8 Flooding from Infrastructure Failure

8.8.1 The Site is not afforded protection from flood defences and therefore the risk of failure from a breach is very low. Whilst the ASFA technically provides flood management, this is considered a reservoir, and the risk is discussed in **Section 8.7** of this FRA.

8.8.2 Sellindge Wastewater Treatment Works ('WTW') is located to the east of the Project, adjacent to the existing Sellindge Substation. Failure at the wastewater treatment works would result in flows discharging south, bypassing the Site and discharging into Unnamed Tributary 2 and subsequently the East Stour River.

8.8.3 The risk of flooding from infrastructure failure is assessed as Very Low and is therefore not considered further.

8.9 Summary of Sources of Flooding

8.9.1 A summary of the potential sources of flooding and the flood risk arising from them is provided in **Table 8.2** of this FRA. The flood risk screening concludes that the Site is considered to be at risk of flooding from fluvial (rivers) and surface water (pluvial) sources.

Table 8.2: Potential Sources of Flooding

Potential Source of Flooding	Flood Risk at the Site	Further Assessment Required
Fluvial (Rivers)	High	Yes
Tidal (Sea)	Very Low	No
Surface Water or Pluvial	High	Yes
Groundwater	Low	No
Sewers	Very Low	No
Reservoirs, Canals and other Artificial Sources	Very Low	No
Infrastructure Failure	Very Low	No

9 Detailed Flood Risk Review

9.1 Potential Sources of Flood Risk

9.1.1 The flood risk screening assessment reported in **Section 8** and summarised in **Table 8.2** of this FRA indicates that the Site is potentially at risk of fluvial (rivers) and surface water (pluvial) flooding. These flood risks are therefore considered in further detail below.

9.2 Data Sources

9.2.1 In considering the flood risk to the Site, the following external data sources have been considered:

- The *Flood Map for Planning*[5] (EA) (reproduced as **Figure 10.2.8: Flood Map for Planning** of this FRA);
- *Long Term Flood Risk*[6] mapping for the *Risk of Flooding from Rivers or Sea* (EA) (reproduced as **Figure 10.2.9: Long Term Flood Risk Rivers and Sea** of this FRA);
- The *Long Term Flood Risk for the Risk of Flooding from Surface Water*[6] (EA) (reproduced as **Figure 10.2.10: Long Term Flood Risk Surface Water** of this FRA);
- The *Historic Flood Map*[26] (EA) (Reproduced as **Figure 10.2.11: Historic Flood Map** of this FRA);
- Autumn 2000 Great Stour Flood Rarity (JBA 2014)[27];
- 2013-2014 Post Flood Analysis: Kent and South London Area (JBA 2014)[28];
- Aerial Imagery of East Stour Flood Events (provided by EA dated 07/11/2000 and 09/02/2014);
- Ashford Borough Council Strategic Flood Risk Assessment ('SFRA') (JBA 2014)[29];
- Kent County Council Preliminary Flood Risk Assessment (2011)[30];
- South Ashford 2D Modelling Study (2010) (JBA 2012)[31]; and
- Upper Stour hydrological assessment by continuous simulation Draft v3 (JBA 2023)[32].

9.2.2 A detailed hydraulic model of the East Stour River developed by SLR Consulting was developed to inform this FRA. Further details of the modelling

approach and outcome is provided in **Annex B: East Stour Hydraulic Modelling Report** of this FRA.

9.2.3 Information of relevance to the detailed assessment of flood risk from the SFRA is discussed in **Section 9.3** and historical flooding information sources are discussed in **Section 9.4** of this FRA.

9.3 Ashford Borough Council SFRA

9.3.1 ABC's SFRA[25] was published in 2014 and was commissioned to provide sufficient information to enable ABC to apply the Sequential Test to potential areas of development and to assist in identifying where the application of the Exception Test may be necessary.

Fluvial Flood Risk

9.3.2 Most of the Northern Area (Fields 26 to 29) and Fields 19, 23 to 25 of the Central Area of the Site are classified by the EA as being in Flood Zone 2 (identified as land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding, which is defined as 'medium' probability) and Flood Zone 3 (identified as land having a 1 in 100 or greater annual probability of river flooding, which is defined as 'high' probability). Parts of the Cable Route Corridor and Sellindge Substation are also located within Flood Zones 2 and 3.

9.3.3 At the Site, the areas considered to be in Flood Zones 2 or 3 are fluvial flood risks and not tidal.

9.3.4 As part of the SFRA[25], Flood Zone 3b (the functional floodplain) has been identified as being the flood extents for the 5% and 4% AEP (1 in 20 and 1 in 25 year) event where these have been modelled and mapped. The SFRA also notes that where Flood Zone 3b extents are not available, a precautionary approach should be followed, and Flood Zone 3 should be considered as equivalent to the functional floodplain.

9.3.5 ABC Flood Mapping from SFRA, presented on **ES Volume 3, Figure 10.8: Delineation between Flood Zone 3a and 3b (Doc Ref. 5.3)**, shows the extent of Flood Zone 3a and Flood Zone 3b at the Site. This indicates that the large majority of the Flood Zone 3 area within the Order limits are considered as Flood Zone 3b.

Surface Water Flooding

9.3.6 The SFRA states that areas of surface water flooding are typically attributed to urban carriageways or locations where drainage becomes blocked or surcharges preventing free discharge from the sewer into watercourses.

9.3.7 This flood mechanism is however not applicable to the Site which is predominantly rural in nature and is not drained by a local sewer network.

9.4 Historic Flooding

9.4.1 Fluvial flooding has historically been a significant problem in the both the rural and urban areas of ABC, with major flood events recorded in 1947, 1967, 1968, 1972, 1973, 1979, 1985, 1988, 1998, 2000, 2001, 2013 and 2014. These events have primarily been focused along the headwater tributaries of the River Stour including the East Stour River.

Historic Flood Map and Recorded Flood Outlines

9.4.2 The *Historic Flood Map* and *Recorded Flood Outlines* mapping provided by the EA indicate that the Site has historically flooded in 1974, 2000 and 2001. The recorded flood outline for the 1974 event indicates the northern half of Field 19 was inundated. The recorded flood outlines for the 2000 and 2001 events indicate that the northern boundaries of Fields 16 and 18 were inundated, with significant flooding across Fields 19, 23, 24, 26, 27 and 29. It is noted that the flood event in 1974 occurred prior to the construction of the AFSA in 1989.

9.4.3 Mapping of the Historic Flood Events is shown on **Figure 10.2.10: Long Term Flood Risk Surface Water** of this FRA.

9.4.4 The ABC SFRA (JBA 2014) states that the AFSA over spilled in the autumn of 2000 and spring of 2001. Further information provided by the EA in the 2013-2014 Post Flood Analysis: Kent and South London Area (JBA 2014) states that the AFSA reached full capacity over the winter of 2013-2014.

Autumn 2000 Event

9.4.5 The JBA Autumn 2000 Great Stour Flood Rarity[24] assessed the peak flow on the Great Stour at the Wye gauge, approximately 16km downstream of the Site and the Horton gauge, approximately 30km downstream of the Site. In addition, rainfall accumulations at the Canterbury STW rain gauge were also assessed.

9.4.6 Analysis of the rainfall accumulations against the maximum return periods suggested by the Flood Estimation Handbook ('FEH') Depth Duration Frequency ('DDF') model at the Canterbury STW rain gauge indicated that;

- the annual probability for the event between 8 to 15 October lasting 3.4 days was in the region of 1 in 14;
- over the 2.5 day period between 28 October to 1 November the annual probability was around 1 in 2.3; and
- over the 1.5 day period between 4 to 9 November the annual probability was around 1 in 1.8 years.

9.4.7 It is noted that the Canterbury STW rain gauge is not within the Great Stour at Wye catchment but provides an indication of the regional severity of the Autumn 2000 event.

9.4.8 Analysis by JBA of the peak flows at the Wye gauge using FEH statistical method single site found that:

- between 12 and 13 October, the peak recorded flow of 29.8 m^3s^{-1} had an annual exceedance probability of 1 in 18;
- between 30 and 31 October, the peak recorded flow of 26.9 m^3s^{-1} had an annual exceedance probability of 1 in 9; and
- between November 7 and 8, the peak flow of 32.1 m^3s^{-1} had an annual exceedance probability of 1 in 31.

9.4.9 A summary of the JBA analysis on the Autumn 2000 Great Stour flood events is provided in **Table 9.1** of this FRA.

Table 9.1: Autumn 2000 Great Stour Flood Events

Date	Canterbury STW Rain Gauge		Great Stour at Wye Peak Flow Gauge	
	Annual Probability 1 in X	Duration (Days)	Annual Probability 1 in X	Peak Flow (m^3s^{-1})
8 – 15 October	14	3.4	18	29.8
28 October – 1 November	2.3	2.5	9	26.9
4 – 9 November	1.8	1.5	31	32.1

Source: JBA 2014[24]

9.4.10 Aerial imagery provided by the EA indicates that flows overtopped the AFSA spillway in November 2000 with Fields 16, 18, 19, 23, 24, and 26 to 29 affected by flooding during this event.

9.4.11 The JBA post event analysis[24] indicates that the AFSA spillway is now overtopped during events that are now considered to occur more frequently than the intended design standard of the 1% AEP event.

Winter 2013 – 2014 Event

9.4.12 The 2013-2014 Post Flood Analysis: Kent and South London Area report (JBA 2014)[28] assessed the peak flow and flow volumes on the East Stour at the South Willesborough gauge, approximately 6km downstream of the Site. In addition to this, the rainfall accumulations at the South Willesborough tipping bucket rain gauge were also assessed.

9.4.13 Over a period of 8 days in the winter 2013-2014, 84.8mm was recorded at the South Willesborough tipping bucket rain gauge. Analysis of this rainfall accumulations using the Flood Estimation Handbook ('FEH') Depth Duration Frequency (DDF')[33] method indicates that the annual probability of this event was around 1 in 3.8.

9.4.14 Analysis by JBA[18] of the peak flows on the East Stour River at the South Willesborough gauge found that the peak flow of 13.0 m^3s^{-1}, which occurred on 1 February 2014, had an annual exceedance probability of 1 in 4.

9.4.15 Analysis by JBA[18] of the volume of flow on the East Stour River at the South Willesborough gauge found that the annual probability of the event was between 1 in 15 and 1 in 30 for event durations of 1-2 weeks and between 1 in 50 and 1 in 100 for event durations of 4-8 weeks.

9.4.16 During the Winter 2013-2014 events, which were assessed to have an annual exceedance probability of between 1 in 15 and 1 in 30 along the East Stour the AFSA reached full capacity.

Historic Flooding Summary

9.4.17 Analysis of historic flood events along the East Stour indicate that the AFSA does not provide the design level of protection. The AFSA was designed to provide protection up to 1% AEP event with no overtopping of the spillway. Historic flood information provided by the EA and post event analysis undertaken by JBA in 2014 indicate that the level of protection provided by the AFSA is around a 3.3% AEP event.

9.4.18 The historical flood mapping indicates that Fields 16, 18, 19, 23, 24 and 26 to 29 have been affected by flooding from the East Stour which is consistent with the EA's flood mapping for the area.

9.5 Detailed Assessment of Surface Water Flood Risk

Long Term Flood Risk - Risk of Flooding from Surface Water

9.5.1 The *Long Term Flood Risk* mapping for the *Risk of Flooding from Surface Water*, an extract of which is shown on **Figure 10.2.10: Long Term Flood Risk Surface Water** of this FRA, indicates the extent of the Site at risk of surface water flooding.

9.5.2 In rural areas, the mechanisms that drive surface water flooding are often the same as those that result in fluvial flooding. It is therefore considered that where the mapped areas of surface water flooding align with a watercourse (of the fluvial floodplain), the detailed hydraulic model developed to inform this FRA provides a more robust assessment of the flood risk from both fluvial and pluvial sources.

9.5.3 This is particularly the case for the entire Northern Area where a significant area of flooding is predicted upstream and adjacent to AFSA, as well as Fields 19, 23 and 24 within the Central Area which are bound by fluvial watercourses.

9.5.4 Surface water flood mapping is derived from a coarse scale DTM which in some cases may overestimate the prevailing surface water flood risk by not accurately mapping small, ordinary watercourses which are dominated by surface water flows.

9.5.5 Based on a review of Site topography, the Site sits on the downslope of a northwest to southeast topographic ridge. This ridge is therefore the source point for surface water flows and due to its proximity, on or adjacent to the Site, surface water flows noted in the flood mapping are due to the channelisation of runoff from the Site rather than overland flows from off-site sources. In some instances, such as through Fields 3 and 7, where off-site flows discharge onto the Site, these are typically limited by small upgradient catchment areas.

9.5.6 An assessment of each area of the Site is provided in **Paragraphs 9.5.79 to 9.5.17** of this FRA.

Northern Area (including Project Substation)

9.5.7 The Northern Area, in particular Fields 27 and 28, are considered to be at a high risk of flooding from surface water sources. Fields 26 (including the Project Substation area) and 29 are at low to very low risk of surface water flooding.

9.5.8 The areas of surface water flood risk are routed along the East Stour River and floodplain and are clearly representative of fluvial flooding rather than solely surface water sources. The risk of fluvial flooding is assessed in **Section 9.6** of this FRA. Clearly there are significant overland and out of bank flow pathways through the Site which following extreme rainfall, would have a faster speed of onset than fluvial flooding along the East Stour River. Environment Agency surface water flood mapping predicts depths of up to 0.9m. No solar infrastructure is proposed where flood depths exceed 0.8m above ground.

South Western Area

9.5.9 The South Western Area is shown to be predominantly at ‘very low’ risk of surface water flooding, with some small extents at ‘low’ risk of flooding arising from overland flow routes. Localised areas of ‘medium’ and ‘high’ risk are associated with the field drainage ditches and ordinary watercourses running

along the boundaries of the fields. Whilst the majority of flow would remain in channel, the surface water modelling predicts out of bank flood depths between 0.3m and 0.6m for the 0.1% AEP event and below 0.3m for the 1% AEP event.

South Eastern Area

9.5.10 The South Eastern Area is shown to be predominantly at "very low" risk of flooding, with some small extents of "low" risk of flooding arising from overland flow routes. Localised areas of "medium" and "high" risk are associated with the field drainage ditches and ordinary watercourses running along the boundaries of the fields, including the Spring and Bow cottage properties located at the Laws Lane/Bank Road junction. During the extreme 0.1% AEP event maximum flood depths are shown to be between 0.9m and 1.2m within the drainage ditches, with maximum flood depths between 0.15m and 0.30m outside of these channels. The Project is not expected to worsen effects in this area.

Central Area

9.5.11 Within the Central Area, Fields 10 to 17 and 25 are shown to be predominantly at 'very low' risk of flooding with some small extents at 'low' risk of flooding arising from overland flow routes. In these instances maximum flood depths are shown to be between 0.15m and 0.30m during the extreme 0.1% AEP event.

9.5.12 Field 18 has several overland flow routes that are at 'low' risk of flooding, with localised areas of 'medium' and 'high' risk associated with the field drainage ditches and ordinary watercourses.

9.5.13 The maximum flood depths within Field 18 are shown to be between 0.9m and 1.2m within the drainage ditches, and maximum flood depths between 0.3m and 0.6m along the overland flow route during the extreme 0.1% AEP event.

9.5.14 Surface water flooding within Field 19 clearly shows that the channel along the southern boundary of the field breaches its channel bank and flows overland via a historical paleochannel which is identifiable in the topography. This risk is therefore considered fluvial in nature and is instead assessed in **Section 9.6** of this FRA.

9.5.15 Areas of surface water flooding identified through Fields 23 and 24, which are split by the AFSA outfall watercourse, are also considered fluvial in nature and thus the prevailing risk is better represented in the fluvial modelling (**Section 9.6** of this FRA) rather than coarse scale ground modelling.

Sellindge Substation

9.5.16 Sellindge Substation is considered to be at 'low' to 'very low' risk of flooding from surface water sources and it is assumed that these surface water flows would be intercepted by the existing surface water drainage at the facility.

Cable Route Corridor and Cable Route Crossing

9.5.17 Elevated surface water flood risk is present along the Cable Route Corridor which runs parallel with the East Stour River corridor. Whilst this is technically fluvial in nature, below ground cables are generally designed as water compatible and would not be impacted by standing water at the surface.

Surface Water Flood Risk Summary

9.5.18 It is concluded that the surface water flood modelling likely overestimates the surface water flood risks, particularly in areas where overland flows would flow in channel or be considered fluvial in nature. Areas where surface water is predicted within the field (i.e., not in channel) generally do not exceed a depth of 0.6m during the 0.1% AEP event.

9.5.19 It is concluded that in areas where surface water flood modelling shows flooding along a watercourse, this flood risk is considered fluvial in nature. This is particularly the case along the East Stour River which is assessed in **Section 9.6** of this FRA.

9.5.20 Overland flow pathways are also noted in areas which, in reality, would be intercepted by known surface water features present on the Site. IIn such instances, flows would be retained in channel and the risk would be considered much lower.

Climate Change

9.5.21 The *Risk of Flooding from Surface Water* mapping[6] does not include an allowance for the impact of climate change.

9.5.22 Over the anticipated operational lifetime of 40 years for the Project, current EA CCA Guidance indicates that an increase in peak rainfall of 45% can be anticipated. Therefore the risk of flooding from surface water is likely to increase through the lifetime of the Project.

9.5.23 Surface water drainage and improved surface water connectivity is provided as a result of the Project. The **Outline OWSDS (Doc Ref. 7.14)** sets out the principles of the drainage strategy for the Project. Drainage will be provided for any impermeable areas (Project Substation, Inverter Station, Intermediate Substation, PV Array) for the 1 in 100-year rainfall event plus a 45% allowance for climate change.

9.5.24 Whilst solar PV arrays are not considered to increase runoff rates from the Site, depression storage (i.e., swales) will be provided on the Site to increase the surface water flow capacity, as set out in the **Outline OWSDS (Doc Ref. 7.14)**.

9.5.25 The Project will offer a small improvement from the baseline condition and the impact of climate change on surface water flooding as a result of the Project is considered negligible.

9.5.26 Whilst areas within the Project domain are clearly at a high risk of surface water flooding, this risk is can be mitigated to ensure that the Project is safe for its anticipated lifetime. This is demonstrated in **Section 10** of this FRA which details the flood mitigation and management required at the Site.

9.6 Detailed Assessment of Fluvial Flood Risk

Flood Map for Planning

9.6.1 The *Flood Map for Planning*[5], an extract of which is shown on **Figure 10.2.8: Flood Map for Planning** of this FRA, indicates the extent of the Site at risk of fluvial flooding and specifically those areas that lie within the Flood Zones defined by the PPG.

9.6.2 The Site is shown to lie partially in Flood Zone 2 and Flood Zone 3. Whilst the flood maps do not distinguish between the flood risk from tidal and fluvial sources, it is clear from the elevation of the Site that the flood risk is from fluvial sources and in particular the East Stour River and its tributaries.

9.6.3 Parts of the Site also benefit from the protection afforded by the AFSA as shown by the '*Reduction in Risk of Flooding with Rivers and Seas due to Defences*' mapping reproduced as **Figure 10.2.9: Long Term Flood Risk Rivers and Sea** of this FRA.

9.6.4 **Table 9.2** of this FRA identifies Fields which are considered to be in areas at risk of flooding from fluvial sources. Where fields are not listed, these lie in an area designated wholly as Flood Zone 1 (very low risk). In some instances, Fields may fall across all Flood Zones and this is identified below and mapped within **Figure 10.2.8: Flood Map for Planning** of this FRA.

Table 9.2: Flood Zone Designation per Field

Field	Flood Zone		
	1	2	3
16	✓	✓	✓
18	✓	✓	✓
19		✓	✓
23	✓	✓	✓
24			✓

Field	Flood Zone		
	1	2	3
25	✓		✓
26 (Project Substation)	✓	✓	✓
27*			✓
28*		✓	✓
29*		✓	✓
Cable Route Corridor		✓	✓
Sellindge Substation		✓	✓

* No PV panels or other built infrastructure are proposed in Fields 27, 28 and 29.

Long Term Flood Risk - Risk of Flooding from Rivers or Sea

9.6.5 The *Long Term Flood Risk* mapping for the *Risk of Flooding from Rivers or Sea*, an extract of which is shown by **Figure 10.2.9: Long Terms Flood Risk Rivers and Sea** of this FRA, indicates the extent of the Site at risk of fluvial/tidal flooding.

9.6.6 The *Risk of Flooding from Rivers or Sea* mapping takes into account the effect of any flood defences in the area. These defences reduce but do not completely eliminate the risk of flooding as they can be overtopped, or fail.

9.6.7 The Site is shown to lie partially in areas at risk of flooding with the risk categories summarised below:

- Very Low – This area has a chance of flooding less than 0.1% each year.
- Low – This area has a chance of flooding between 0.1% and 1% each year.
- Medium – This area has a chance of flooding between 1% and 3.3% each year.
- High – This area has a chance of flooding greater than 3.3% each year.

Northern Area (including Project Substation)

9.6.8 Within the Northern Area, the north western corner of Field 26, which includes the proposed foot print of the Project Substation, is shown to lie in an area at 'very low' risk of fluvial with the remainder of the Field at 'medium' and 'high' risk of flooding. Fields 27 and 28 are shown to lie entirely in an area at 'high' risk of flooding. Field 29 lies within an area at 'low' risk of flooding to the south east and 'high' risk of flooding to the north west.

South Western Area and South Eastern Area

9.6.9 These areas are shown to lie entirely in an area at 'very low' risk of fluvial or tidal flooding.

Central Area

9.6.10 Fields 10 to 14 and Field 17 within the Central Area are shown to lie entirely in an area at 'very low' risk of fluvial. Field 16 is shown to be at 'low' risk of flooding along its northern boundary. Fields 15 and 18 are shown to be at 'medium' risk of flooding along their northern boundaries. Field 19 is shown to be at 'medium' risk of flooding within the eastern half and predominantly at 'low' risk of flooding within the western half with some extents of 'medium' and 'high' risk. Fields 23 and 24lie almost entirely within an area at 'medium' risk of flooding with some small extents at 'high' risk. Field 25 predominantly lies in an area at 'very low' risk of fluvial, with the southern boundary at 'medium' risk of flooding.

Cable Route Corridor, Cable Route Crossing and Sellindge Substation

9.6.11 The Cable Route Corridor, the Cable Route Crossing and Sellindge Substation are located in areas considered to be at a 'high' risk of fluvial flooding.

Fluvial Flood Modelling

9.6.12 A detailed hydraulic model of the East Stour River and its associated tributaries has been constructed by SLR to inform this FRA. It should be noted the EA is currently constructing an updated hydraulic model of the East Stour River, however the results of this modelling study are currently unavailable. As such the detailed hydraulic model constructed by SLR to support this FRA is considered the best currently available information on fluvial flood risk to the Site.

9.6.13 A HMR sets out the approach to construction of the hydraulic model and is provided as **Annex B: East Stour Hydraulic Modelling Report** of this FRA. The results of the hydraulic model are summarised below.

9.6.14 The flood extent outputs from the hydraulic model have been compared to the EA's *Flood Map for Planning* Flood Zone mapping. As the Flood Zones are defined in the absence of defences, the model was run with the AFSA removed. The EA's Flood Zone 3 mapping and the modelled 1% AEP undefended flood extent is shown on **Annex B: East Stour Hydraulic Modelling Report, Figure 11 and Figure 12** of this FRA. The EA's Flood

Zone 2 mapping and the modelled 0.1% AEP undefended flood extent is shown on **Annex B: East Stour Hydraulic Modelling Report, Figure 13**. Downstream of the AFSA, the modelled 5% AEP undefended flood extent has been taken as Flood Zone 3b. This is in line with ABC's definition of Functional Floodplain (Zone 3b). However, the PPG states that land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% AEP of flooding) will normally be defined as the Functional Floodplain. In line with the PPG definition of Functional Floodplain, upstream of the AFSA embankment the modelled 0.1% AEP defended flood extent has been defined as Flood Zone 3b.

9.6.15 With reference to **Annex B: East Stour Hydraulic Modelling Report** of this FRA, the Site lies within Flood Zones 1, 2, 3a and 3b. This fluvial flood risk is discussed further in **Paragraphs 9.6.16** to **9.6.28** of this FRA.

Flood Model Outputs

9.6.16 **Annex B: East Stour Hydraulic Modelling Report** of this FRA concludes that during the 'pre-development' defended scenario, which accounts for the effect of the AFSA scheme, the Central Area and Northern Areas are at risk of flooding during the design flood event. This design flood event is defined as the 1% AEP event allowing for the Upper End estimate of climate change (55%) over the lifetime of the Project taken to be the 2050s epoch.

9.6.17 During the design flood event, flood levels within the AFSA are shown to exceed the spillway crest level of 50.20mAOD, with the maximum flood level upstream of the spillway reaching 50.36mAOD.

South Western Area and South Eastern Area

9.6.18 No flooding is predicted in the South Western Area or South Eastern Area of the Site.

Central Area

9.6.19 Within the Central Area, Fields 19, 23 and 24 are shown to be at risk of flooding from floodwaters spilling from the banks of the East Stour River and the Unnamed Tributary 3 prior to the overtopping of the AFSA spillway, with the south eastern boundary of Field 25 also shown to be at risk.

9.6.20 Following the overtopping of the AFSA spillway, flood depths are shown to increase within Fields 19, 23 and 24. Additionally, Fields 15, 16 and 18 are shown to be at risk of inundation. During both the design flood event and the extreme 0.1% AEP flood event, flood depths within the Central Area are shown to remain below 0.8m.

9.6.21 Modelled flood levels through the Central Area are summarised in **Table 9.3** of this FRA. **Table 9.3** of this FRA does not include fields where flooding is not predicted.

Table 9.3: Central Area Flood Risk Summary

Field	Minimum Ground Level (mAOD)	Maximum Ground Level (mAOD)	5% AEP Flood Level (mAOD)	1% AEP Flood Level (mAOD)	1% AEP + 55% Climate Change Flood Level (mAOD)	0.1% AEP Flood Level (mAOD)
15	45.0	51.0	No flooding	44.92 – 45.27	45.17 – 45.50	45.24 – 45.52
16	44.6	46.8	No Flooding	44.68 – 44.93	44.65 – 45.18	44.72 – 45.25
18	45.4	47.9	No Flooding	45.27 – 45.42	45.49 – 46.06	45.52 – 46.11
19	44.4	45.9	No Flooding	44.64 – 45.98	44.76 – 46.06	44.82 – 46.09
23	45.9	46.7	45.94 – 46.09	46.21 – 46.34	46.33 – 46.47	46.38 – 46.53
24	45.9	46.6	45.87 – 46.62	46.19 – 46.68	46.32 – 46.74	46.38 – 46.78

Northern Area (including Project Substation)

9.6.22 Within the Northern Area, all fields are shown to be at risk of flooding from floodwaters impounded behind the AFSA embankment during the design flood event.

9.6.23 No flooding is predicted on the higher ground to the north of Field 26 where the Project Substation is proposed.

9.6.24 Flood levels within or adjacent to each field in the Northern Area are summarised in **Table 9.4** of this FRA.

Table 9.4: Northern Area Flood Risk Summary

Field	Minimum Ground Level (mAOD)	Maximum Ground Level (mAOD)	5% AEP Flood Level (mAOD)	1% AEP Flood Level (mAOD)	1% AEP + 55% Climate Change Flood Level (mAOD)	0.1% AEP Flood Level (mAOD)
26	47.7	60.8	50.25	50.29	50.36	50.39
27	47.7	50.0	50.25	50.29 – 50.30	50.36 – 50.38	50.39 – 50.42
28	46.7	48.6	50.25	50.29	50.36	50.39
29	47.7	64.0	50.25	50.29 – 50.30	50.36	50.39

Sellindge Substation Extension

9.6.25 Electrical infrastructure will be required to connect the Project to the existing National Grid Sellindge Substation. This will be sited on an area of land northeast of the existing platform for National Grid's Sellindge Substation. This extension area will extend to up to 0.05ha and will be constructed to the same ground level as the existing substation which is approximately 51.45mAOD.

9.6.26 The model outputs from the **Annex B: East Stour Hydraulic Modelling Report** of this FRA indicate that during the 1% AEP flood event with a 55% uplift to account for climate change, flood levels in this area could reach 51.59mAOD. This would equate to maximum potential flood depths on the newly constructed platform of 0.14m.

9.6.27 Standard design will mean that infrastructure within the Sellindge Substation will be sited on metal frames and the equipment are assumed to be raised above the ground. On this basis the infrastructure would not be affected by extreme fluvial flooding and the risk posed to this infrastructure is assessed to be low.

Grid Connection Cable (and Cable Route Crossing)

9.6.28 Flood risk to the proposed Grid Connection Cable is considered negligible given that this is subsurface development designed to be flood resilient. Whilst there will inherently be a risk of flooding during construction this will be mitigated as part of an EFRP (secured through the **Outline CEMP (Doc Ref.**

7.8)). Once the Grid Connection Cable is in-situ, flooding from any source will not have an adverse impact.

9.7 Climate Change

9.7.1 As discussed in **Section 7.3** of this FRA, this FRA considers a 55% increase in peak fluvial flows though the lifetime of the Project.

9.7.2 The Project design has considered the design flood level through the Site using the modelled 1% AEP plus 55% climate change flood levels as extracted from the SLR HMR. Appropriate design measures are secured through the **Design Principles (Doc Ref. 7.5)**, **Works Plans (Doc Ref. 2.3)** and **Outline OSWDS (Doc Ref. 7.14)**. On this basis, the impact of climate change on fluvial flows is considered within the Project design to have a negligible impact.

9.7.3 Due to the AFSA attenuating and limiting downstream flows only minor increases in flood depths and extent are shown during the credible maximum climate change scenario (Upper End allowance). Flood levels are shown to remain below the proposed PV panels levels and all Inverter Stations remain outside of the flood extent for the lifetime of the Project during the 1.0% AEP flood event including the credible maximum impact (55%) of climate change.

9.8 Ashford Hydraulic Model

9.8.1 The conclusions of **Annex B: East Stour Hydraulic Modelling Report** of this FRA differ somewhat to those reached by the Ashford Fluvial Model study 2012[31]. In the Ashford Fluvial Model study, the earlier hydraulic model predicted reduced flood flows and hence lower flood levels downstream of the AFSA.

9.8.2 A detailed assessment of the Ashford Fluvial Model is provided as part of the HMR provided as **Annex B: East Stour Hydraulic Modelling Report, Section 5.4** of this FRA. However, the key points that may explain the discrepancy between the two studies are provided below:

- The focus of the Ashford Fluvial Model was the entire River Stour catchment and as such, hydrological inputs were calculated for the critical flood events in Ashford and not at the Site. Additionally, the hydrology assessment was undertaken prior to recent improvements in FEH methods for permeable catchments.
- Overtopping flows of bridge structures have not been represented in the Ashford Fluvial Model and as such it is likely that the model is overestimating energy losses at these structures.
- The stage-discharge relationship for the AFSA fish pass overestimates flows with a peak discharge rate of 2.7 m^3s^{-1} compared to the peak design discharge rate of 0.34 m^3s^{-1}.

- The modelled AFSA spillway weir coefficient of 0.25 appears to be unreasonably low for the spillway structure.

10 Flood Risk to the Project

10.1 Introduction

10.1.1 The Project comprises the construction, operation and decommissioning of solar photovoltaic arrays and energy storage, together with associated infrastructure and an underground cable connection to the existing National Grid Sellindge Substation. Further information on the Project is provided in **Section 2.2** of this FRA.

10.1.2 This Section sets out how the flood risks highlighted by the assessment in **Section 9** will be controlled through the mitigation and management measures that form part of the Project.

10.2 Avoidance

10.2.1 The Project has undergone several iterations, influenced by the development of the hydraulic model, principally to avoid locating sensitive infrastructure in areas at risk of flooding and to remove solar arrays from areas where excessive depths of flooding are predicted. The principal steps to avoid flood risks are secured by the **Works Plans (Doc Ref. 2.5)** and **Design Principles (Doc Ref. 7.5)** and are as follows:

- The main development areas of the Project are sited within Flood Zone 1.
- Standoffs apply along all watercourses to avoid corridors where deep and fast flowing flood water is most likely (i.e. minimum 10m buffer as measured from the East Stour River and IDB-managed Ordinary Watercourses from the top of bank or channel edge under normal flows. No new physical infrastructure other than essential works (such as cable crossings, watercourse crossings, drainage and PRoW footbridges) will be developed in this buffer).
- The Project Substation has been designed to ensure the development platform is sited outside the design flood extent (the development platform will be no greater than 56mAOD and no lower than 55mAOD which is appropriately above the design flood level).
- PV panels are not proposed in the Northern Area which is within the AFSA.
- PV panels will be installed on PV mounting structures and will be a minimum of 0.8m above the ground.
- No PV panels are located in areas where the depth of flooding could exceed 0.8m.
- Electrical infrastructure at Sellindge Substation Extension are expected to

be raised above the ground level and thus above the design flood level (56m AOD).

10.2.2 Additional measures are secured through the **Outline OSWDS (Doc Ref. 7.14)** including ensuring that associated storm water controls are sited outside the design flood extent.

10.2.3 Given these controls included in the design, once constructed the risk of flooding posed to the Project from both fluvial and surface water flooding will be low.

10.3 Flood Management

10.3.1 The risks relating to fluvial and surface water flooding at the Site have been mitigated as far as practicable through the design principles and layout of the Project. The Site may however still be impacted by fluvial flooding from the East Stour River and its tributaries with flooding potentially cutting off access to areas of the Site. Parts of the Site may also be impacted by surface water flooding following extreme heavy rainfall.

10.3.2 While flooding of the nature expected would not damage the infrastructure, it could disrupt construction and decommissioning activities or pose a risk to equipment, activities and workers.

10.3.3 The main contractor and the Site operator will prepare, maintain, and implement robust EFRP for the construction, operation and decommissioning phases respectively. These documents will set out actions to minimise the risk posed to staff and operatives. The **Outline CEMP (Doc Ref. 7.8),** the **Outline OMP (Doc Ref 7.11)** and the **Outline DEMP (Doc Ref 7.14)** include the commitment to prepare EFRP for each stage, which will form part of the detailed CEMP(s), the OMP and DEMP(s) and will include:

- Details of roles and responsibility for maintaining, updating and implementing the plan;
- Overview of the local flood risk;
- Details of the local EA flood warning service;
- Specific action that will be undertaken in response to the issuing of a flood alter or flood warning; and
- Details of access and egress routes onto the Site for period in advance and during a flood event.

10.3.4 The construction and decommissioning EFRP(s) will include measures to adapt works plans in response to both the risk of fluvial flooding and also extreme rainfall events. Measures such as halting and rescheduling works in high-risk areas and removing unsecured equipment and infrastructure from

the floodplain (including Secondary Construction Compounds in the floodplain) will form part of the approach.

Flood Alert and Warning

10.3.5 During the construction, operation and decommissioning of the Project, there is a risk of flooding in parts of the Site from principally from the East Stour River, its tributaries and overland flow following extreme heavy rainfall.

10.3.6 However, the Site falls within an area covered by the EA's *Floodline* flood warning service. The service provides three levels of warning, Flood Alert, Flood Warning and Severe Flood Warning plus a Three-day flood risk forecast. The information provided by the currently available system is summarised in **Table 10.1** of this FRA.

Table 10.1: Floodline flood warning system

Warning	When it is used	What it means
Three-day forecast	Daily forecasts of flood risk on the website www.environment-agency.gov.uk. These are updated more frequently for higher flood risk situations.	Be aware. Think ahead. Keep an eye on the weather situation.
Flood Alert	Two hours to two days in advance of flooding.	Flooding is possible. Be prepared.
Flood Warning	Half an hour to one day in advance of flooding.	Flooding is expected. Immediate action required.
Severe Flood Warning	When flooding poses a significant risk to life or significant disruption to communities.	Severe flooding. Danger to life.

10.3.7 The Site falls within both a Flood Alert and Flood Warning area:

- The '*Upper River Stour*' Flood Alert area covers communities on the Great Stour from Charing Heath to the A2070 including Ashford, communities on the East Stour, communities on the Whitewater and Ruckinge Dykes and the Aylesford Stream.
- The more detailed '*East Stour from Sellindge to South Ashford*' Flood Warning area includes the East Stour from Sellindge to South Ashford including Barrowhill, Mersham and Sevington.

10.3.8 The EFRP will require the main contractor (construction) and the Site operator (operation) to sign up to the *Floodline* service (or equivalent service in the future).

10.3.9 With regards to extreme heavy rainfall, the EFRP will require the main contractor (construction) and the Site operator (operation) to subscribe to Met Office extreme weather warnings. These will provide early notification of potential heavy rainfall and surface water flooding at the Site.

Safe Access and Egress

10.3.10 The provision of safe access and escape for flood risk during construction and decommissioning will be considered within the detailed CEMP(s) and DEMP(s). The provision of safe access and escape for flood risk during operations will be considered within the detailed OMP.

10.3.11 In the event of uncertainty about the provision of safe and dry access to any areas of the Site, these areas would be evacuated. In the event that significant flooding is predicted the entre Site would be evacuated.

10.3.12 Should operatives be required to evacuate the entire Site in response to a flood alert or warning, it is anticipated that the evacuation route would be to the south of the Site (i.e. Bank Road) which would provide an egress route east to the M20, Folkstone and Hythe or west towards the A2070.

Vulnerability of People

10.3.13 The main risks to the people associated with the Project and with regards to flooding arise during the construction and decommissioning phases, alongside personnel undertaking maintenance works during operation.

10.3.14 Personnel working on or accessing the Site are likely to be healthy, able bodied and had prior experience / training. Given the physical ability of personnel, awareness of flood response procedures and available forecasting and notification of extreme rainfall and fluvial flooding along watercourses locally, the vulnerability of people is considered to be low.

11 Flood Impacts Arising from the Project

11.1.1 Without mitigation, development can increase the flood risk elsewhere. The following potential mechanisms for exacerbating flood risk at this Site have been identified:

- Changes in flood conveyance;
- Reduction in floodplain storage;
- Increases in surface water runoff; and
- Physical disturbance or damage to AFSA.

11.1.2 These potential off-Site flood risk impacts as a consequence of the Project are considered in **Sections 11.2** to **11.5** of this FRA.

11.2 Changes in Flood Conveyance

11.2.1 Flood flow velocities upstream of the AFSA embankment are low as water is impounded or held back by the raised structure. As a result, there is no potential for significant impacts on flood conveyance. Downstream of the embankment changes delivered as part of the Project could conceptually impact conveyance. The potential impact of the Project on the obstruction of fluvial and surface water flood flows is therefore discussed below in **Paragraphs 11.2.2** to **11.2.15.**

PV Arrays

11.2.2 The **Design Principles (Doc Ref. 7.5)** require that all PV panels are south facing, This means they will be installed in rows running east to west roughly along the primary direction of the floodplain flow (so that the wide gap between banks of arrays is available for flood flow / debris).

Security Fencing and Hedges

11.2.3 Fences are required around operational areas and new hedges are proposed as part of the landscape proposals. In places, these will extend into the floodplain. In concept these features will increase the roughness of the floodplain and create a small potential for accumulation of debris and associated blockage of flood flows.

11.2.4 To prevent obstructions to flood flows, such as blockage, the **Design Principles (Doc Ref. 7.5)** secure that security fencing within Fields 19, 23 and 24 will have a minimum clearance space of 0.2m between the bottom of the security fence and the ground, and with minimum mesh spacing of 0.1m. The distance between the security fencing and hedgerows or ordinary

watercourses (referred to as drains or channels) outside of the security fence would be at least 3.2m.

11.2.5 The impact of debris building up against the proposed fences and forming a blockage has been assessed within **Annex B: East Stour Hydraulic Modelling Report, Section 6.3** of this FRA. This shows that blockage at the fences and hedges will only result in very small and localised uplifts in flood levels (<0.02m). These minor changes do not extend beyond the Order limits.

Primary Site Access Track, Internal Haulage Road and Internal Access Tracks

11.2.6 The internal haulage road and internal access track will be at grade with no raise or uplift from the existing ground level. All proposed internal access tracks and haulage roads will therefore not have any impact on flood flows. The Primary Site Access track is located outwith areas at risk of flooding.

Construction Compounds

11.2.7 One Secondary Construction Compound in Field 23 will be located within the fluvial floodplain. No uplift in ground levels and built structures are proposed in this area which would only be used for temporary storage. On this basis, the compound will not impact or obstruct flood flows.

11.2.8 An additional Secondary Construction Compound is included in Field 19. This provides an alternative in the event that the Secondary Construction Compound in Field 23 were subject to surface water flooding.

Watercourse Crossings

11.2.9 **ES Volume 4, Appendix 10.5: Schedule of Watercourse Crossings** sets out the proposed watercourse crossings associated with the Project and their locations. These include temporary vehicle bridge crossings as follows:

- Ordinary Watercourse (Riparian Drain): between Field 18 and Field 19;
- IDB Managed Ordinary Watercourse: between Field 23 and Field 24.
- East Stour River: between Field 24 and Field 25;
- East Stour River: between Field 27 and Field 28; and
- East Stour River: Field 27 and cable route corridor.

11.2.10 Permanent footbridges will be installed at the end of the construction phase to accommodate diverted PRoW. This will occur at two of the locations where temporary vehicle crossings are required during construction and decommissioning. These will be at the following locations, neither of which are over the East Stour River:

- Ordinary Watercourse (Riparian Drain): between Field 18 and Field 19;

and

- IDB Managed Ordinary Watercourse: between Field 23 and Field 24.

11.2.11 As required by the **Design Principles (Doc Ref. 7.5)** vehicle bridge crossings will be installed to avoid impact to the channel and minimise on-site engineering. The bridge soffits will be set at least 600mm above the adjacent bank level and the bridge supports will be set at least 1m back from the edge of the top of the bank. The track approach to the watercourse crossing will be kept at grade.

11.2.12 The temporary vehicle bridge crossings will comprise pre-engineered modular structures of 'Bailey' type construction, i.e. open lattice sides. For the temporary bridge structures, the raising of the proposed soffit level to 600mm above the banks of the watercourse will ensure that the structures remain above the design 1% AEP plus upper end climate change flood level and that there is a significant freeboard to the current day 1% AEP flood level.

11.2.13 The temporary bridge crossings will be used mainly during the construction and decommissioning phases. However, at limited times during the operation and maintenance phase temporary bridges may be required to be reinstalled to provide access for maintenance, repair and replacement activities. The temporary bank to bank bridges will be pre-engineered modular steel bridges which will be delivered to the Site via HGV and installed for the construction and decommissioning periods and removed once construction / decommissioning is complete. This type of temporary bridge means that there is no construction work required within the watercourse as the bridges span the width of the watercourse.

11.2.14 The permanent footbridges will be lightweight, free span structures with open lattice sides. These will be similar in nature to existing PRoW footbridges on the Site.

11.2.15 The top of bank and design flood levels at the proposed watercourse crossing locations is summarised in **Table 11.1** of this FRA.

Table 11.1: Watercourse crossing indicative design and flood levels

Watercourse Crossing	Top of Bank Level (mAOD)	Indicative Bridge Soffit Level (mAOD)	1% AEP + 55% Climate Change Flood Level (mAOD)
Field 18 to 19	45.79	46.39	46.00
Field 23 to 24	45.93	46.53	46.34
Field 24 to 25	47.47	48.07	47.29
Field 27 to 28	47.73	48.33	50.35
Field 27 to cable route	49.74	50.34	50.36

11.3 Reduction of Floodplain Storage

11.3.1 The potential impact of the Project on floodplain storage is discussed below.

PV panels

11.3.2 No raising of ground levels is proposed associated with the proposed PV panels that will be within the floodplain.

11.3.3 Following consultation, the EA requested that level for level flood storage analysis is undertaken to assess the loss in flood storage from the PV mounting structures.

11.3.4 Analysis shows that the volume of floodplain storage lost as a result of the PV Array structures would be c. 2m^3. Possible changes in the design of the frame footing can be accommodated without any uplift in ground level. As such this will not impact the volume of flood storage lost.

11.3.5 Through the addition of scrapes and a large wetland basin within the floodplain compensatory storage will be provided resulting in a net increase in flood storage of c. 1,541m^3 with no net loss of floodplain volume at any level when considered on a level for level basis. Further details of these depressions are provided and their inclusion in the Project is secured through the **Outline OSWDS (Doc Ref 7.14)**.

11.3.6 Details of the level for level flood storage analysis is provided in **Annex D: Floodplain Compensation Level for Level Calculations** of this FRA.

Inverter Stations and Intermediate Substations

11.3.7 The Intermediate Substations and Inverter Stations will not be located in a floodplain and thus will have no impact on flood flows.

Project Substation and Associated Drainage Infrastructure

11.3.8 The Project Substation, located in Field 26, will be levelled using cut and fill to create a flat development platform. At the toe of the platform, a surface water attenuation swale is proposed which will outfall into a pond / wetland area prior to discharge into surface waters (as secured through the **Outline OWSDS (Doc Ref. 7.14)**).

11.3.9 The Project Substation platform and associated surface water drainage swale, which provides hydraulic control and attenuation of stormwater runoff, are located outside of the fluvial floodplain. Ground level changes associated with the substation platform and swale which are located outside of the flood plain will have no impact on flood risk.

11.3.10 The **Outline OSWDS (Doc Ref. 7.14)** proposes that a wetland basin which receives flow from the swale (purely for water quality purposes) will be located in the fluvial floodplain. No ground level raise is proposed in this area and instead the wetland provides extra compensation flood storage from the existing situation. On this basis, the Project Substation would not increase the risk of flooding.

Sellindge Substation Extension

11.3.11 The extension to the Sellindge Substation will extend to up to 0.05ha on the north eastern extent of the existing platform. The platform will be set at the same level as the existing platform. To achieve a level platform in that area of the Site, ground levels would need to be lowered and there would be no uplift.

11.3.12 Given that there are no proposed uplifts in existing ground level there can be no loss in flood storage associated with this element of the Project.

11.4 Increases in Surface Water Runoff

11.4.1 An Outline Operational Surface Water Drainage Strategy has been developed for the Project as part of the DCO Application and this is provided as the **Outline OSWDS (Doc Ref 7.14)**. This strategy sets out the principles for surface water management at the Site which will ensure there is no impact on runoff rates and flood risk as a result of the Project.

11.4.2 The principles of the storm water drainage system as set out in the **Outline OSWDS (Doc Ref 7.14)** are designed to ensure that there is no uplift in peak rates. The strategy is also designed to accommodate volumes of storm water runoff for all events up to, and including, the 1% annual probability storm with a 45% allowance for climate change.

PV Arrays

11.4.3 PV panels will not increase runoff rates as surface water runoff will discharge from the panel onto the vegetated strip between rows. Water will then infiltrate to the soils and / or flow overland replicating the greenfield situation.

11.4.4 While no change is expected in runoff rates, the **Outline OSWDS (Doc Ref 7.14)** proposes areas of depression storage which will be provided across the Site down gradient of areas where PV panels are proposed. These are intended to intercept and slow surface runoff from the Site and encourage infiltration.

11.4.5 Prior to construction investigations will be undertaken to ensure that these depressions, mostly excavated into the shallow alluvium, will be free draining. In the event that this will not be passively achieved permeable material will be installed along one flank to allow water to gradual drain down and ensure capacity if available for repeat storms. Details of this are provided within the **Outline OSWDS (Doc Ref 7.14).**

11.4.6 As a result of the additional depression storage created, the Project will result in a small reduction in peak rates and total volume of surface water runoff from the area of PV panels. There will be a corresponding increase in filtration and shallow baseflows towards the river from these areas.

Inverter Stations

11.4.7 As set out in the **Outline OSWDS (Doc Ref. 7.14),** stormwater which falls on the Inverter Station platforms will percolate into the void space of gravel compound. Onward discharge will be restricted to at or below 1l/s (as low as practicably possible) using a hydrobrake. Storage or excess flow will be provided within the subbase.

11.4.8 Flows from the Inverter Station compounds will discharge via unlined filter drain into adjacent surface waters. These filter drains will promote infiltration and clean flows.

Project Substation

11.4.9 As detailed in the **Outline OSWDS (Doc Ref. 7.14)**, stormwater which falls on the Project Substation platform will percolate into the void space of the gravel compound. Water will percolate through the gravel subbase draining towards an outfall. Discharges via this outfall (for the gravel subbase within the compound) will be restricted by an orifice. Water will then pass via a series of gabion baskets, located at the toe of the platform, for energy dissipation before entering an attenuation swale.

11.4.10 Discharge from the swale will be restricted to greenfield rates by an orifice. Water will then flow into a wetland feature which serves to encourage infiltration and provide the final tier of water quality treatment.

Sellindge Substation Extension

11.4.11 This will likely be constructed as a compacted gravel compound which be an extension to the existing platform of up to 0.05ha in area. Much of the rainfall falling on this surface will continue to discharge to the ground, particularly in drier summer periods.

11.4.12 Storm water drainage will be provided to capture and mange excess flow with runoff directed into National Grid's existing drainage networks. As secured through the **Outline OSWDS (Doc Ref. 7.14)**, if considered necessary at the detailed design stage minor upgrades would be implemented to ensure that there is no net uplift in runoff and no increase in flood risk.

11.5 Physical Disturbance to AFSA

11.5.1 **ES Volume 4, Appendix 10.4: AFSA Risk Assessment (Doc Ref. 5.4)** provides information to evidence that construction, operation and decommissioning of the Project would not compromise the function or efficacy of the AFSA. This is primarily delivered by ensuring appropriate standoffs are applied from the AFSA embankment both with the Project design and through the construction and decommissioning.

11.5.2 In addition to this, **Annex B: East Stour Hydraulic Modelling Report** of this FRA details hydraulic modelling both with and without the Project. This confirms that the extent of flooding upstream of the AFSA embankment will not be increased by the Project.

11.6 Flood Impact Summary

11.6.1 As set out in **Table 11.2** of this FRA, it is concluded that there are no adverse flood risk impacts arising from the Project.

Table 11.2: Summary of Flood Impacts

Flood Impact	Discussions	Impact
Changes in flood conveyance	Minor impacts on conveyance possible from solar PV Arrays, fences and hedges. These impacts have been modelled and confirmed to be negligible. Other aspects of the Project will be constructed out of the floodplain or without uplift to ground surfaces.	Negligible
Reduction in floodplain storage	All major changes of ground level required will be in areas out of the floodplain.	Negligible

Flood Impact	Discussions	Impact
	Minor losses of flood storage associated with the frame of PV Arrays will be more than offset by depression storage created as a part of the Project.	
Increases in surface water runoff	Use of SuDS will ensure that there is no uplift in peak rates or volumes of storm water runoff from the Site.	Negligible
Physical disturbance or damage to AFSA	Appropriate standoffs are applied from the AFSA embankment both with the Project design, construction, operation and decommissioning.	Negligible

12 Residual Risk

12.1.1 The residual risks of flooding associated with the Project are:

- Fluvial Flooding;
- Surface Water Flooding; and
- Reservoir Failure (Breach of ASFA).

12.1.2 This assessment has quantified the risks of fluvial and surface water flooding at the Site and provided relevant mitigation to ensure there is no adverse impact to flood risk as a result of the Project but also to mitigate the impacts to equipment and personnel as far as reasonably possible.

12.1.3 **Section 10** of this FRA details all relevant flood mitigation and management measures incorporated at the Site to reduce this inherent risk as far as reasonably practicable. This includes the implementation of EFRP to manage the risks and impact during periods of fluvial or surface water flooding on the Site.

12.1.4 Irrespective of this there is still a residual risk of flooding from both fluvial and surface water associated with:

- Events that are greater than the design standards assessed and applied in the assessment design process;
- A failure by the contractor or operator to correctly implement the EFRP; and
- A failure in the process of flood warning from either the EA or Met Office.

12.1.5 As discussed in **Section 8.7** of this FRA, the Site is located adjacent to AFSA reservoir which is recognised and maintained under the Reservoir Act 1975. Reservoir flood mapping produced by the EA indicates that the Site is at risk of flooding following failure of AFSA.

12.1.6 The hydraulic modelling provided in **Annex B: East Stour Hydraulic Modelling Report** did not explicitly model a breach of the AFSA. It is acknowledged that if a breach did occur this could result in deep and high velocity flood flows passing through areas of the Site.

12.1.7 Flooding of this nature would damage and destroy some of the PV Arrays; however, the layout of the Project would ensure that key elements including the Project Substation and most of the Inverter Stations were not impacted. In addition, the implementation of the EFRP would adequately protect staff and personnel from harm.

12.1.8 Following this review, it is concluded that the residual flood risks are suitably low, and that further mitigation or management is not required.

13 Conclusions

13.1 Background

13.1.1 SLR has been appointed by the Applicant to provide a FRA in support of a DCO Application.

13.1.2 With reference to the Flood Map for Planning, the Site is considered to lie within Flood Zones 1, 2, 3a and 3b as defined in Table 1 of PPG.

13.1.3 Operational elements of the Project proposed in Flood Zone 3a and 3b are as follows;

- PV panels – limited to locations whereby the design flood depth is below 0.8m;
- Sellindge Substation - The design flood depth in this area is shallow and not sufficient to damage electric equipment which will be appropriately raised;
- Below ground electric cables which will extend through areas of Flood Zone 3a and 3b. Once in place these will not be impacted by flooding and will not have any effect on flood risk;
- Security fencing – raised by 0.2m off of ground and with mesh sized >0.1m to minimise risk of conveyance impacts; and
- Internal access tracks – 90% permeable and constructed at grade to avoid impact on runoff and conveyance.

13.2 Vulnerability Classification and Flood Zone Compatibility

13.2.1 The Project is classed as ‘Essential Infrastructure’ development type which is defined as ‘Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for electricity supply including generation, storage and distribution systems; including electricity generating power stations, grid and primary substations storage; and water treatment works that need to remain operational in times of flood’.

13.2.2 ‘Essential Infrastructure’ development types are subject to the Exception Test when located in areas designated as Flood Zone 3a and 3b.

13.3 Sequential and Exception Tests

13.3.1 The sequential and exception tests have been applied to the Project and are passed. This FRA demonstrates that the Project can be made safe throughout its anticipated lifetime.

13.4 Flood Risk Management

13.4.1 The Project layout has been informed by detailed hydraulic modelling of the East Stour River undertaken by SLR Consulting. Design principles have been adopted which ensure that the Project will be able to operate without significant damage even during severe flood conditions.

13.4.2 EFRPs will be in place for all stages of the Project (construction, operation and maintenance, and decommissioning). These will adopt the EA Flood Alert and Warning system and Met Office severe weather warnings, with evacuation protocols in place as necessary.

13.5 Off-site Impacts

13.5.1 The Project will not detrimentally affect flood risk elsewhere but instead will result in a small net benefit on flood risk through the increases in the flood storage capacity available on Site as a result of the Project.

13.6 Residual Risk

13.6.1 It is acknowledged that residual risks of flooding will exist associated with:

- fluvial and surface water flooding events that are greater than the design standards assessed and applied in the assessment design process;
- a failure by the contractor or operator to correctly implement the EFRP;
- a failure in the process of flood warning from either the EA or Met Office; and
- a failure of the embankment of the AFSA.

13.6.2 Following this review, it is concluded that the residual flood risks are suitably low and that further mitigation or management is not required.

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1.1.1 This Annex to **ES Volume 4, Appendix 10.2: Flood Risk Assessment (Doc Ref. 5.4)** ('FRA') provides background information on how the FRA for the Stonestreet Green Solar DCO Project is compliant with Paragraph 5.8.15 of NPS EN-1, which sets out the minimum requirements for FRAs.

1.1.2 For ease, the requirements listed in Paragraph 5.8.15 of NPS EN-1 are reproduced in **Table 1**. The 'FRA Compliance' column indicates how these requirements have been addressed.

Table 1: NPS EN-1 Compliance

NPS EN-1 Requirements	FRA Compliance
be proportionate to the risk and appropriate to the scale, nature and location of the project;	The information presented in the FRA is considered to be proportionate to the risk and appropriate to the scale, nature and location of the Project. The FRA assesses the potential flood risk to the Site within the Order limits but also considers key receptors including the AFSA. The scope of the assessment has been agreed through consultation with key stakeholders including the EA, the LLFA (Kent County Council) and the River Stour (Kent) IDB. Details on the consultation process with these bodies and how this has been reflected in the assessment and **Outline OSWDS (Doc Ref. 7.14)** is set out in **Tables 10.1 to 10.4** of **ES Volume 2, Chapter 10: Water Environment (Doc Ref. 5.2)**.

NPS EN-1 Requirements	FRA Compliance
consider the risk of flooding arising from the project in addition to the risk of flooding to the project;	**ES Volume 4, Appendix 10.2: FRA, Section 8 (Doc Ref. 5.4)** provides a screening assessment of potential sources of flood risk at the Site. The risk posed by potentially significant sources is then considered in detail in **ES Volume 4, Appendix 10.2: FRA, Sections 9 and 10 (Doc Ref. 5.4)** with the changes in flood risk arising from the Project considered in **ES Volume 4, Appendix 10.2: FRA, Section 11 (Doc Ref. 5.4)**. Residual flood risk is considered in **ES Volume 4, Appendix 10.2: FRA, Section 12 (Doc Ref. 5.4)**. A hydraulic model has been produced by SLR and is provided as **Annex B: East Stour Hydraulic Modelling Report** ('HMR') of **ES Volume 4, Appendix 10.2: FRA (Doc Ref. 5.4)**. The model enables the assessment of the risk of fluvial flooding to the Project (**ES Volume 4, Appendix 10.2: FRA, Sections 9.6** and **Section 10 (Doc Ref. 5.4)**) but also the risk of fluvial flooding arising from the Project (**ES Volume 4, Appendix 10.2: FRA Section 11 (Doc Ref. 5.4)**).
take the impacts of climate change into account, across a range of climate scenarios, clearly stating the development lifetime over which the assessment has been made;	Climate change allowances in line with relevant EA guidance are detailed in **ES Volume 4, Appendix 10.2: FRA, Section 7 (Doc Ref. 5.4)** and are applied in the analysis of surface water flood risk (in **ES Volume 4, Appendix 10.2: FRA, Section 9.5 (Doc Ref. 5.4)**) and fluvial flood risk (**ES Volume 4, Appendix 10.2: FRA, Section 9.6 (Doc Ref. 5.4)**). The operational lifetime of the Project, which has then been applied to the assessment of climate change impacts, is stated in **ES Volume 4, Appendix 10.2: FRA, Section 7.2 (Doc Ref. 5.4)** (i.e. 40 years).

NPS EN-1 Requirements	FRA Compliance
be undertaken by competent people, as early as possible in the process of preparing the proposal;	The FRA has been undertaken by competent hydrologists at SLR with relevant qualifications and an array of experience. Details are provided in **ES Volume 4, Appendix 1.5: Statement on Expertise and Qualifications of Competent Experts (Doc Ref 5.4).**
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 and exceedance;	The HMR provided as **ES Volume 4, Appendix 10.2: FRA, Annex B (Doc Ref. 5.4)** assesses both the defended (i.e., inclusion of AFSA) and undefended scenario. An assessment of the residual risks to the Site (i.e., failure of the AFSA, surface water flooding and fluvial flooding) is provided in **ES Volume 4, Appendix 10.2: FRA, Section 12 (Doc Ref. 5.4)** and considers these to be suitably low.
consider the vulnerability of those using the site, including arrangements for safe access and escape;	**ES Volume 4, Appendix 10.2: FRA, Section 9 (Doc Ref. 5.4)** provides details of the measures that will be employed to ensure that the development will be safe for its lifetime taking account of the vulnerability of its users. Arrangements for safe access and escape will be detailed in Emergency Flood Response Plans ('EFRP') that will be prepared for each phase of the Project. An outline of the contents of the EFRPs is provided within the **Outline Construction Environmental Management Plan ('Outline CEMP') (Doc Ref. 7.8)**, the **Outline Operational Management Plan ('Outline OMP') (Doc Ref. 7.11)** and the **Outline Decommissioning Environmental Management Plan ('Outline DEMP') (Doc Ref. 7.12)**.

NPS EN-1 Requirements	FRA Compliance
consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and include information on flood likelihood, speed-of-onset, depth, velocity, hazard and duration;	The HMR provided as **ES Volume 4, Appendix 10.2: FRA, Annex B (Doc Ref. 5.4)** details modelling that numerically assesses the speed of onset, depth, velocity and duration of fluvial flood risk and based on this it is clear that the Flood Hazard will be low in key areas of the site. This has then been fed through into the detailed assessment of fluvial flood risk contained in **ES Volume 4, Appendix 10.2: FRA, Section 9.6 and 10 (Doc Ref. 5.4)**. For other flood sources the nature of flooding has been considered qualitatively based on available data sources. This has been fed through into the assessment of flood risk contained in **ES Volume 4, Appendix 10.2: FRA, Sections 8, 9 and 10 (Doc Ref. 5.4)**.
identify and secure opportunities to reduce the causes and impacts of flooding overall, making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management;	**ES Volume 4, Appendix 10.2: FRA, Section 11 (Doc Ref. 5.4)** assesses the flood impacts that could arise from the Project and details how these are avoided through design and layout. **ES Volume 4, Appendix 10.2: FRA, Table 11.2 (Doc Ref. 5.4)** concludes that all potential impacts are negligible. **The Outline Operational Surface Water Drainage Strategy ('OSWDS') (Doc Ref. 7.14)** sets out measures to manage storm water runoff from the Site. This includes restricting runoff through the use of SuDS to the greenfield runoff rates and the introduction of depression storage to better manage runoff from the land and provide addition fluvial flood storage on the Site.
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;	**ES Volume 4, Appendix 10.2: FRA, Section 8 (Doc Ref. 5.4)** provides a preliminary assessment of the risk of flooding from all potential sources. **ES Volume 4, Appendix 10.2: FRA, Section 9 (Doc Ref. 5.4)** provides a detailed review of flood sources that are considered significant (surface water and fluvial) analysing a range of return period flood events to the Project.

NPS EN-1 Requirements	FRA Compliance
include the assessment of the remaining (known as 'residual') risk after risk reduction measures have been taken into account and demonstrate that these risks can be safely managed, ensuring people will not be exposed to hazardous flooding;	**ES Volume 4, Appendix 10.2: FRA, Section 12 (Doc Ref. 5.4)** provides an assessment of the residual risks to the Site (i.e. failure of the AFSA, surface water flooding and fluvial flooding) and concludes these to be suitably low and that they will be safely managed through the implementation of EFRPs (see **Outline CEMP (Doc Ref. 7.8)**, **Outline OMP (Doc Ref. 7.11)** and **Outline DEMP (Doc Ref. 7.12)** for details.
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. Information should include: *i. Describe the existing surface water drainage arrangements for the site*	The existing surface water drainage arrangements are provided in the **Outline OSWDS, Section 2 (Doc Ref. 7.14)**.
ii. Set out (approximately) the existing rates *and* volumes of surface *water* run-off generated by the site. Detail the proposals for restricting discharge rates	The existing rates and volumes of surface water runoff of the Site are provided in the **Outline OSWDS, Section 4.2 (Doc Ref. 7.14)** and **Outline OSWDS, Appendix A (Doc Ref. 7.14)**. Details for restricting discharge rates are provided in the **Outline OSWDS, Section 4.6 (Doc Ref. 7.14)**.
iii. Set *out proposals for managing and discharging surface water from the site using sustainable drainage systems and accounting for the predicted impacts of climate change. If sustainable drainage systems have been rejected, present clear evidence of why their inclusion would be inappropriate*	Proposals for managing and discharging surface water runoff from the Site are detailed in **Outline OSWDS, Section 4.6 (Doc Ref. 7.14).** These proposals incorporate sustainable drainage systems and account for projected uplifts in peak rainfall associated with climate change over the lifetime of the Project.

NPS EN-1 Requirements	FRA Compliance
iv. Demonstrate how the hierarchy *of drainage options has been followed.*	This information is provided in the **Outline OSWDS, Section 4.5 (Doc Ref. 7.14).**
v. Explain and justify why the types of SuDS and method of discharge have been selected and why they are considered appropriate.	This information is provided in the **Outline OSWDS, Section 4.5 (Doc Ref. 7.14).**
vi. Explain how sustainable drainage systems have been integrated with other aspects of the development such as open space or green infrastructure, so as to ensure an efficient use of the site	This information is provided in the **Outline OSWDS, Section 4.6 (Doc Ref. 7.14)**.
vii. Describe the multifunctional benefits the sustainable drainage system will provide	This information is provided in the **Outline OSWDS, Section 4.6 (Doc Ref. 7.14)**.
viii. Set out which opportunities to reduce the causes and impacts of flooding have been identified and included as part of the proposed sustainable drainage system	This information is provided in the **Outline OSWDS, Section 4.6 (Doc Ref. 7.14)**.
ix. Explain how run-off from the completed development will be prevented from causing an impact elsewhere	This information is provided in the **Outline OSWDS, Section 4.6 (Doc Ref. 7.14)**.

NPS EN-1 Requirements	FRA Compliance
x. *Explain how the sustainable drainage system been designed to facilitate maintenance and, where relevant, adoption. Set out plans for ensuring an acceptable standard of operation and maintenance throughout the lifetime of the development*	This information is provided in the **Outline OSWDS, Section 4.6 (Doc Ref. 7.14)** with further details relating to the ongoing operation and maintenance of the proposed SuDS included in the **Outline OSWDS, Section 4.9 (Doc Ref. 7.14)**.
• *detail those measures that will be included to ensure the development will be safe and remain operational during a flooding event throughout the development's lifetime without increasing flood risk elsewhere;*	**ES Volume 4, Appendix 10.2: FRA, Section 10.3 (Doc Ref. 5.4)** details design measures at the Site to mitigate, manage or avoid flood risk and ensure the development will remain operational during a flooding event throughout the Project's lifetime with no impact on flood risk elsewhere (**ES Volume 4, Appendix 10.2: FRA, Section 11 (Doc Ref. 5.4)**). EFRPs (see the **Outline CEMP (Doc Ref. 7.8)**, **Outline OMP (Doc Ref. 7.11)** and **Outline DEMP (Doc Ref. 7.12)**) will ensure the safety of staff and personnel on the Site.
• *identify and secure opportunities to reduce the causes and impacts of flooding overall during the period of construction; and*	The **Outline CEMP (Doc Ref. 7.8)** provides measures that will be implemented during construction to manage ground condition, avoid uplifts in storm water runoff and protect the AFSA embankment. A surface water drainage scheme will also be developed as part of surface water management measures as secured by the **Outline CEMP (Doc Ref. 7.8)**. The **Outline CEMP (Doc Ref. 7.8)** states that the Principal Contractor will be required to produce an EFRP with the detailed CEMP(s) and sets out the information that this will be required to include. The EFRP will be in place for the construction phase. The implementation of these measures will reduce the impact from flooding.

NPS EN-1 Requirements	FRA Compliance
• *be supported by appropriate data and information, including historical information on previous events.*	Refer to relevant data sources listed in **ES Volume 4, Appendix 10.2: FRA, Section 9.2 (Doc Ref. 5.4)** and **ES Volume 4, Appendix 10.2: FRA, Section 9.4 (Doc Ref. 5.4)** on Historic Flooding.

Annex B: East Stour Hydraulic Modelling Report

Stonestreet Green Solar Farm

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13 February 2024

Revision: 01

Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
00	13 February 2024	CE	SK	ILW

Basis of Report

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Acronyms and Abbreviations

1D	1-Dimensional
2D	2-Dimensional
AEP	Annual Exceedance Probability
AFSA	Aldington Flood Storage Area
DCO	Development Consent Order
DTM	Digital Terrain Model
EA	Environment Agency
ES	Environmental Statement
FEH	Flood Estimation Handbook
FRA	Flood Risk Assessment
GPS	Global Positioning System
ha	Hectares
HC	Higher Central
HMR	Hydraulic Modelling Report
HR	Hydrology Report
HS1	High Speed 1
kV	Kilovolt
LiDAR	Light Detecting and Ranging
mAOD	m Above Ordnance Datum
MW	Megawatt
NGR	National Grid Reference
NPPF	National Planning Policy Framework
PPG	Planning Practice Guidance
PV	Photovoltaic
ReFH2	Revitalised Flood Hydrograph 2
UE	Upper End
UK	United Kingdom

1.0 Introduction

1.1 Background

This Hydraulic Modelling Report ('HMR') has been prepared by SLR Consulting Limited ('SLR') on behalf of EPL 001 Limited ('the Applicant') in relation to the Development Consent Order ('DCO') application for Stonestreet Green Solar ('the Project'). This HMR has been prepared to summarise the construction of a linked 1-Dimensional ('1D') / 2-Dimensional ('2D') hydraulic model of the East Stour and its associated tributaries, developed to inform the Flood Risk Assessment ('FRA') for the Project.

The aim of the model is to evaluate the fluvial flood risk to the Site from the East Stour and its associated tributaries for specific flood events corresponding to the risk categories defined by both the Development Plan Policy and the National Planning Policy Framework[1] ('NPPF') and its associated Planning Practice Guidance[2] (PPG). The model has been used to assess the fluvial flood risk including the effect of flood defences ('the Defended scenario') and without the effect of flood defences ('the Undefended scenario'). In addition, the impact of climate change has been considered.

The output of the hydraulic model is considered to provide the best currently available information on flood risk to the Project.

This HMR should be read in conjunction with the other documents submitted within the Application.

1.2 The Project

The Project comprises the construction, operation, maintenance, and decommissioning of solar photovoltaic ('PV') arrays and energy storage, together with associated infrastructure and an underground cable connection to the existing National Grid Sellindge Substation.

The Project will include a generating station (incorporating solar arrays) with a total capacity exceeding 50 megawatts ('MW'). The agreed grid connection for the for the Project will allow the export and import of up to 99.9 MW of electricity to the grid. The Project will connect to the existing National Grid Sellindge Substation via a new 132 kilovolt ('kV') substation constructed as part of the Project and cable connection under the Network Rail and High Speed 1 ('HS1') railway.

The location of the Project is shown on **ES Volume 3, Figure 1.1: Site Location Plan (Doc Ref. 5.3)**. The Project will be located within the Order limits (the land shown on the **Works Plans (Doc Ref. 2.3)** within which the Project can be carried out). The Order limits plan is provided as **ES Volume 3, Figure 1.2: Order Limits (Doc Ref. 5.3)**. Land within the Order limits is known as the 'Site'. A general Site location plan is provided by **HMR Figure 1**.

1.3 Model Selection

A linked 1D/2D hydraulic model has been selected to quantify the extent and depth of flooding at the Site as this type of model is better able to represent the two-dimensional flow characteristics associated with the expected 'out of bank' flows compared with a full 1D model.

The model has been constructed using the ESTRY/TUFLOW[3] linked hydraulic modelling package. This package is developed and distributed by BMT and is widely used in the UK.

The Site is primarily at risk of flooding from the East Stour River, including from the impounded area of the Aldington Flood Storage Area ('AFSA'). The East Stour River flows generally in a westerly direction through the northern extent of the Site, with the northwestern extremities of the Site lying within the AFSA. Downstream of the AFSA

embankment the channel has been modelled using the 1D ESTRY hydraulic model package which is linked to the 2D TUFLOW hydraulic model package. The AFSA, channels upstream of the AFSA embankment, and out-of-bank overland flow paths have been modelled using TUFLOW.

The TUFLOW 2D computational engine represents flow paths by dividing the floodplain into a grid of individual cells. The flow of water between cells is then computed repeatedly at regular timesteps by solving the 2D shallow-water equations to simulate the passage of the flood wave and estimate the spread of flooding. As each cell contains information on the ground level, flood flows can be routed in any direction and will naturally tend to follow the local topography. These models are therefore ideally suited to cope with topographical variations in the floodplain and areas with complex flow paths.

1.4 Extent of Study Area

The 2D hydraulic model has been constructed to include all the hydraulically significant features in the vicinity of the Site. Some of the key features include the following:

- AFSA embankment and control structures;
- HS1 railway embankment and culverts; and
- Station Road bridge crossings and sluice gate.

The lateral extent of the model was selected to ensure that it encompassed the full extent of the 0.1% Annual Exceedance Probability ('AEP') flood event. The extent of the study area and location of the modelled watercourses is shown on **HMR Figure 2**.

Within the study area is the AFSA which forms part of the Ashford Flood Alleviation Scheme, completed in 1989 to reduce the frequency and intensity of flooding in both the rural and urban areas of Ashford and nearby villages. The works at Aldington were designed to reduce the flood flows from a peak of 19m^3/s for the 1.0% AEP event to just in excess of 4m^3/s for the peak outflow. This was achieved by means of a vortex flow control device located on an unnamed tributary ('Unnamed Tributary 3') south of the East Stour channel, in combination with the construction of an embankment to create a flood storage area which provides temporary detention of the flood volume for discharge at the reduce flow rate over a longer timescale. Upstream of the AFSA embankment flows are diverted into Unnamed Tributary 3 via by a weir located at approximately NGR: TR 06720 38136. The weir ensures that the fish pass through the AFSA embankment remains operational and that the downstream mill wheel can be operated. At Evegate Mill House a sluice gate at approximately NGR: TR 06381 38133 and weir at approximately NGR: TR 06386 38093 control water levels within the East Sour River and divert flows into the Mill Race. The Mill Race and Unnamed Tributary 3 flow back into the East Stour at approximately NGR: TR 06190 38081.

The upstream model boundaries have been set at Harringe Lane, approximately 1km upstream of the Site boundary on the East Stour. On Unnamed Tributaries 1 and 2 the upstream boundary has been set at the A20, approximately 330m northeast of the Site, this is to ensure that any attenuating effects of the M20 road and HS1 railway embankments downstream are represented within the model. On Unnamed Tributary 3 the upstream boundary has been set at Church Lane, approximately 390m east of the AFSA impoundment area. The downstream boundary of the model is set at NGR: TR 05292 38607, approximately 600m northwest of the Site boundary where the local topography constricts the floodplain.

2.0 Data Collection

2.1 2-Dimensional Model Requirements

The construction of 2D hydraulic models requires a number of data sets and parameters which include the following:

- Channel topographic cross-sections;
- Floodplain topography in the form of a digital terrain model (DTM);
- Hydraulic structures;
- Hydrological inputs;
- Hydraulic boundaries; and
- Hydraulic roughness (Manning's n)

2.1.1 Channel Topographic Cross-Sections

2.1.1.1 SLR Topographic Survey

Cross-sections of the river channel were survey by the Land Surveying team at locations specified by the Hydraulic Modelling team. A TS15 total station (Theodolite) was used principally for the survey of the river cross-sections and the elevations of bridges, culverts and other structures. This was supplemented by a Zenith 40 GPS where no line of sight from the Theodolite was available.

Georeferenced ground levels were taken along 13 cross-sections within the study section of the river. To enable the channel to be accurately represented in the 1D domains, cross-sections were specified where a significant change in the river morphology occurred, such as a change in direction, channel width or channel depth.

In addition to the cross-sections, spot level elevations were recorded along Church Lane to the north and south of the M20 and HS1 embankment underpasses, which form a key flow path within the study area. Spot level elevations were also recorded along Evegate Mill Lane immediately north of Unnamed Tributary 3, where the LiDAR DTM showed an unrealistic depression in road levels.

The SLR topographic survey is enclosed at **Annex A**.

2.1.1.2 Environment Agency Supplied Topographic Survey

In addition to the topographic survey undertaken by the Land Surveying team, river channel survey data[4] for the East Stour River and Tributaries were provided by the Environment Agency (EA). The topographic survey included 95 cross-sections within the study section of the river, which were incorporated into the model to accurately represent the East Stour in both the 1D and 2D domains.

J01058 East Stour, Ashford to Stanford Channel Survey undertaken by Maltby Land Surveys Ltd between December 2017 and March 2018 is enclosed at **Annex B**.

2.1.2 Floodplain Topography (DTM)

The 1m composite 2022 filtered aerial photogrammetry (LiDAR) data[5] for the wider study area was obtained from the Defra Website which has been used for the DTM of the wider study area. However, within the land encompassed by the Order limits, UAV Photogrammetry and LiDAR point cloud topographic survey data (obtained by Sensat in January 2022) has been used to define the DTM.

The topography of the study area is shown on **HMR Figure 3** and the topographic survey completed by Sensat is enclosed at **Annex C**

2.1.3 Hydraulic Structures

A number of hydraulic structures cross the East Stour and its associated tributaries within the study area. Details of these structures were obtained as part of the topographic surveys.

The location of the hydraulic structures within the model area is shown on **HMR Figure 4**.

2.1.4 Hydrological Inputs

The derivation of the hydrological inputs used in the model is detailed within Hydrology Report (HR) enclosed at **Annex D** The study area was broken down into five catchments, consisting of four lumped catchment estimates at the upstream extents of the East Stour, Unnamed Tributaries 1, 2 and 3 within the study area. The remaining intervening catchment was split into ten sub-catchments based on the study area topography and watercourses. The study area catchments and sub-catchments are illustrated on **HMR Figure 5**.

For the four lumped catchments peak flows were estimated using a Hybrid Method approach. For the 5% AEP event up to and including 1% AEP event, peak flows were estimated based on the Flood Estimation Handbook (FEH) Statistical Method, utilising single site donor adjusted QMED estimates and pooling group analysis. For the 0.1% AEP event, peak flows were estimated by applying the uplift from the 0.1% AEP event to 1% AEP event peak flow estimate from the FEH Revitalised Flood Hydrograph 2 (ReFH2) method to the Statistical Method 1% AEP event peak flow estimate. As the Statistical Method does not provide a hydrograph, the inflow hydrographs have been derived from ReFH2 method and factored so the critical storm duration winter event matches the final peak flow estimates.

For the intervening catchments, peak flows were estimated using the ReFH2 method.

Flow-Time hydrographs derived for the lumped catchments have been used at the upstream boundaries for the Hydraulic model, with Flow-Time hydrographs derived for the intervening catchment distributed across the reach of the watercourse flowing through the respective sub-catchment.

The final peak flow estimates for the 27.25hr event are set out in **Table 2-1**.

Table 2-1 Model Inflows (27.25hr Event)

Site Code	Annual Exceedance Probability					
	5.0 % Peak Flow (m^3/s)	3.3% Peak Flow (m^3/s)	1.0% Peak Flow (m^3/s)	1.0% + HC CC[1] Peak Flow (m^3/s)	1.0% + UE CC[2] Peak Flow (m^3/s)	0.1% Peak Flow (m^3/s)
ESUS	5.61	6.25	8.59	11.17	13.32	17.65
TRIB1	3.6	4.06	5.89	7.66	9.13	11.57
TRIB2	3.39	3.79	5.21	6.78	8.08	10.80
TRIB3	2.20	2.49	3.88	5.04	6.01	7.19
IES1	1.21	1.33	1.99	2.59	3.09	3.69
IES2	1.43	1.58	2.36	3.07	3.66	4.38
ITRIB1a	0.25	0.27	0.41	0.54	0.64	0.77
ITRIB1b	0.14	0.15	0.23	0.30	0.36	0.44
ITRIB2a	0.10	0.12	0.18	0.23	0.27	0.33

Site Code	Annual Exceedance Probability					
	5.0 % Peak Flow (m^3/s)	3.3% Peak Flow (m^3/s)	1.0% Peak Flow (m^3/s)	1.0% + HC CC[1] Peak Flow (m^3/s)	1.0% + UE CC[2] Peak Flow (m^3/s)	0.1% Peak Flow (m^3/s)
ITRIB2b	0.08	0.09	0.14	0.18	0.21	0.26
ITRIB3	0.71	0.79	1.18	1.53	1.83	2.18
ICULV1	0.24	0.27	0.41	0.53	0.63	0.76
ICULV2	0.37	0.41	0.63	0.82	0.97	1.17
ICHL	0.13	0.15	0.22	0.29	0.35	0.42

Notes:

[1]Higher Central (HC) 2050s epoch climate change allowance for the Stour Management Catchment.

[2]Upper End (UE) 2050s epoch climate change allowance for the Stour Management Catchment.

2.1.5 Hydraulic Boundaries

Hydraulic boundaries were defined sufficiently far enough upstream and downstream of the site ensure that all significant hydraulic features affecting the Site were incorporated into the model. The locations of the upstream and downstream model boundaries is illustrated on **HMR Figure 6**.

2.1.5.1 Upstream Boundaries

The upstream boundaries were selected such that they were sufficiently upstream of the site, and for Unnamed Tributaries 1 and 2 upstream of both the M20 and HS1 embankments. This ensured that any attenuating effects of these embankments would be represented in the hydraulic model.

2.1.5.2 Downstream Boundary

The downstream boundary was selected such that it was well downstream of the Site and any local flow paths suggested by the topography.

A Head-Flow boundary has been selected as the downstream boundary, with the 1D Head-Flow relationship derived from using the conveyance of the downstream model cross-section and slope of the 1D channel immediately upstream of the boundary. The 2D Head-Flow relationships have been derived automatically in TUFLOW by specifying the slope perpendicular to the boundary line.

2.1.6 Hydraulic Scenarios

The hydrological scenarios modelled are summarised in **Table 2-2**, with the critical duration events shown in **bold**.

Table 2-2 Hydraulic Scenarios

Event Duration (Hours)	Annual Exceedance Probability (%)					
	5.0	3.3	1.0	1.0 + HC CC	1.0 + UE CC	0.1
7.25						
8.25	Undefended					
17.25	**Undefended**		Undefended			Undefended
24.25	Undefended		**Undefended**			Defended **Undefended**
27.25			Undefended		Defended	**Defended** Undefended
36.25				Defended	**Defended** **Proposed** **Sensitivity**	Defended
48.25			Defended	**Defended**	Defended	
60.25			**Defended**	Defended		
72.25			Defended			
84.25	Defended	Defended				
96.25	**Defended**	**Defended**				

2.1.7 Hydraulic roughness

Channel and floodplain roughness was represented within the model by Manning's n. Values were initially chosen from those in published texts such as Chow (1959)[6] by comparison with photographs of the river and floodplain taken during the topographic survey.

A universal Manning's n value of 0.040 within the 1D domain of the model was initially selected to represent the river channel under '*normal*' conditions described in published texts as a '*clean, winding, some pools, shoals'*.

Floodplain roughness was represented by the Manning's n values shown in **Table 2-3**. Again these values were selected with reference to standard texts, photographs and engineering judgement.

Table 2-3: Floodplain Manning's n Coefficients

Description	Manning's n value
Default Value	0.035
Buildings	0.300
General Surface (Natural)	0.040
Inland Water	0.035
Landform Slope	0.025
Natural Environment (Woodland)	0.100
Path	0.035
Railway Surfaces	0.035
Roads	0.020

Description	Manning's n value
Roadside	0.035
Unclassified	0.035
Main Channel, clean, winding, some pools and shoals, some weeds and stones	0.045
Main Channel, sluggish reaches, weedy, deep pools	0.070
Scattered Brush and Heavy Weeds	0.050
Light Brush and Trees	0.060
Medium to Dense Brush	0.100

3.0 Model Construction

3.1 Software Version

In line with best practice, the hydraulic model was constructed with the latest ESTRY/TUFLOW software version 2023-03-AB.

3.2 Grid Size and Timestep

A 2D domain was constructed with a 2m grid which was considered an appropriate grid size for the extent of the study area. The model used TUFLOW HPC solver which uses an adaptive timestep. The time stepping used by the HPC solver during the model runs is discussed in **Section 5.4**.

3.3 1D Network

The 1D network was built using a combination of cross-section data from the surveyed cross-sections. The cross-sections were trimmed to the top of banks such that the 1D domain includes only the width of the river channel.

The upstream extents of the 1D network are at the AFSA control structures at NGR: TR 06703 38141 and NGR: TR 06679 37920 extending for an approximate 2.15km reach to the downstream extent of the model at TR 05292 38607. In addition to the 1D network the culverts through the embankments within the study area were modelled in 1D and embedded in the 2D domain.

3.3.1 Structures

A summary of the 1D structures modelled is provided in **Table 3-1** below.

Table 3-1 Modelled 1D Structures

Structure	Location (Easting, Northing)	Details
Church Lane Bridge	608147, 138125	Arch bridge, EA survey section ESTO01_12172. Modelled as I type culvert with default loss parameters. Flow over deck modelled in 2D.
Access Bridge	607801, 138125	Arch bridge, EA survey section ESTO01_11808. Modelled as I type culvert with default loss parameters. Flow over deck modelled in 2D.
Fish Pass	606687, 138135	Culvert with 300mm diameter orifice, EA survey section ESTO01_10574. Orifice dimensions provided by EA separately. Modelled as C type culvert with default loss parameters. Middle interpolate section representing orifice.
Footbridge	606612, 138123	Footbridge, EA survey section ESTO01_10482. Modelled as BB type bridge with default loss parameters. Flow over deck modelled as 1D weir.
Footbridge	606391, 138108	Footbridge, EA Survey Section ESTO10_0028. Modelled as BB type bridge with default loss parameters. Flow over deck modelled as 1D weir.

Structure	Location (Easting, Northing)	Details
Station Road Sluice Gate	606372, 138135	Sluice Gate, EA Survey Section ESTO01_10236. Opening between top of sluice gate and soffit of culvert modelled as dual barrelled R type culverts, with default loss parameters. Flow over deck modelled in 2D.
Station Road Culvert	606372, 138135	Culvert, EA Survey Section ESTO01_10236. Modelled as dual barrelled R type culvert with default loss parameters. Flow over deck modelled in 2D.
Weir	606335, 138130	Weir, EA Survey Section ESTO01_10192. Modelled as a WW type Weir with default loss parameters.
Weir	606330, 138125	Weir, EA Survey Section ESTO01_10190. Modelled as a WR type Weir with default loss parameters.
Access Bridge	606081, 138141	Access Bridge, EA Survey Section ESTO01_09835. Modelled as BArch type bridge with default loss parameters. Flow over deck modelled in 2D.
Footbridge	605670, 138276	Footbridge, EA Survey Section ESTO01_09305. Modelled as BB type bridge with default loss parameters. Flow over deck modelled as 1D weir.
Footbridge	606386, 138096	Footbridge, EA Survey Section ESTO06_0307. Modelled as BB type bridge with default loss parameters. Flow over deck modelled as 1D weir.
Disused Mill Wheel	606381, 138093	Weir, EA Survey Section ESTO06_0301. Modelled as a WW type Weir with default loss parameters.
Station Road Bridge	606333, 138043	Arch bridge, EA survey section ESTO06_0229. Modelled as I type culvert with default loss parameters. Flow over deck modelled in 2D.
Footbridge	606488, 137839	Footbridge, EA survey section ESTO07_0534. Modelled as BB type bridge with default loss parameters. Flow over deck modelled as 1D weir.
Station Road Culvert	606368, 137877	Culvert, EA survey section ESTO07_0354. Modelled as R type culvert with default loss parameters. Flow over deck modelled in 2D.
Hydrobrake	606677, 137919	Hydrobrake, stage discharge curve derived from gauge data provided by the EA. Modelled as Q type depth discharge channel.
Railway Embankment Culvert	607107, 138381	Culvert, SLR survey section CULV1. Modelled as C type culvert with default loss parameters. Upstream invert level based on LiDAR data. Downstream invert level based on survey.
Ditch Connection	606845, 138213	Assumed culvert connection. Modelled as C type culvert with default loss parameters. 500mm assumed diameter based on engineering judgement. Invert levels based on LiDAR data.

Structure	Location (Easting, Northing)	Details
Ditch Connection	606850, 138198	Assumed culvert connection. Modelled as C type culvert with default loss parameters. 500mm assumed diameter based on engineering judgement. Invert levels based on LiDAR data.
Railway Embankment Culvert	607417, 138282	Culvert, SLR survey section CULV2. Modelled as C type culvert with default loss parameters.
M20 Embankment Culvert	608154, 138696	Culvert, SLR photo TRIB1_002_P5. Modelled as R type culvert with default loss parameters. Height: 3.5m, Width: 3.0m, estimated dimensions from site walkover. Invert levels based on LiDAR data.
Railway Embankment Culvert	607689, 138274	Culvert, SLR photos TRIB1_005_P1 and TRIB1_005_P2. Modelled as C type culvert with default loss parameters. 2.4m diameter based on downstream channel width. Upstream invert level based on LiDAR data. Downstream invert level based on surveyed downstream bed level.
Church Lane Ditch Connection	608341, 138600	Assumed culvert connection. Modelled as C type culvert with default loss parameters. 500mm assumed diameter based on engineering judgement. Invert levels based on LiDAR data.
Church Lane Ditch Connection	608303, 138510	Assumed culvert connection. Modelled as C type culvert with default loss parameters. 500mm assumed diameter based on engineering judgement. Invert levels based on LiDAR data.
Church Lane Ditch Connection	608111, 138270	Assumed culvert connection. Modelled as C type culvert with default loss parameters. 500mm assumed diameter based on engineering judgement. Invert levels based on LiDAR data.
Church Lane Ditch Connection	608085, 138241	Assumed culvert connection. Modelled as C type culvert with default loss parameters. 500mm assumed diameter based on engineering judgement. Invert levels based on LiDAR data.
M20 Embankment Culvert	608668, 138387	Culvert, SLR photos TRIB2_001_P1 and TRIB2_001_P2. Modelled as R type culvert with default loss parameters. Height: 2.5m Width: 3.5m, estimated dimensions from site walkover. Invert levels based on LiDAR data.
Railway Embankment Culvert	608570, 138100	Culvert, SLR survey section TRIB2_002b. Modelled as R type culvert with default loss coefficients. Upstream invert level based on LiDAR data. Downstream invert level based on survey.

Structure	Location (Easting, Northing)	Details
Railway Embankment Culvert	608589, 138098	Culvert, no line of sight for survey. Modelled as R type culvert with default loss coefficients. Height: 2.0m Width: 3.0m, based on other railway embankment culverts and engineering judgement. Invert levels based on LiDAR data.

3.4 2D Domain

3.4.1 Topography Updates

A number of topographic features were reinforced or represented in the 2D domain using TUFLOW z shape layers. The details of which are as follows:

- AFSA embankment levels – Embankment and spillway crest levels were reinforced using a wide z shape line at 51.3mAOD and 50.2mAOD respectively. In line with the embankment crest level information provided by the EA.
- Bridge deck levels – Where the 2D ground levels were between bridge soffit and top of deck levels, surveyed top of deck levels have been reinforced using z shape regions, to represent the obstruction to flows.
- Parapet and head walls – Parapet and headwalls have been represented in the 2D domain using thin z shape lines with surveyed top of wall levels.
- Spill levels – Where structure overtopping flows have been modelled in 2D, surveyed spill or road crest level have been reinforced using z shape regions.
- East Stour side weir – For the East Stour River side weir just upstream of the fish pass, crest level have been reinforced using thin z shape line with surveyed levels. The downstream toe of weir has been reinforced using z shape regions with surveyed levels.
- Drainage ditches – Small drainage ditches within the model domain have been reinforced with wide z shape breaklines, from sampled minimum LiDAR levels within a 2m radius of the line.
- National Grid Bund – The bund running along the northern and eastern boundary of the National Grid Sellindge substation has been reinforced using a wide z shape breakline, from sampled maximum LiDAR levels within a 2m radius of the line.
- Top of bank levels – Top of bank levels along the 1D-2D boundaries of the model have been reinforced using wide z shape breaklines, from sampled maximum LiDAR levels within a 2m radius of the line.
- Road levels – Road levels along the Church Lane underpasses under the M20 and railway have been reinforced with surveyed road crest levels using z shape regions. Additionally, road levels along Station Road immediately north of Unnamed Tributary 3 have been reinforced with a z shape region using surveyed road crest levels, to fill a topographic low spot in the underlying LiDAR DTM.
- Smoothing – In order to smoothly tie in the areas of the DTM defined by the Sensat Topographic Survey with those defined by the LiDAR data z shape regions have been digitized around the boundary of the Sensat Topographic survey to smooth any differences in Surveyed and LiDAR level.

3.4.2 Buildings and Dense Vegetation

The obstruction to flood flows by buildings within the model domain has been represented by updating the manning's n coefficient for the building footprints to be 0.300.

Hedges, woodlands, and other dense stand of vegetation within the model domain have been represented by updating the manning's n coefficients for areas to values between 0.050 and 0.100 based on aerial imagery, observations from the site walkover, and engineering judgement.

3.4.3 Structures

A summary of the 2D structures modelled is provided in **Table 3-2** below.

Table 3-2 Modelled 2D Structures

Structure	Location (Easting, Northing)	Details
Footbridge	608816, 137925	Footbridge, EA survey section ESTO01_12946. Modelled using BG loss layer, with a peak form loss coefficient of 0.281.
Footbridge	608570, 138029	Footbridge, EA survey section ESTO01_12641. Modelled using BG loss layer, with a peak form loss coefficient of 0.286.
Footbridge	608496, 138049	Footbridge, EA survey section ESTO01_12552. Modelled using BG loss layer, with a peak form loss coefficient of 0.260.
Footbridge	607359, 138176	Footbridge, EA survey section ESTO01_11320. Modelled using BG loss layer, with a peak form loss coefficient of 0.255.
Footbridge	607201, 138173	Footbridge, EA survey section ESTO01_11157. Modelled using BG loss layer, with a peak form loss coefficient of 0.259.
Footbridge	606809, 138209	Footbridge, EA survey section ESTO01_10723. Modelled using BG loss layer, with a peak form loss coefficient of 0.254.
Weir	606719, 138147	Weir, EA survey section ESTO07_0986. Weir geometry reinforced in 2D domain using ZSH layers.

Structure	Location (Easting, Northing)	Details
Footbridge	607675, 138205	Footbridge, SLR survey section TRIB1_006. Modelled using BG loss layer, with a peak form loss coefficient of 0.279.

3.5 1D/2D boundary

The upstream 1D boundaries were defined using TUFLOW SX regions set within the upstream 2D channels immediately upstream of the AFSA embankment. Within the 1D modelled reach the 1D/2D boundaries were defined using TUFLOW HX lines set at the top of banks.

3.6 Inputs

The inputs to the model were applied as Flow-Time boundaries at the upstream boundaries of the model and as distributed lateral inflows throughout the modelled reaches. Head-Flow boundaries were applied at the downstream boundary in both the 1D and 2D domains to prevent any glass walling effects.

3.7 Post Development Scenarios

A number of new hedges are proposed as part of the landscaping strategy. The new hedges have been incorporated into the post development scenario using a manning's n value of 0.100 to represent the increased obstruction to flood flows.

The locations of the new proposed hedges is illustrated on **HMR Figure 7**.

3.7.1 Fence Blockage Scenarios

In addition to the impact assessment of the new proposed hedges, the potential impact of debris build up against the proposed fences within the floodplain has been assessed. Potentially debris sources and pathways were qualitatively assessed using engineering judgement to identify locations most at risk of blockage.

Two post development blockage scenarios were assessed, one consisting of a 25% blockage ratio and one consisting of a 50% blockage ratio. These were modelled using Cell Width Factor ('CWF') units, with a 0.75 CWF and 0.5 CWF applied for the 25% blockage and 50% blockage scenario respectively. Both blockage scenarios also include the new proposed hedges.

The location of the blockages assessed is illustrated on **HMR Figure 7**.

4.0 Sensitivity Analysis

In line with good practice, the following parameters and variables for the model for the 1% AEP event + UE CC have been varied by +/- 20%:

- Model inflows;
- Downstream boundary conditions; and
- Channel and floodplain roughness.

Additionally, cell size convergence was assessed by running the model with a 1m cell size.

4.1 Model Inflows

A sensitivity analysis has been undertaken on the model inflow to ensure that the model is not overly sensitive to the flow selected. The inflow was adjusted by +/- 20% and the results are summarised below:

- A 20% increase in model inflows, resulted in minor increases in flood extents within the AFSA, with more substantial increases in flood extent seen along the southern floodplain downstream of the AFSA. Within the AFSA, flood depths are shown to increase by approximately 30mm, with increases downstream of the AFSA generally between 40mm to 70mm.
- A 20% decrease in model inflows, resulted in minor decreases in flood extents within the AFSA, with more substantial decreases in flood extent seen along the southern floodplain downstream of the AFSA. Within the AFSA, flood depths are shown to decrease by approximately 30mm, with decreases downstream of the AFSA generally between 40mm to 90mm.
- The change in modelled flood extents and depths in response to a variation in model inflow show the expected relationship. The model results are not shown to be overly sensitive to the model inflows selected.

The variation on modelled flood extents in response to a variation in model inflow is illustrated on **HMR Figure 8**.

4.2 Downstream Boundary Conditions

A sensitivity analysis has been undertaken on the downstream boundary condition to ensure the model is not overly sensitive to the downstream boundary condition selected. The slope of the downstream boundary was adjusted by +/-20% and the results are summarised below:

- Variations in downstream boundary slope resulted in negligible changes in modelled flood extents.
- A 20% increase in downstream boundary slope reduced water levels at the downstream boundary by 65mm. With no change in water level shown from 250m upstream of the downstream boundary.
- A 20% decrease in downstream boundary slope increased water levels at the downstream boundary by 28mm. With no change in water level shown from 290m upstream of the downstream boundary.
- The change in modelled water levels in response to variation in downstream boundary slope show the expected relationship. The model results are not overly sensitive to the downstream boundary condition selected with the model results at the Site unaffected by variations in downstream boundary slope.

4.3 Hydraulic Roughness

A sensitivity analysis has been undertaken on the manning's n roughness coefficient selected to ensure the model is not overly sensitive to changes in manning's n coefficient. The manning's n coefficient was adjusted by +/- 20% and the results are summarised below:

- A 20% increase in manning's n coefficients resulted in minor increase in modelled flood extents. Within the AFSA, no changes in modelled flood depths can be seen. Downstream of the AFSA, increases in flood depths are generally shown between 30mm to 50mm.
- A 20% reduction in manning's n coefficients resulted in minor decreases in modelled flood extents. Within the AFSA, no changes in modelled flood depths can be seen. Downstream of the AFSA, decreases in flood depths are generally shown between 30mm to 70mm.
- The change in modelled flood extents and depths in response to a variation in model roughness show the expected relationship. The model results are not shown to be overly sensitive to the manning's n coefficients selected.

The variation in modelled flood extent in response to a variation in model roughness is illustrated on **HMR Figure 9**.

4.4 Cell Size Convergence

A sensitivity analysis has been undertaken on the model cell size selected to ensure that the cell size selected is sufficiently detailed to accurately represent the flow paths present. The cell size resolution was adjusted from 2m to 1m. Only minor changes in modelled extent can be seen as a result of increase the cell size resolution to 1m grid, as such the 2m model resolution is sufficient to accurately represent the flow paths present.

The variation in modelled flood extent in response to model cell size is illustrated on **HMR Figure 10**.

4.5 Summary

Sensitivity testing was undertaken on key model, including model inflows, downstream boundary condition, model roughness and model cell size. The model results demonstrate the expected relationships in response to variations in the key modelling parameters and are not shown to be overly sensitive to the key modelling parameters selected.

5.0 Model Validation and Health

5.1 Validation against Ashford Borough Council SFRA Mapping

The Ashford Borough Council ('ABC') Strategic Flood Risk Assessment ('SFRA')[7] mapping for Flood Zone 3b, considered as the 5% AEP or 4% AEP flood extent where modelled, and precautionarily the EA Flood Zone 3 extent where not mapped. The validation process using these flood extents has been undertaken as follows:

- For areas of the model downstream of the AFSA, comparison of model results for the 5% AEP Undefended event; and
- For areas within and upstream of the AFSA: the modelled 0.1% AEP Defended flood extent has been used in line with the definition of Flood Zone 3b. This aligns with the definition of flood zones in the PPG which states that land that is design to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% AEP of flooding) will normally be defined as the Functional Floodplain.

ABC's mapping of Flood Zone 3b and equivalent modelled flood extents are illustrated on **HMR Figure 11.**

As can be seen on **HMR Figure 11,** downstream of the confluence of the East Stour River and Mill Race at NGR: TR 06194 38085, where the Flood Zone 3b has been based on the 5% AEP modelled extent for the Ashford Fluvial Modelling[8] study, the modelled extent for the 5% AEP Undefended scenario is broadly similar to the mapped extent for Flood Zone 3b.

Upstream of the confluence within the AFSA, Flood Zone 3b has been based on the EA Flood Map for Planning[9] Flood Storage Areas extent. The modelled 0.1% AEP Defended extents are shown to be larger, particularly to the north of the AFSA. With reference to **ES Volume 4, Annex 10.2 Flood Risk Assessment (Doc Ref. 5.4), Section 7.12** there are a number of key points of difference between the Ashford Fluvial Model and this study which may explain the discrepancy in extent. In particular, stage discharge gauge data for the AFSA hydrobrake indicate that current peak discharge rate modelled is lower than specified in the original design.

Upstream of the AFSA, Flood Zone 3b has been precautionarily based on the EA Flood Zone 3 mapping. As expected, the modelled flood extents for the 5% AEP Undefended scenario are shown to be substantially smaller.

The similarity of the extents downstream of the AFSA indicates that the model is representative of the current understanding of flood risk in the area. Upstream of the AFSA, the differences in flood extent are expected and as such not a cause of concern.

5.2 Validation against Environment Agency Mapping

To validate the modelled flood extents, the 1% AEP and 0.1% AEP Undefended modelled flood extents were compared to the EA Flood Map for Planning Flood Zones 3 and 2 respectively.

5.2.1 Flood Zone 3

The EA mapping of Flood Zone 3 and equivalent modelled 1% AEP Undefended flood extent are illustrated on **HMR Figure 12.**

As can be seen on **HMR Figure 12**, downstream of the confluence of the East Stour River and Mill Race, where it is understood that Flood Zone 3 is based on the Ashford Fluvial Modelling study, the modelled extents are shown to closely match the Flood Zone 3 mapping.

Upstream of the confluence it is understood that Flood Zone 3 is based on coarse national scale flood zone mapping. Between the confluence and the AFSA, the modelled extents are broadly similar to the Flood Zone 3 mapping. Within the AFSA, modelled extents are similar particularly to the north, with reductions in extent seen to the south. Upstream of the AFSA significant reductions in extent are seen. The discrepancy in modelled extent upstream of the AFSA embankment may be due to improved representation of channel conveyance in finer scale model developed for this study, the representation of the Undefended scenario, and the hydrological inputs for this study calculated for critical flood events at the site.

Within the areas of the site where development is proposed, the modelled extents indicate that the model is representative of the current understanding of flood risk in the area.

5.2.2 Flood Zone 2

The EA mapping of Flood Zone 2 and equivalent modelled 0.1% AEP Undefended flood extent are illustrated on **HMR Figure 13**.

As can be seen on **HMR Figure 13**, downstream of the confluence of the East Stour River and Mill Race, where it is understood that Flood Zone 2 is based on the Ashford Fluvial Modelling study, the modelled extents are shown to closely match the Flood Zone 2 mapping.

Upstream of the confluence, it is understood that Flood Zone 2 is based on a combination of historic flood outlines and coarse national scale flood zone mapping. Between the confluence and the AFSA the modelled extents are shown to be broadly similar. Within the AFSA, where Flood Zone 2 is understood to be based on historic flood outlines, the modelled extents are shown to be substantially smaller. This discrepancy is likely due to the AFSA restricting flows during the historic flood event, leading to a larger flood extent. Additionally it is noted that the Flood Zone 2 extent to the south of the confluence of Unnamed Tributary 1 and the East Stour River at NGR: TR 07680 38219, does not follow the local topography, demonstrated by Flood Zone 2 extending over a hill.

Upstream of the AFSA, where Flood Zone 2 is understood to be based on coarse national scale flood zone mapping, the modelled extents are shown to be broadly similar.

Within the areas of the site where development is proposed and upstream of the AFSA, the modelled extents indicate that the model is representative of the current understanding of flood risk in the area.

5.3 Validation against Historic Flood Information

In order to validate the Defended scenario model, the modelled flood extents have been compared to aerial imagery of the November 2000 flood event illustrated on **HMR Figure 14**.

During the November 2000 flood event, peak flow at the South Willesborough gauge[10] reached 17.30m^3/s, which is located approximately 5km downstream of the study area. Adjusting for the approximate 13% increase in catchment area between the gauge and the downstream extent of the model a peak flow of 15.27m^3/s is expected at the downstream extent of the model for a similar event. This peak flow is between the peak flow of 13.4m^3/s for the 27.25 hour 1% AEP event and 16.9m^3/s for 36.25 hour 1% AEP event.

As can be seen on **HMR Figure 14**, the flood extents for these events are broadly similar to aerial imagery of flooding, with good agreement of the overland flow routes through the floodplain downstream of the AFSA. Additionally, good agreement can be seen between the modelled extent impounded by the AFSA and aerial imagery.

During the February 2014 flood events, peak flood levels are the AFSA gauge reached 50.3mAOD on the 15th February, with peak flows at the South Willesborough gauge reaching 11.50m^3/s. Adjusting for the increase in catchment area, a peak flow of 10.15m^3/s is

expected at the downstream extent of the model for a similar event. This peak flow is the same as for the 96.25 hour 3.3% AEP event, where peak flood levels at the AFSA reached 50.26mAOD. JBA's analysis[11] found that the event had an annual probability of occurrence between 3.3% and 6.7% along the East Stour.

The modelled flood extents and peak flows for the defended scenario show good agreement with the historic flood information, indicating that the model is representative of the current day flood risk to the Site.

5.4 Model Health

The TUFLOW HPC solver is an explicit solution which conserves volume, as such the adaptive timestep selected and three key control numbers are used to assess model stability.

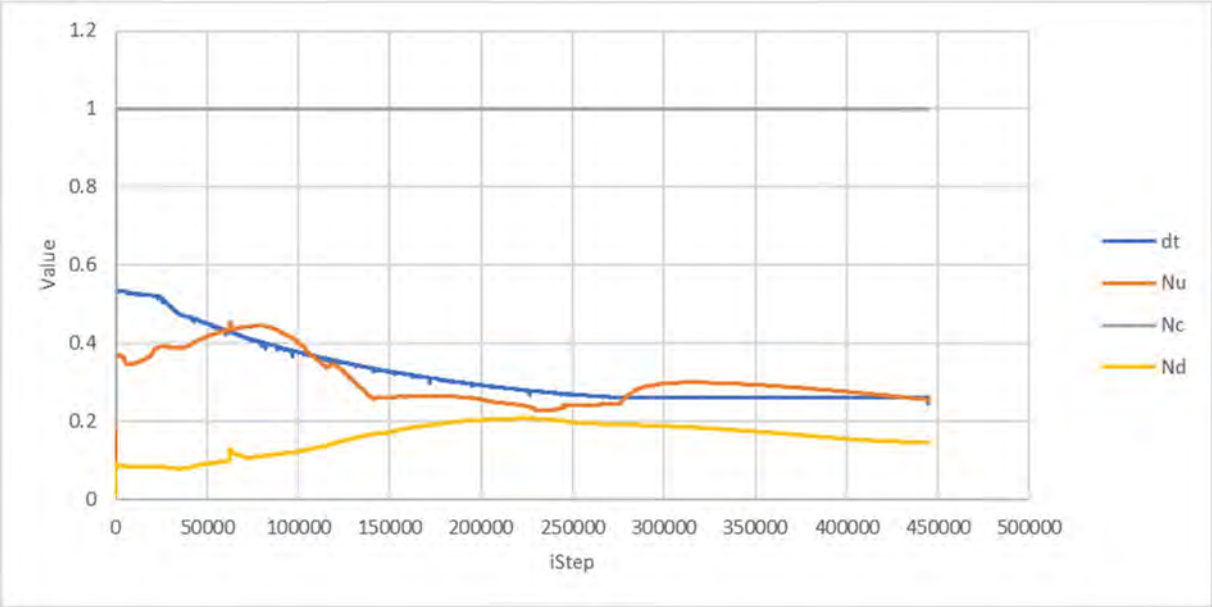
5.4.1 Defended Scenario

For the Defended scenario cumulative mass error remains below 0.3% as is expected when using a volume conserving solver. The adaptive timestep selected and Nu, Nc, and Nd control numbers for the pre-development 1% AEP + UE CC event are plotted in **Figure 5-1**. Referring to these model parameters and values plotted in **Figure 5-1**:

- The timestep (dt) selected by the HPC solver should not fall below 1/10th of the timestep value that would be selected for a TUFLOW Classic model. In the case of a model with a 2m cell size the HPC timestep should not fall below 0.04 seconds. As can be seen in **Figure 5-1**, dt remains above 0.04 seconds for the duration of the modelled event.
- Courant number (Nu) should not exceed 1.0, as can be seen Nu remains below 1.0 for the duration of the modelled event.
- Wave speed number (Nc) should not exceed 1.0, as can be seen Nc remains at 1.0 for the duration of the modelled event.
- Moment diffusion number (Nd) should not exceed 0.3, as can be seen Nd remains below 0.3 for the duration of the modelled event.

The timesteps selected by the HPC solver and control number outputs indicate that the model is healthy and stable.

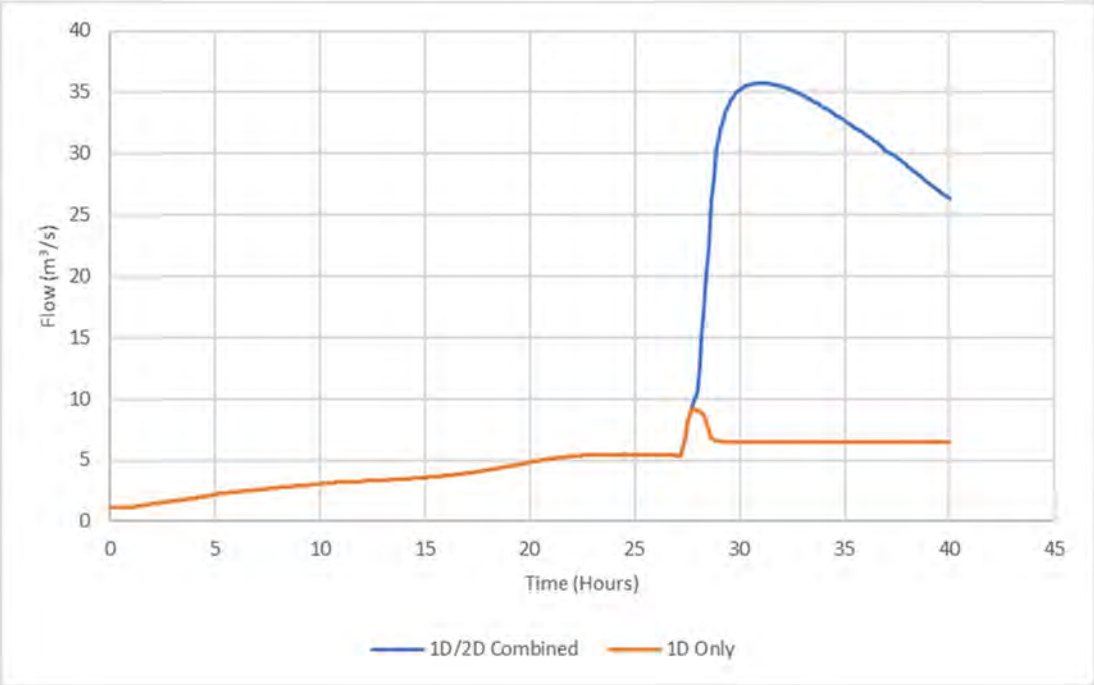
Figure 5-1: Plot of Defended Scenario HPC Timestep and Control Numbers



A review of the modelled flows, show that a spike in 1D flows can be observed at the footbridge structures when upstream water levels reach the soffit level. The increase in flow occurs as a result of pressure flow occurring initially when the upstream water levels reach the bridge soffit, as the downstream water levels increase the flow regime transitions to drowned flow which has higher energy losses and therefore reduced flow.

A plot of the 1D and combined 1D-2D flows at the footbridge at NGR: TR 05664 38273 (EA survey section ESTO01_09305) is shown in **Figure 5-2**. This shows the spike in 1D flows and that this spike in flow does not impact the peak 1D-2D combined flow, as such the spike in 1D flows is not expected to affect the modelled maximum flood depths, extent or flows when considering the whole 1D-2D model.

Figure 5-2: ESTO01_09305 Modelled Flows



5.4.2 Undefended Scenario

For the Undefended scenario cumulative mass error reaches 1.46%, which is associated with the 1D-2D model boundaries. It is noted that a 2% to 3% cumulative mass error can be considered acceptable in TUFLOW depending on the objectives of the modelling. Given that the design flood levels have been based on the Defended scenario not the Undefended scenario, the cumulative mass error in the Undefended results has no impact on the Project design. Additionally, the location of the 1D upstream boundary has been optimised for the Defended scenario, and retained in the Undefended model to ensure the representation of the different scenarios is as similar as possible.

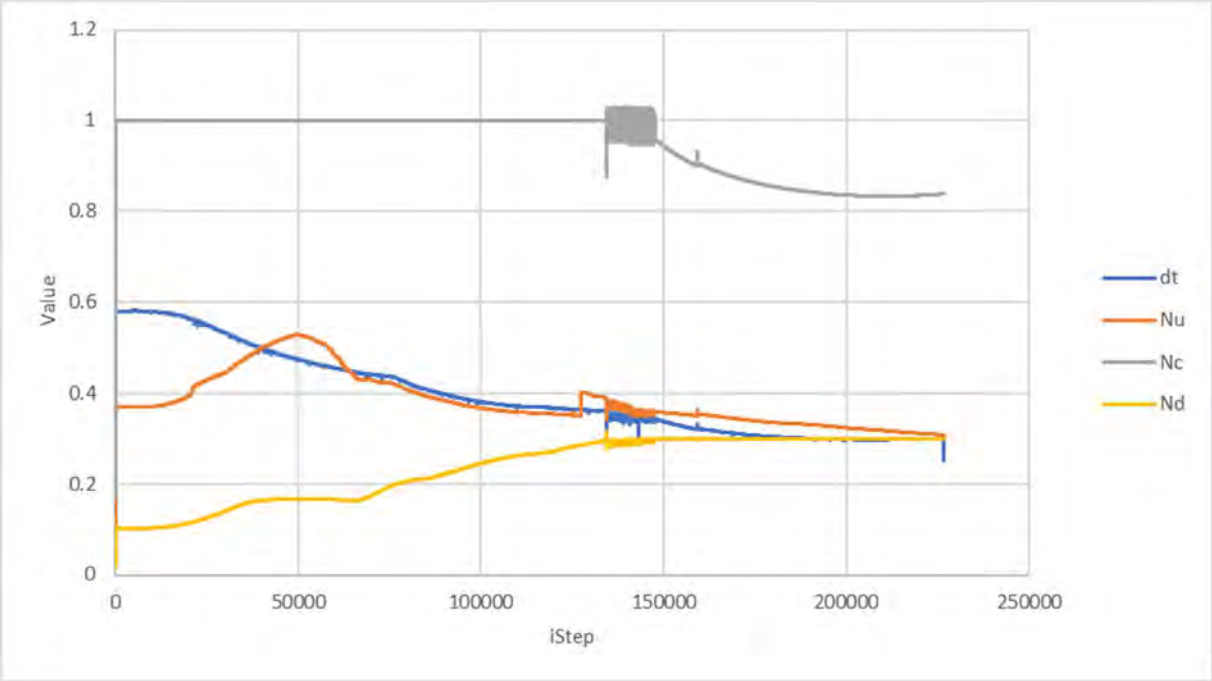
The adaptive timestep selected and Nu, Nc, and Nd control numbers for the pre-development Undefended scenario 0.1% AEP event are plotted in **Figure 5-3**. Referring to these model parameters and values plotted in **Figure 5-3**:

- dt remains above 0.04 seconds for the duration of the modelled event.
- Courant number (Nu) should not exceed 1.0, as can be seen Nu remains below 1.0 for the duration of the modelled event.
- Wave speed number (Nc) should not exceed 1.0, as can be seen Nc oscillates above and below 1.0 during the modelled event. Exceedances in control numbers are to be expected while model timestep is reducing and are an indicator that the initial timestep selected by the HPC solver was too large. This indicates that the model timesteps are limited by wave speed number, given that dt remains above 0.04 seconds the model remains healthy and stable.
- Moment diffusion number (Nd) should not exceed 0.3, as can be seen Nd remains at or below 0.3 for the duration of the modelled event.

The timesteps selected by the HPC solver and control number outputs indicated the model is healthy and stable.

The same spike in 1D flows at footbridge structures observed for the Defended scenario model are also present in the Undefended scenario. As for the Defended scenario model this spike is not expected to affect the modelled maximum flood depths, extent or flows when considering the whole 1D-2D model.

Figure 5-3: Plot of Undefended Scenario HPC Timestep and Control Numbers



5.5 Summary

Validation of the modelled flood extents and flows for the Defended scenario has been undertaken against historic flood information and found good agreement in modelled extents and flows for similar annual probability of occurrence historic events. This indicates that the Defended model is representative of the current day flood risk.

Validation of the modelled flood extents for the Undefended scenario has been undertaken against ABC's and the EA Flood Zone mapping and found good agreement in modelled flood extents where Flood Zones have been based on detailed modelling. Where Flood Zones have been based on coarse national scale modelling broad agreement with modelled flood extents can be seen. Where Flood Zones have been based on historical flood outlines poor agreement can be seen, which is due to the AFSA impounding flows during the recorded flood events increasing flood extents. Outside of the AFSA the Undefended model is representative of the current understanding of flood risk in the area.

The cumulative mass error, HPC timesteps and control numbers for Defended scenario indicate the model is healthy and stable.

There is slightly higher cumulative mass error for the Undefended scenario results compared with the Defended model. However, given the Undefended model has not been used for the Project's design this result is considered acceptable. The HPC timesteps and control numbers indicate the model is healthy and stable.

6.0 Model Results

6.1 Pre-Development Defended Model

6.1.1 5.0% AEP

The extent and depth of flooding expected in response to the 5.0% AEP event is illustrated on **HMR Figure 15.**

During the 5.0% AEP event, the AFSA is shown to reach full capacity during the critical duration 96.25 hour event, with the peak flow of 4.1m^3/s over the spillway.

Downstream of the AFSA, almost the entirety of Field 24 is shown to be inundated with flood depths predominantly below 100mm. In Field 23 a small overland flow route can be seen with flood depths remaining below 100mm. The remainder of the Project downstream of the AFSA is shown to remain flood free, and only small extents of out of bank flooding can be seen downstream of Station Road.

6.1.2 3.3% AEP

The extent and depth of flooding expected in response to the 3.3% AEP event is illustrated on **HMR Figure 16**.

During the 3.3% AEP event, the AFSA is shown to reach full capacity, with a peak flow of 6.3m^3/s over the spillway.

Downstream of the AFSA, almost the entirety of Field 24 is shown to be inundated with flood depths predominantly below 100mm. In Field 23 flood depths are shown to remain below 300mm. In Field 19 some overland flow routes can be seen with flood depths remaining predominantly below 100mm.

6.1.3 1.0% AEP

The extent and depth of flooding expected in response to the 1.0% AEP event is illustrated on **HMR Figure 17**.

During the 1.0% AEP event, the AFSA is shown to reach full capacity, with a peak flow of 14.5m^3/s over the spillway.

Downstream of the AFSA, the entirety of Field 24 is shown to be inundated with flood depths predominantly between 100mm to 200mm. In Field 23 flood depths are predominantly between 100mm to 300mm. The majority of Field 19 is shown to be inundated with the flood depths predominantly below 100mm, however deeper extents of flooding reaching approximately 400mm can be seen along the primary overland flow routes.

6.1.4 1.0% AEP + HC CC

The extent and depth of flooding expected in response to the 1.0% + HC CC AEP event is illustrated on **HMR Figure 18**.

During the 1% AEP + HC CC event, the AFSA is shown to reach full capacity, with a peak flow of 23.5m^3/s over the spillway.

Downstream of the AFSA, the entirety of Field 24 is shown to be inundated with flood depths predominantly between 200mm to 300mm. In Field 23 flood depths are predominantly between 200mm and 400mm. The majority of Field 19 is shown to be inundated with flood depths predominantly below 200mm, however deeper extents of flooding reaching approximately 500mm can be seen along the primary overland flow routes. Small extents of flooding can also be seen along the northern boundaries of Fields 16 and 18 remaining below 100mm.

6.1.5 1.0% AEP + UE CC

The extent and depth of flooding expected in response to the 1.0% + UE CC AEP event is illustrated on **HMR Figure 19**.

During the 1% AEP + UE CC event, the AFSA is shown to reach full capacity, with a peak flow of 30.8m^3/s over the spillway.

Downstream of the AFSA, the entirety of Field 24 is shown to be inundated with flood depths predominantly between 300mm and 400mm. In Field 23 flood depths are predominantly between 200mm and 400mm. The majority of Field 19 is shown to be inundated with flood depths predominantly below 300mm, however deeper extents of flooding reaching approximately 550mm can be seen along the primary overland flow routes. Small extents of flooding can also be seen along the northern boundaries of Fields 16 and 18 remaining below 200mm.

6.1.6 0.1% AEP

The extent and depth of flooding expected in response to the 0.1% AEP event is illustrated on **HMR Figure 20**.

During the 0.1% AEP event, the AFSA is shown to reach full capacity, with a peak flow of 41.4m^3/s over the spillway.

Downstream of the AFSA, the entirety of Field 24 is shown to be inundated with flood depths predominantly between 300mm and 400mm. In Field 23 flood depths are predominantly between 200mm and 500mm. The majority of Field 19 is shown to be inundated with flood depths predominantly between 100mm and 400mm, however deeper extents of flooding reaching approximately 600mm can be seen along the primary overland flow routes.

An analysis of the results indicate that the flooding extent is very similar to the 1% HC CC AEP event, with an increase in flood inundation reaching across into Field 18 where a maximum depth of 0.2m is modelled at the northern extent. A maximum depth of 0.6m and 3.9m is modelled in Field 19 and Field 28 during this event. Small extents of flooding can be seen along the northern boundaries of Fields 16 and 18 predominantly below 200mm, with some small extents between 200mm and 300mm.

6.2 Pre-Development Undefended Model

6.2.1 5.0% AEP

The extent and depth of flooding expected in response to the 5.0% AEP event is illustrated on **HMR Figure 21**.

During the 5.0% AEP event, the model shows in the absence of the existing defences, the majority of Fields 19, 23 and 24 are at risk of flooding.

6.2.2 1.0% AEP

The extent and depth of flooding expected in response to the 1.0% AEP event is illustrated on **HMR Figure 22**.

During the 1.0% AEP event, the model shows in the absence of existing defences, the majority of Fields 19, 23 and 24 are at risk of flooding. Additionally, small extents of flooding can be seen along the northern boundaries of Field 16 and 18.

6.2.3 0.1% AEP

The extent and depth of flooding expected in response to the 0.1% AEP event is illustrated on **HMR Figure 23**.

During the 0.1% AEP event, the modelling shows in the absence of the existing defences, the majority of Fields 19, 23 and 24 are at risk of flooding. Additionally, Fields 16 and 18 are shown to be partially inundated along their northern boundaries.

6.3 Impact Assessment

6.3.1 Hedges

The change in modelled flood depths and extent as a result of the proposed hedges for the design 1% AEP + UE CC event is illustrated on **HMR Figure 24**.

As can be seen, there proposed hedges only have small localised impacts on flood depths around Fields 23 and 24, with increases remaining below 5mm.

The proposed hedges have minimal impacts on local flood risk.

6.3.2 Fence Blockage

The change in modelled flood depth and extent as a result of the 25% blockage scenario is illustrated on **HMR Figure 25**, with the change as a result of the 50% blockage scenario illustrated on **HMR Figure 26**.

As can be seen, the 25% blockage scenario results in minor increases in modelled flood depths around Fields 23 and 24 and to the north of Field 19. Increases in flood depths are shown to remaining below 5mm.

The 50% blockage scenario results in increases in flood depths remaining below 5mm around Fields 23 and 24 and to the north of the eastern half of Field 19. To the north of the western half of Field 19 increases in flood depths are shown to remain below 10mm.

The potential blockage of proposed fences have minimal impacts on local flood risk.

7.0 Conclusion

This HMR has been prepared by SLR on behalf of EPL 001 Limited ('the Applicant') in relation to the DCO application for Stonestreet Green Solar ('the Project'). This HMR has been prepared to summarise the construction of a linked 1D-2D hydraulic model of the East Stour and its associated tributaries, developed to inform the FRA for the Project.

A detailed linked 1D-2D hydraulic model has been developed to quantify the flood risk to the Site based on detailed topographic survey data of the East Stour River and LiDAR data.

The modelled flood extents for the Defended scenario have been validated against historic flood information, included AFSA level gauge data, South Willesborough flow gauge data, and aerial imagery of flood extents. The results of this show that the Defended model is representative of the current day flood risk.

The modelled flood extents for the Undefended scenario have been validated against ABC and EA Flood Zone mapping. The results of this show that the model is representative of the current day understanding of the flood risk in absence of defences.

Sensitivity testing and review of key model health indicators show that the model is stable and healthy, with effects of varying various model parameters showing the expected relationship.

The Defended model shows that the standard of protection for the AFSA is below a 5% AEP event. This is in line with the flood history provided for the area, with the AFSA reaching full capacity on two occasions since it's construction in 1989 in 2000 and 2014.

Analysis of the impact of the Project on local flood risk, shows that there are minimal impacts with maximum increases in flood depths remaining below 5mm. Additionally, analysis was undertaken assessing two blockage scenarios, these also resulted in minimal impacts with maximum increases in flood depths remaining below 5mm for the 25% blockage scenario and 10mm for the 50% blockage scenario.

The flood risk to the Project and impacts on flood risk is discussed in further detail in **ES Volume 4, Appendix 10.2: Flood Risk Assessment (Doc Ref. 5.4)**.

In conclusion, the model is stable and shows good agreement with historic and existing flood risk data for the area. The model is considered to be robust and to provide the best currently available information on the flood risk to the Site.

8.0 References

[1] Department for Levelling Up, Housing and Communities, (2023). *National Planning Policy Framework*.

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[6] Chow, V.T. (1959), *Open Channel Hydraulics*. McGraw-Hill, New York

[7] Jeremy Benn Associates Ltd (2014), *Ashford Borough Council – Strategic Flood Risk Assessment [online]*. Available at: https://www.ashford.gov.uk/planning-and-development/planning-policy/adopted-development-plan-documents/adopted-local-plan-to-2030/local-plan-2030-evidence-base/local-plan-natural-and-built-environment-background-documents/ (Accessed September 2023)

[8] Jeremy Benn Associates Ltd (2012), *South Ashford 2D modelling Study 2010*

[9] Environment Agency (2023), *Flood Map for Planning [online]*. Available at: https://flood-map-for-planning.service.gov.uk/ (Accessed September 2023)

[10] Environment Agency (2023), *Open Hydrology Data – 15min Flow time series for South Willesborough [online]*. Available at: https://environment.data.gov.uk/hydrology/station/4d26d073-72fd-433d-811c-c964779ac260 (Accessed September 2023)

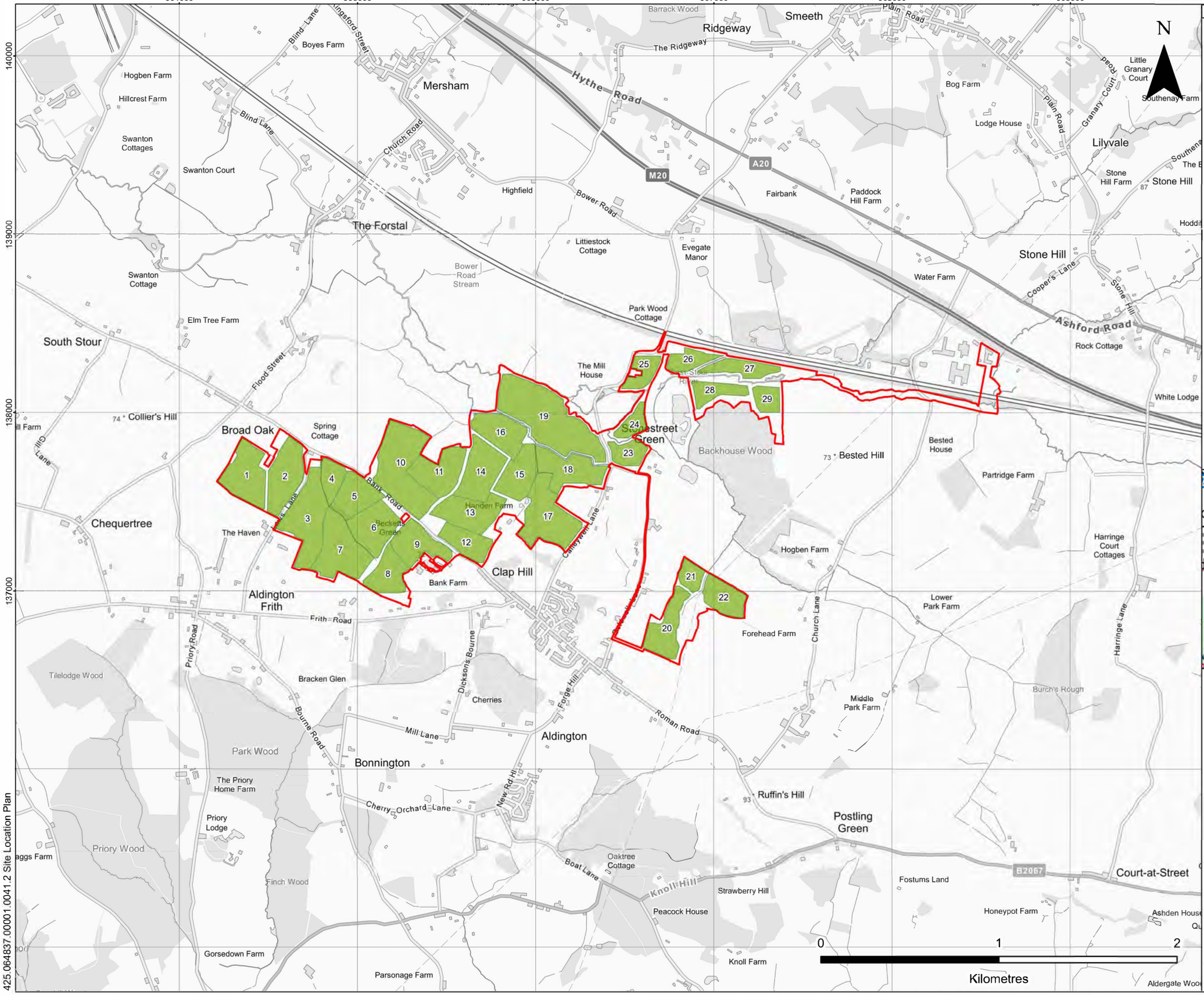
[11] Jeremy Benn Associates Ltd (2014), *2013 – 2014 Post Flood Analysis: Kent & South London Area*

Figures

Annex B: East Stour Hydraulic Modelling Report

Stonestreet Green Solar Farm

EPL 001 Limited



LEGEND

Order limits

Field

APFP Regulation: 5(2)(o)

SLR

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

SITE LOCATION PLAN

HMR Figure 1

Scale	Date
1:20,000 @ A3	MAY 2024

425.064837.00001.0041.2 Site Location Plan

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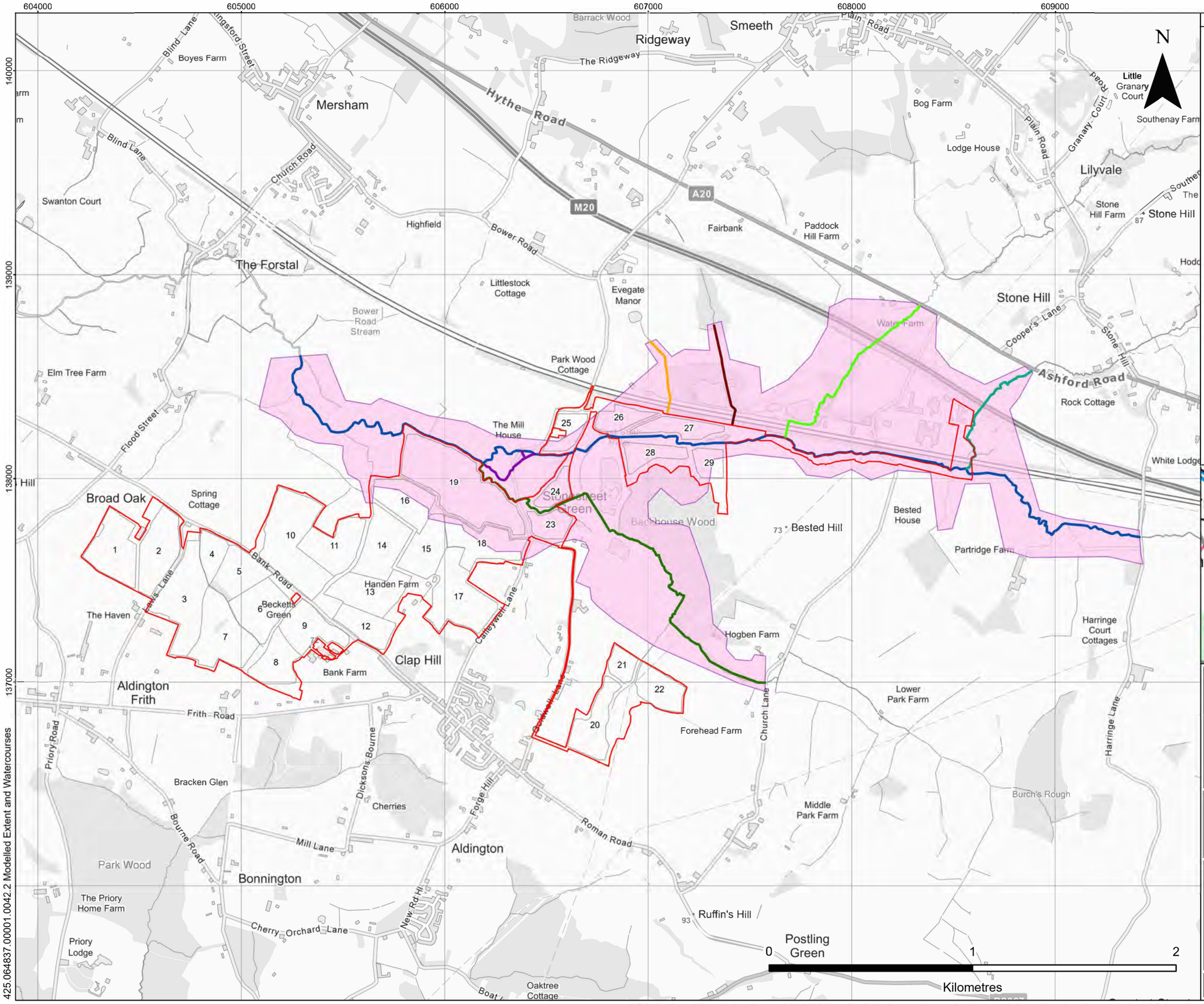

SLR

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

MODELLED EXTENT AND WATERCOURSES

HMR Figure 2

Scale	Date
1:17,500 @ A3	MAY 2024

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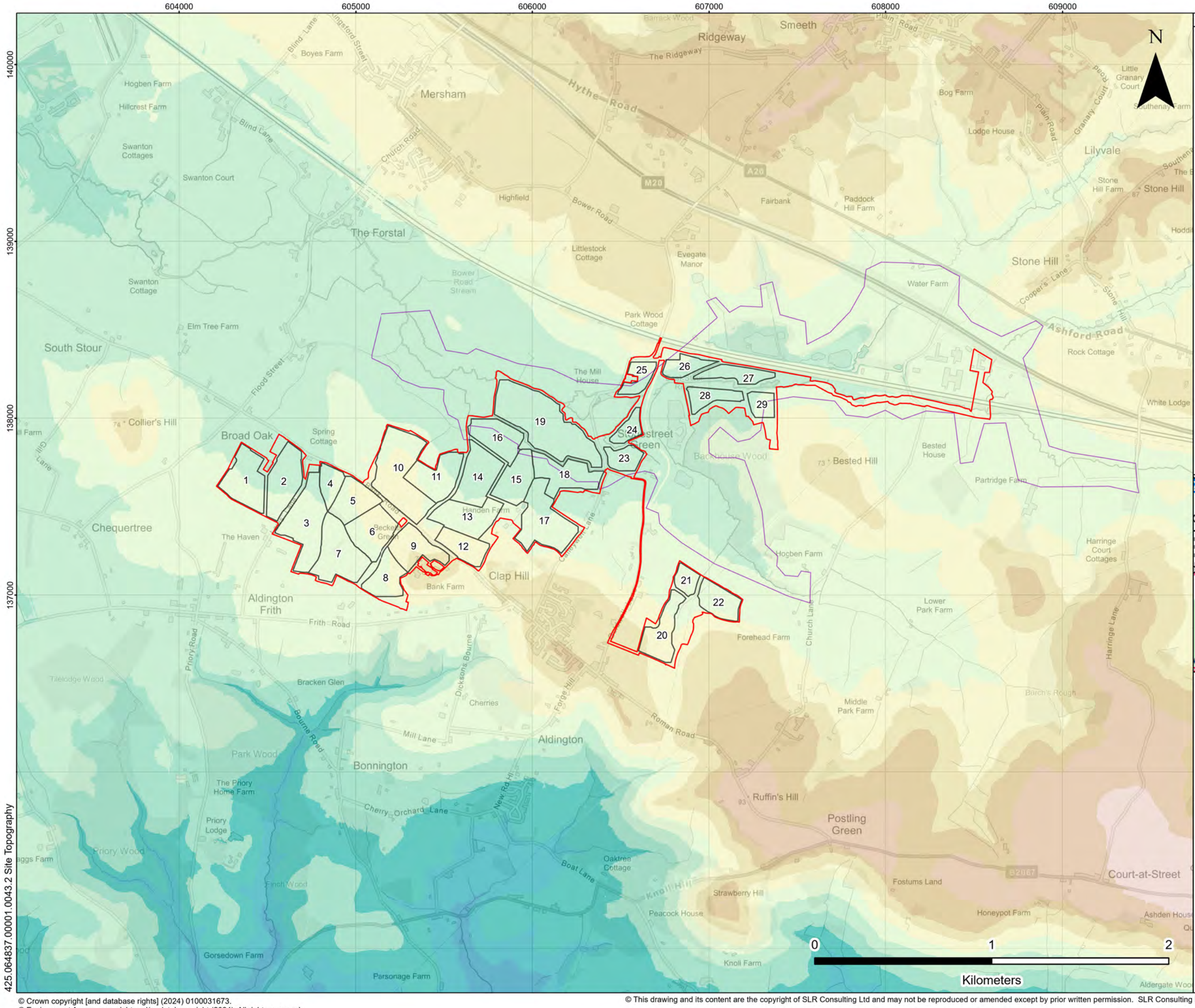

LEGEND

- Order limits
- Field
- Model Extent

Elevation (m)

- <10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100
- >100

Note

The digital terrain and surface models (DTM/DSM) have been derived from DEFRA National LiDAR (2m) dataset with an accuracy of (+/- 15 cm Root Mean Square Error [RMSE]).

APFP Regulation: 5(2)(o)

SLR

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

SITE TOPOGRAPHY

HMR Figure 3

Scale	Date
1:20,000 @ A3	MAY 2024

425.064837.00001.0043.2 Site Topography

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605500 606000 606500 607000 607500

139000 138500 138000

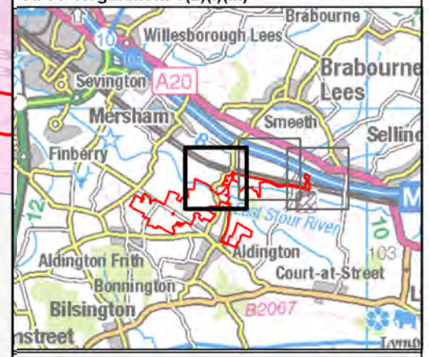
Bower Road
M20
Mersham Primary School
High Speed 1
AE370
AE376
Bower Road
Station Road
Evegate Business Park
M20
N
AE430
AE377
Railway Embankment Culvert
Railway Embankment Culvert
Footbridge
Access Bridge
Station Road Sluice Gate
Weir
Weir
Footbridge
Disused Mill Wheel
Footbridge
Station Road Bridge
Smeeth Primary
East Stour
Footbridge
Ditch Connection
Ditch Connection
Weir
Fish Pass
Footbridge
Footbridge
Footbridge
Hydrobrake
Footbridge
Backhouse Wood
Bank Road
Calleywell Lane
Stonestreet Green
5 6 8 9 10 11 12 13 14 15 16 17 18 19 23 24 25 26 27 28 29

0 200 400 600
Metres

LEGEND

- Order limit
- Field
- Modelled Structures
- Model Extent

APFP Regulation: 5(2)(i)(iii)



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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

MODELLED STRUCTURES

HMR Figure 4.1

Scale	Date
1:7,500 @ A3	MAY 2024

425.064837.00001.0044.2 Modelled Structures

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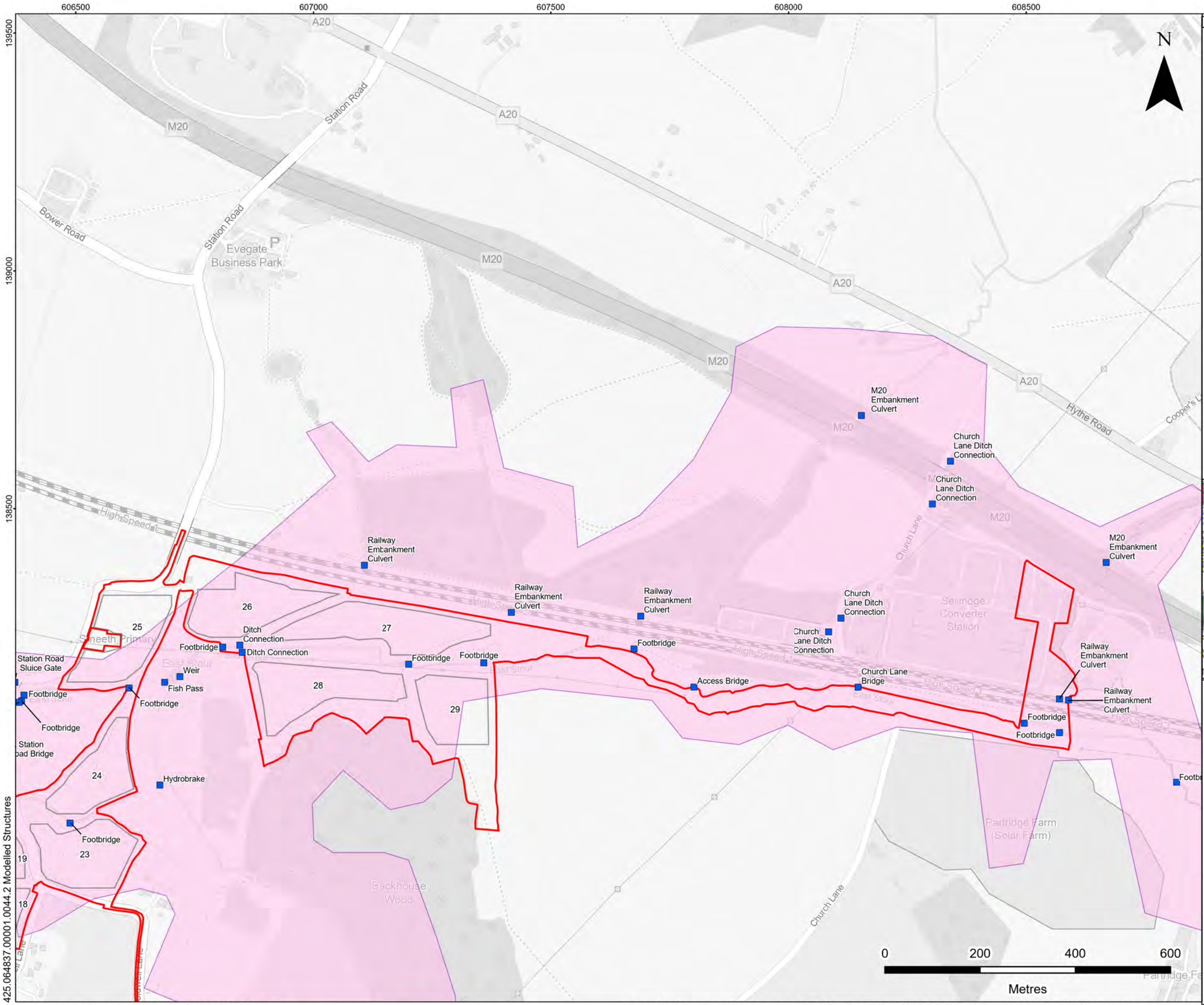
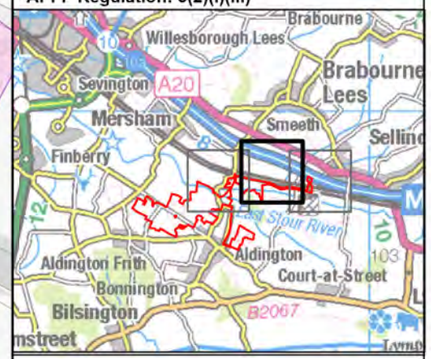


LEGEND

- Order limit
- Field
- Modelled Structures
- Model Extent

APFP Regulation: 5(2)(i)(iii)



SLR

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

MODELLED STRUCTURES

HMR Figure 4.2

Scale	Date
1:7,500 @ A3	MARCH 2024

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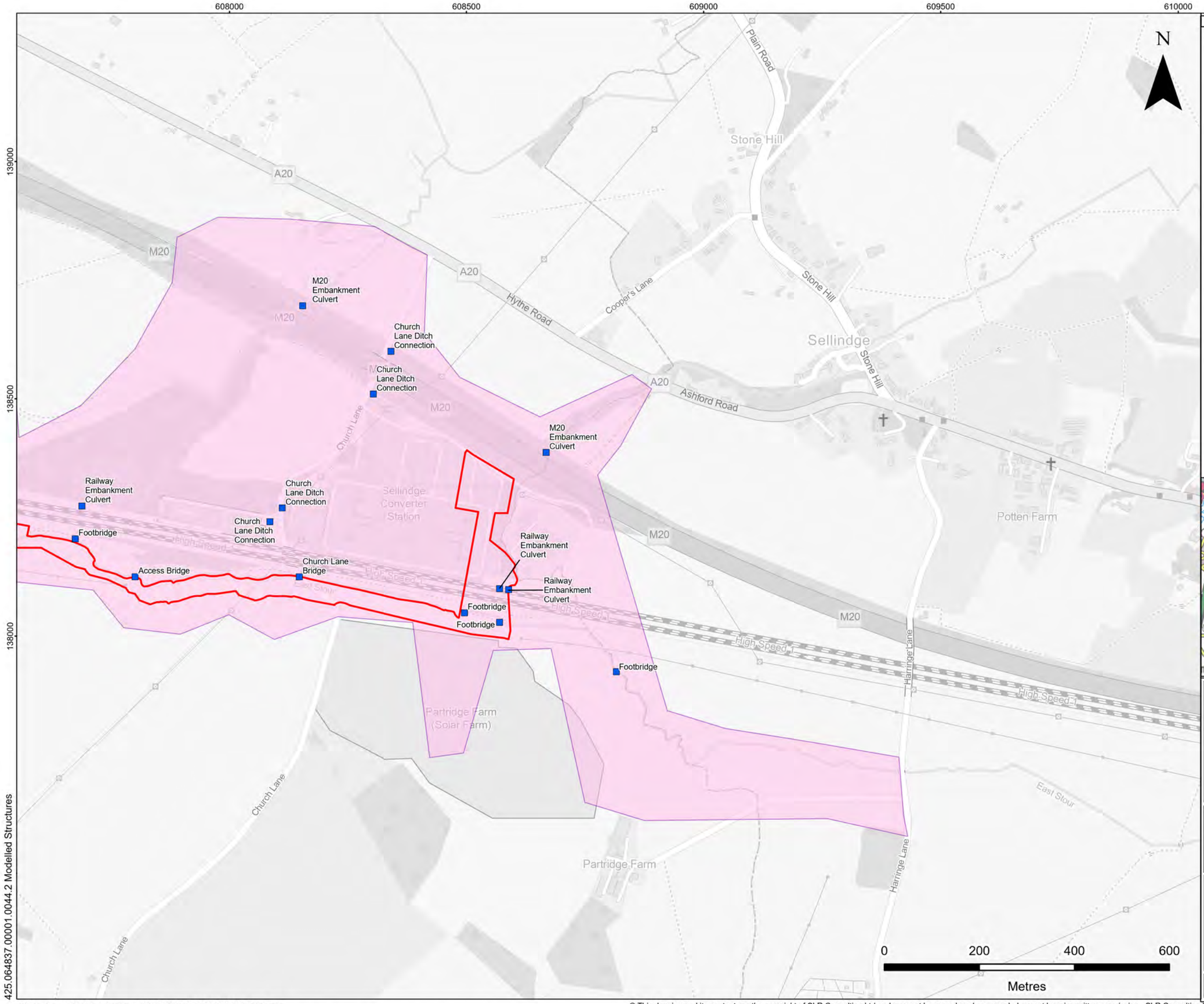
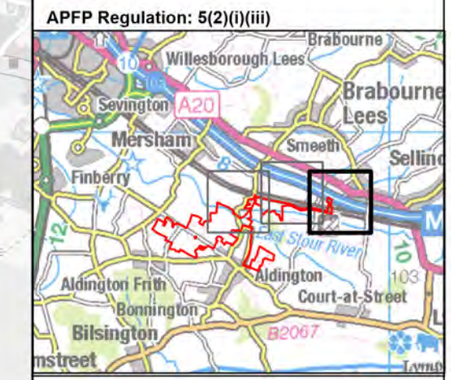


LEGEND

- Order limit
- Modelled Structures
- Model Extent

APFP Regulation: 5(2)(i)(iii)



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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

MODELLED STRUCTURES

HMR Figure 4.3

Scale	Date
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605500 606000 606500 607000 607500

139000 138500 138000

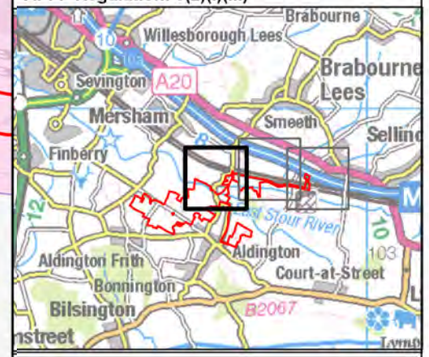
Bower Road
M20
Mersham Primary School
High Speed 1
AE370
AE376
Bower Road
Station Road
Evegate Business Park
M20
N
AE430
AE377
Railway Embankment Culvert
Railway Embankment Culvert
Footbridge
Access Bridge
Station Road Sluice Gate
Weir
Weir
Footbridge
Disused Mill Wheel
Footbridge
Station Road Bridge
Smeeth Primary
East Stour
Footbridge
Ditch Connection
Ditch Connection
Weir
Fish Pass
Footbridge
Footbridge
Footbridge
Hydrobrake
Footbridge
Backhouse Wood
Bank Road
Calleywell Lane
Stonestreet Green
5 6 8 9 10 11 12 13 14 15 16 17 18 19 23 24 25 26 27 28 29

0 200 400 600
Metres

LEGEND

- Order limit
- Field
- Modelled Structures
- Model Extent

APFP Regulation: 5(2)(i)(iii)



SLR

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

MODELLED STRUCTURES

HMR Figure 4.1

Scale	Date
1:7,500 @ A3	MAY 2024

425.064837.00001.0044.2 Modelled Structures

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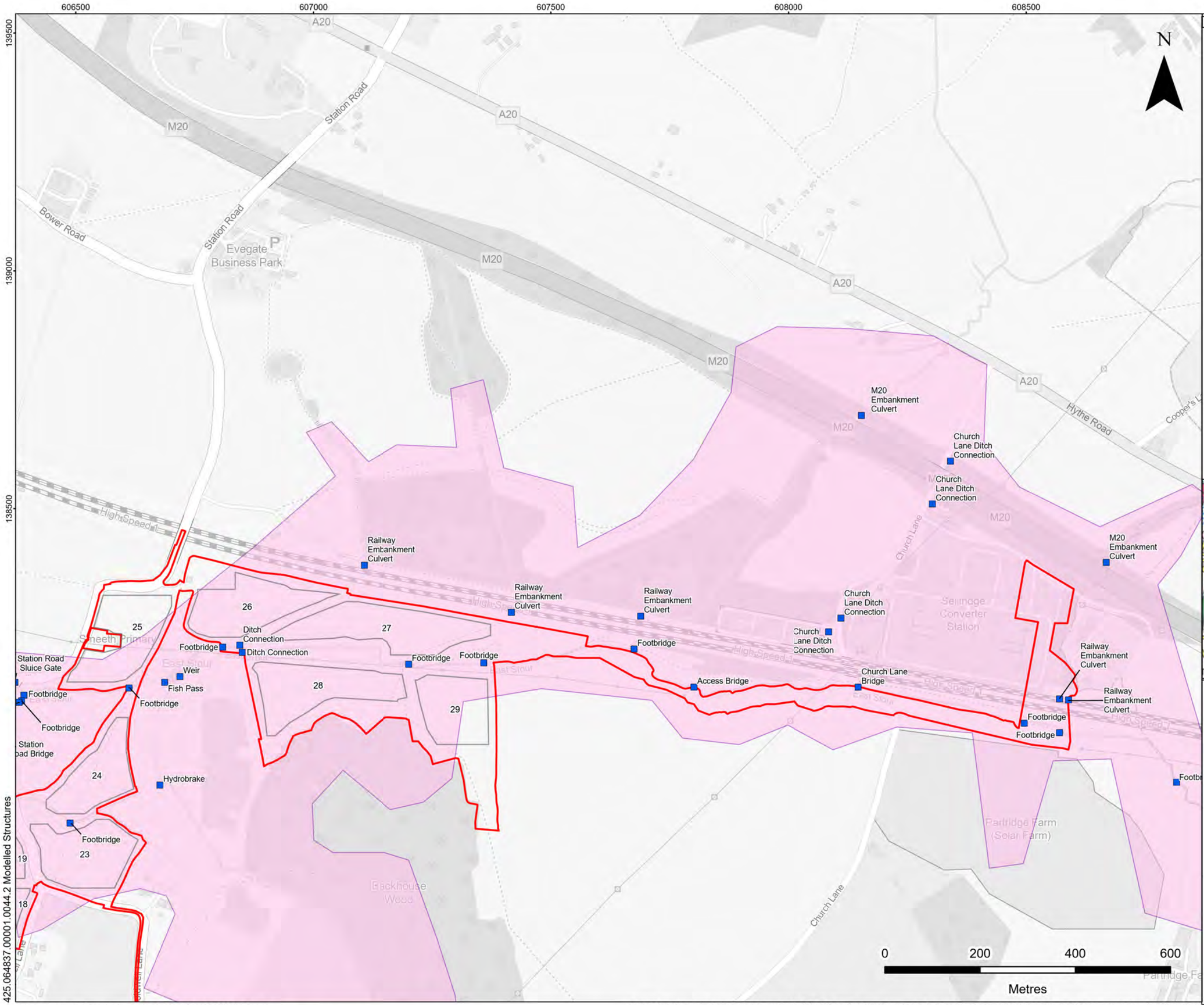
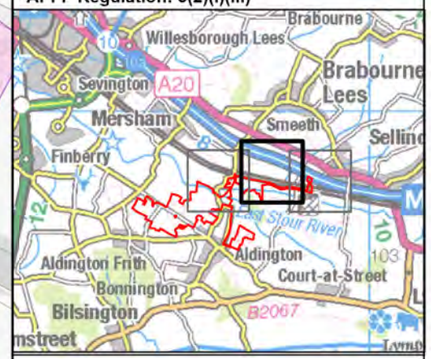


LEGEND

- Order limit
- Field
- Modelled Structures
- Model Extent

APFP Regulation: 5(2)(i)(iii)



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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

MODELLED STRUCTURES

HMR Figure 4.2

Scale	Date
1:7,500 @ A3	MARCH 2024

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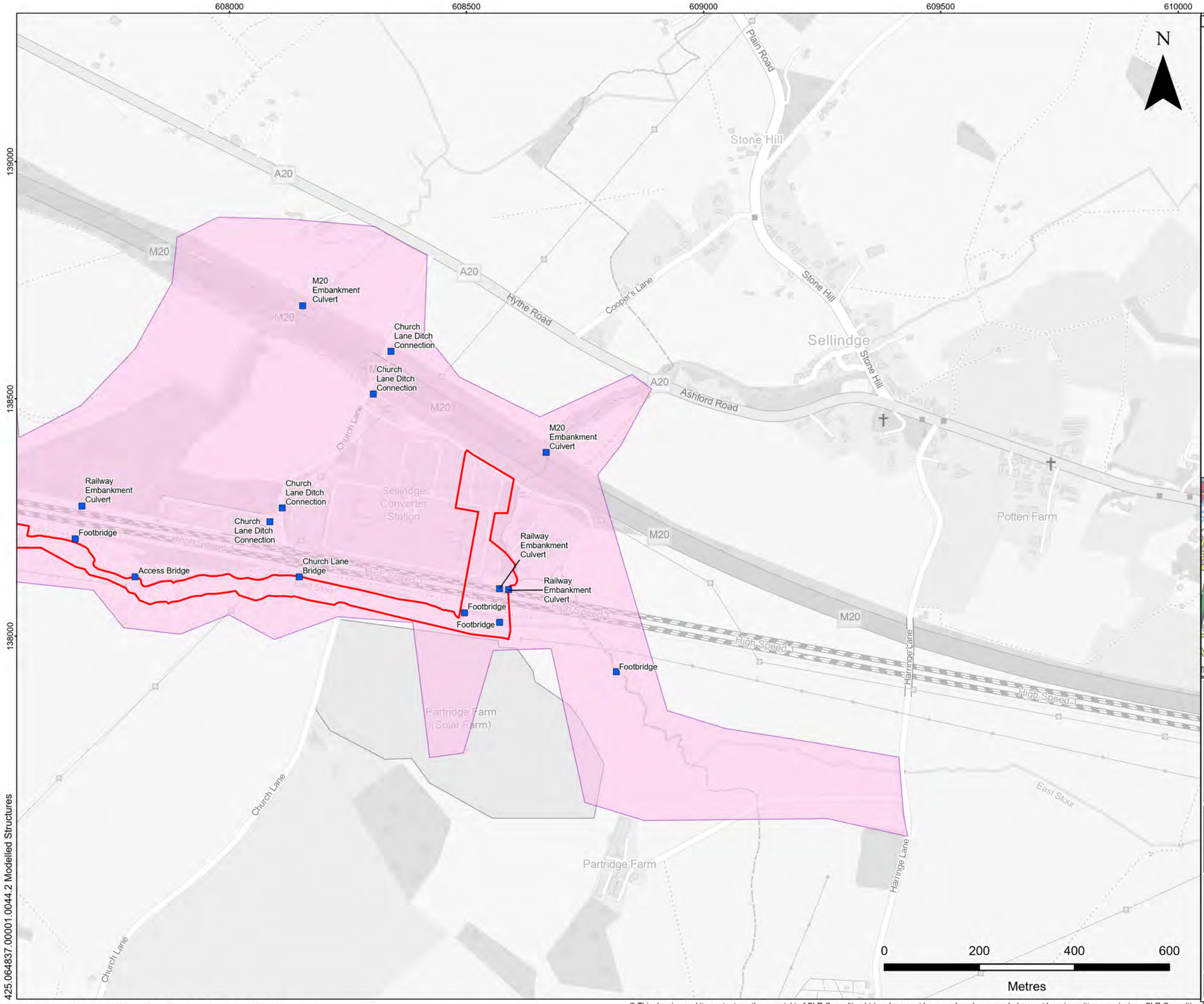
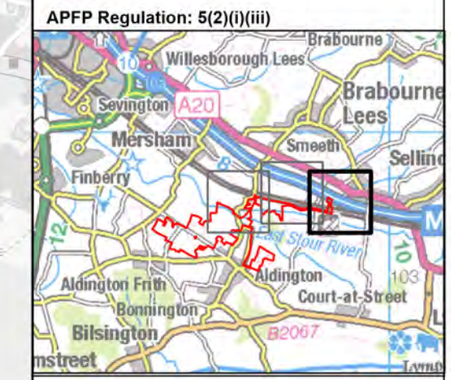


LEGEND

- Order limit
- Modelled Structures
- Model Extent

APFP Regulation: 5(2)(i)(iii)



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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

MODELLED STRUCTURES

HMR Figure 4.3

Scale	Date
1:7,500 @ A3	MAY 2024

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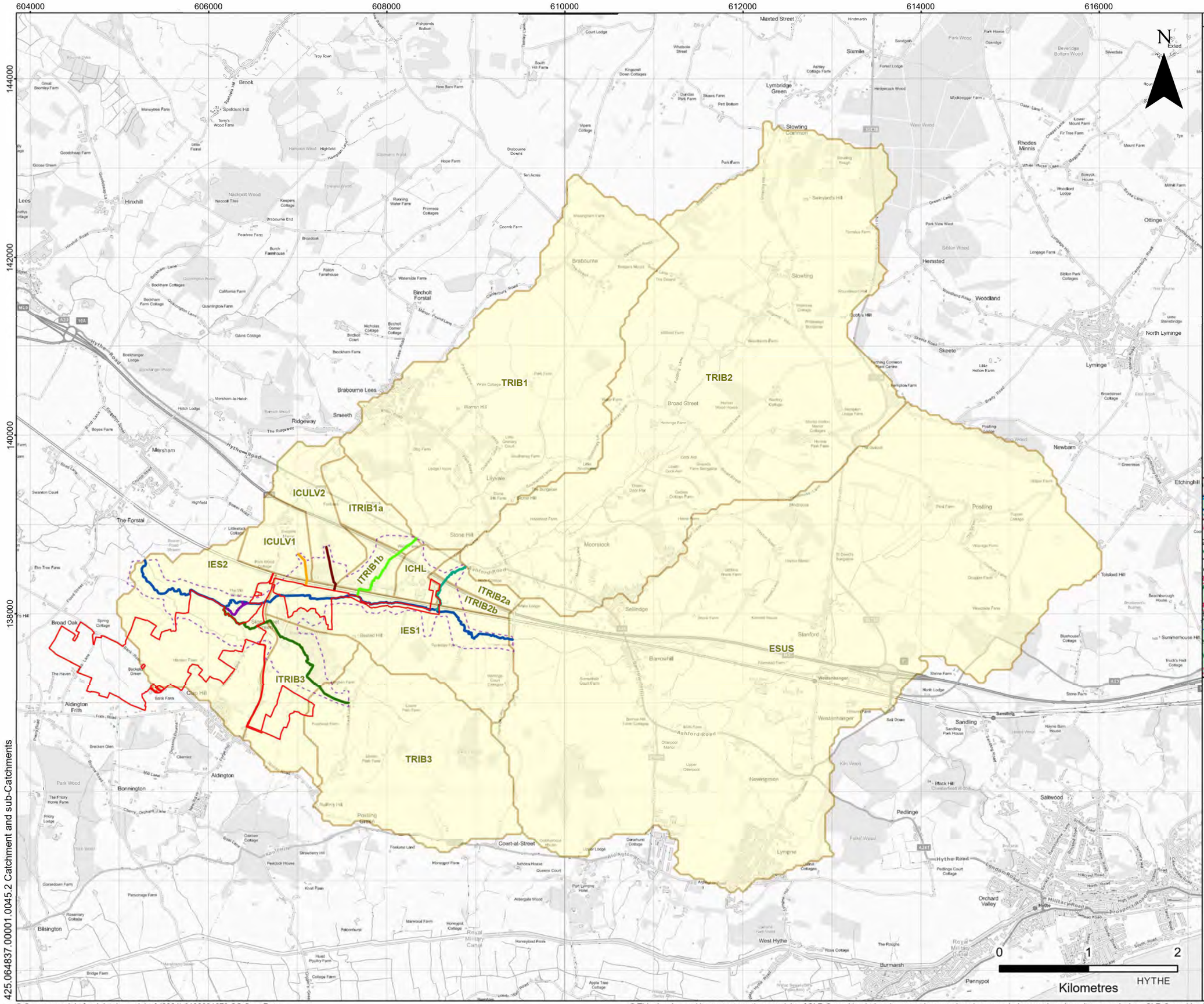


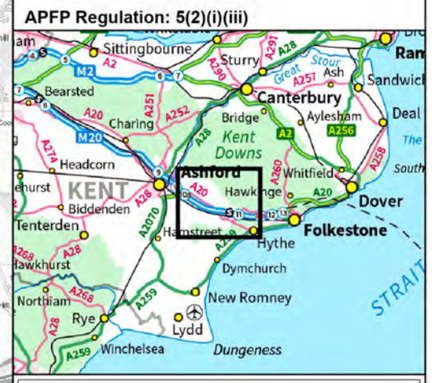
LEGEND

- Order limit
- Catchment
- Model Extent

Modelled Water Courses

- Culvert 1
- Culvert 2
- East Stour River
- Mill Race
- Unnamed Tributary 1
- Unnamed Tributary 2
- Unnamed Tributary 3

APFP Regulation: 5(2)(i)(iii)



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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

CATCHMENT AND SUB-CATCHMENT

HMR Figure 5

Scale	Date
1:40,000 @ A3	MAY 2024

425.064837.00001.0045.2 Catchment and sub-Catchments

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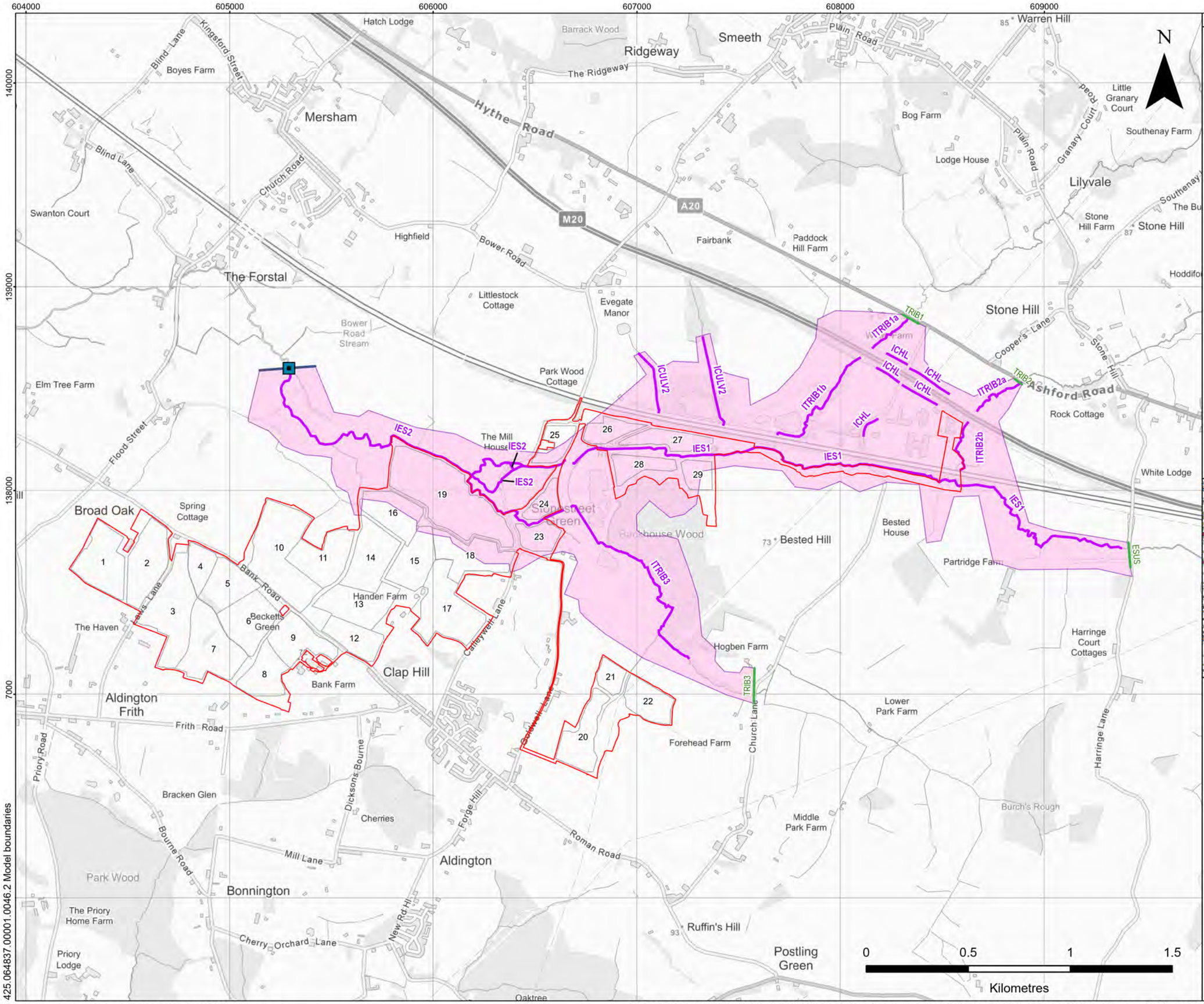
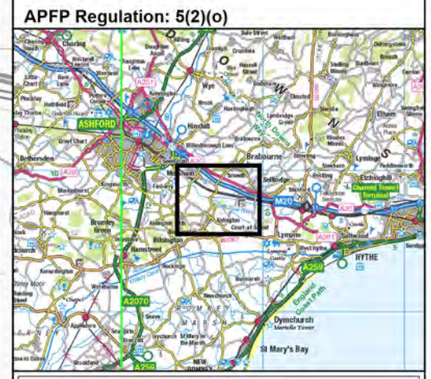


LEGEND

- Order limit
- Field
- Downstream 1D Boundary
- Upstream 2D Boundary
- Downstream 2D Boundary
- Lateral Inflow
- Model Extent

APFP Regulation: 5(2)(o)



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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

MODEL BOUNDARIES

HMR Figure 6

Scale	Date
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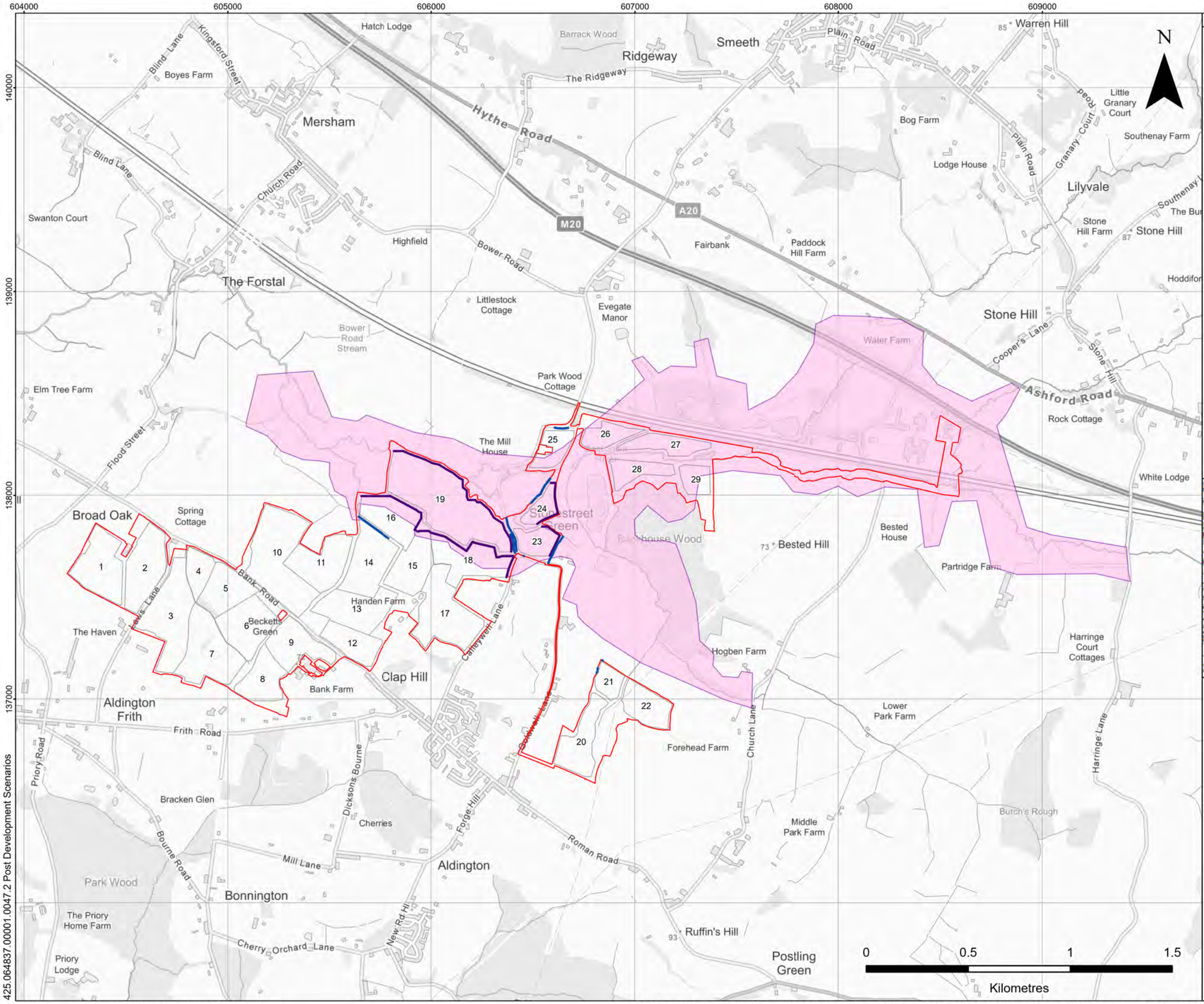
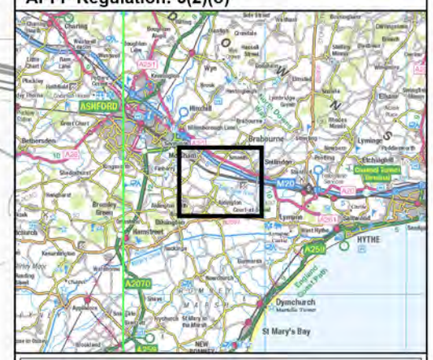


LEGEND

- Order limit
- Field
- Fence Blockage Location
- Proposed New Hedge
- Model Extent

APFP Regulation: 5(2)(o)



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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

POST-DEVELOPMENT SCENARIOS

HMR Figure 7

Scale 1:17,500 @ A3

Date MAY 2024

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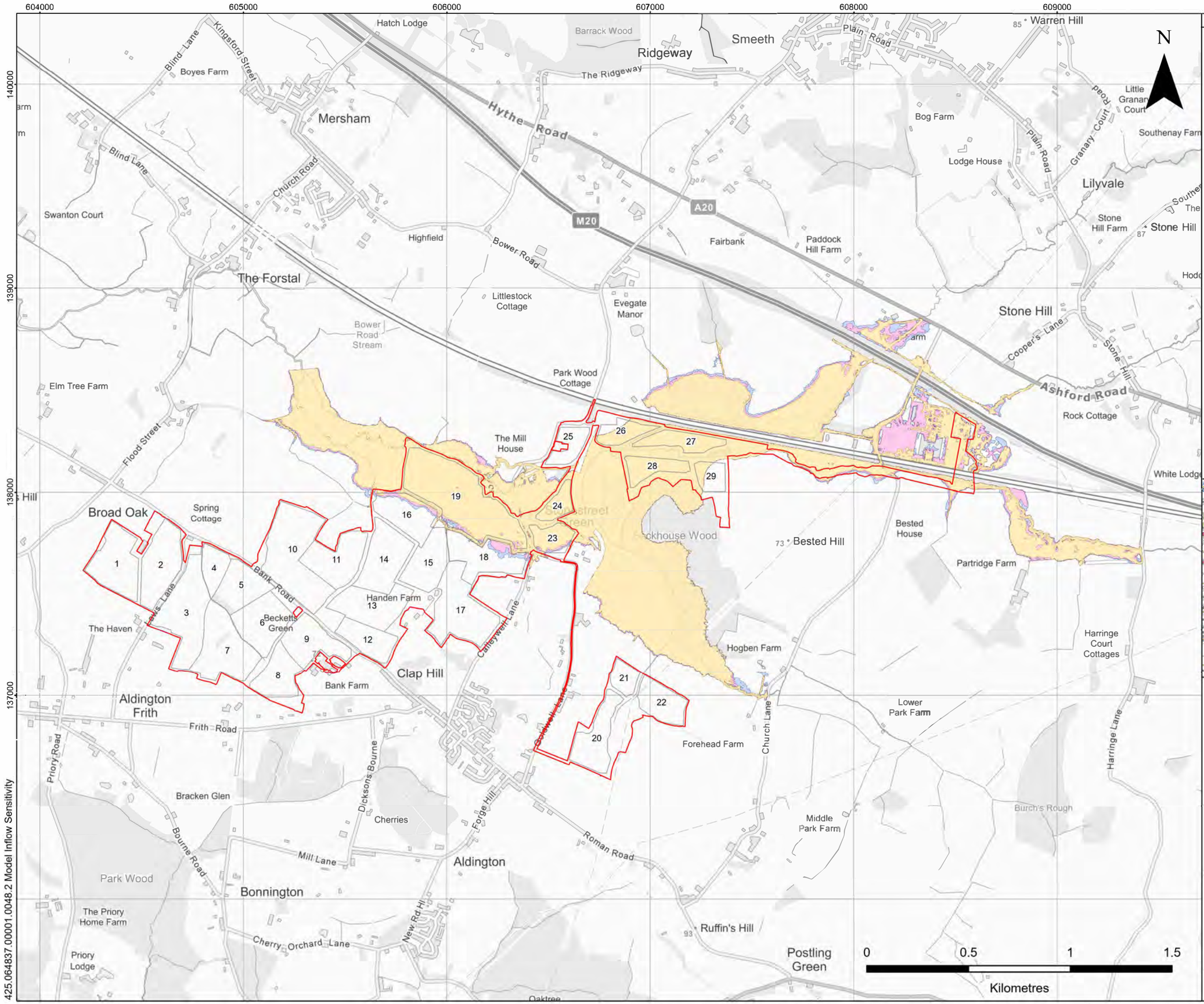
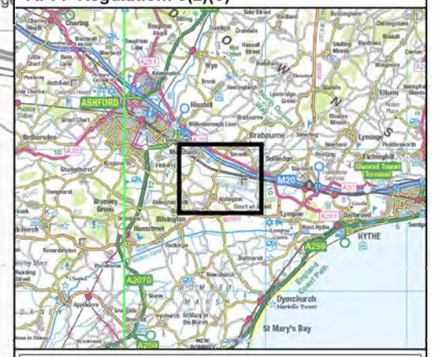


LEGEND

- Order limit
- Field
- -20% Model Inflows Flood Extent: Defended 1:100 Upper End Allowance - 36.25 hr Rainfall Event - 2 m Grid
- Baseline Model Flood Extent: Defended 1:100 Upper End Allowance - 36.25 hr Rainfall Event - 2 m Grid
- +20% Model Inflows Flood Extent: Defended 1:100 Upper End Allowance - 36.25 hr Rainfall Event- 2 m Grid

APFP Regulation: 5(2)(o)



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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

MODEL INFLOW SENSITIVITY

HMR Figure 8

Scale	Date
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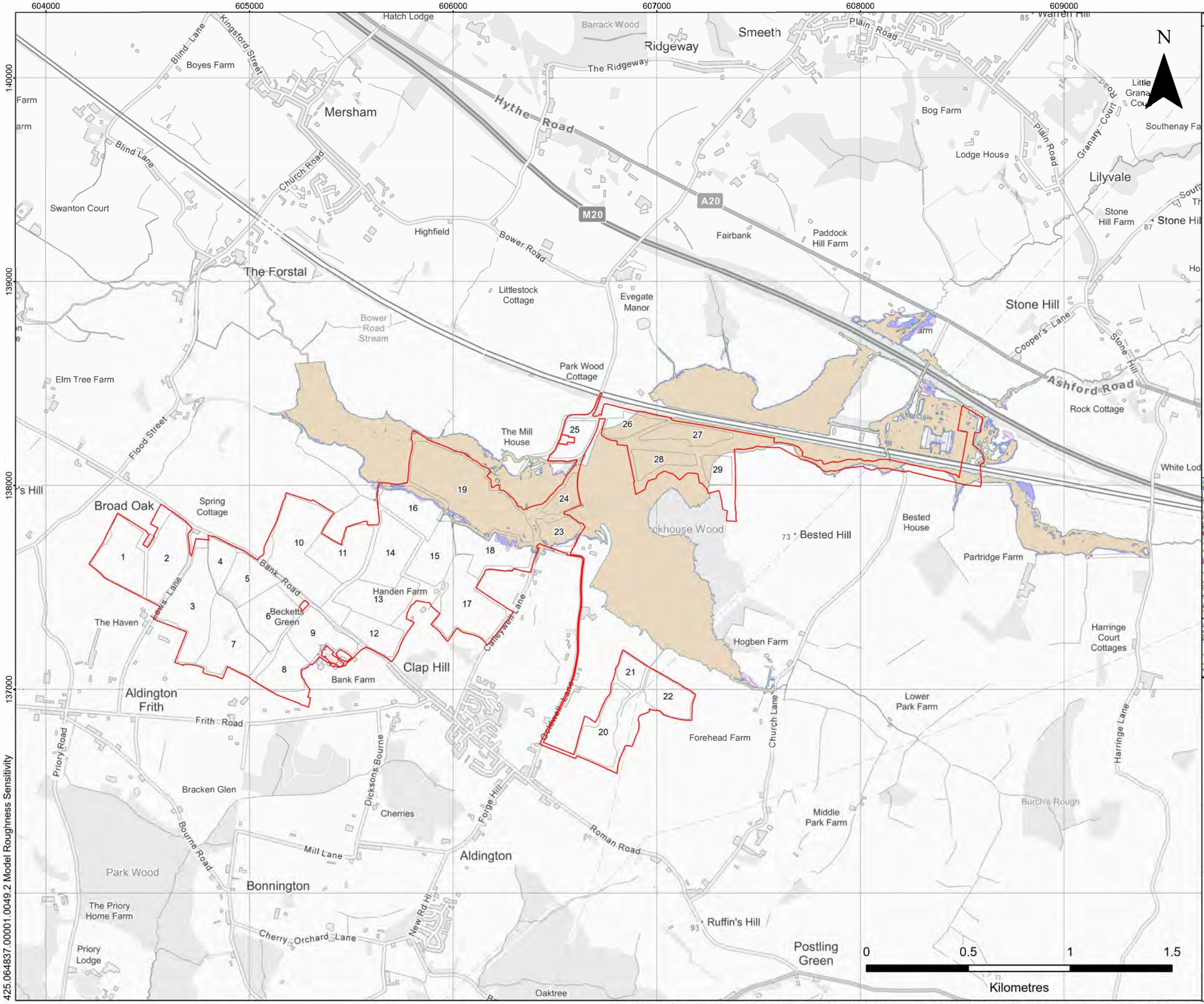

LEGEND

- Order limit
- Field
- -20% Manning's n Coefficient (Roughness) Flood Extent: Defended 1:100 Upper End Allowance - 36.25 hr Rainfall Event - 2 m Grid
- Baseline Model Flood Extent: Defended 1:100 Upper End Allowance - 36.25 hr Rainfall Event - 2 m Grid
- +20% Manning's n Coefficient (Roughness) Flood Extent: Defended 1:100 Upper End Allowance - 36.25 hr Rainfall Event - 2 m Grid

APFP Regulation: 5(2)(o)

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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

MODEL ROUGHNESS SENSITIVITY

HMR Figure 9

Scale	Date
1:17,500 @ A3	MAY 2024

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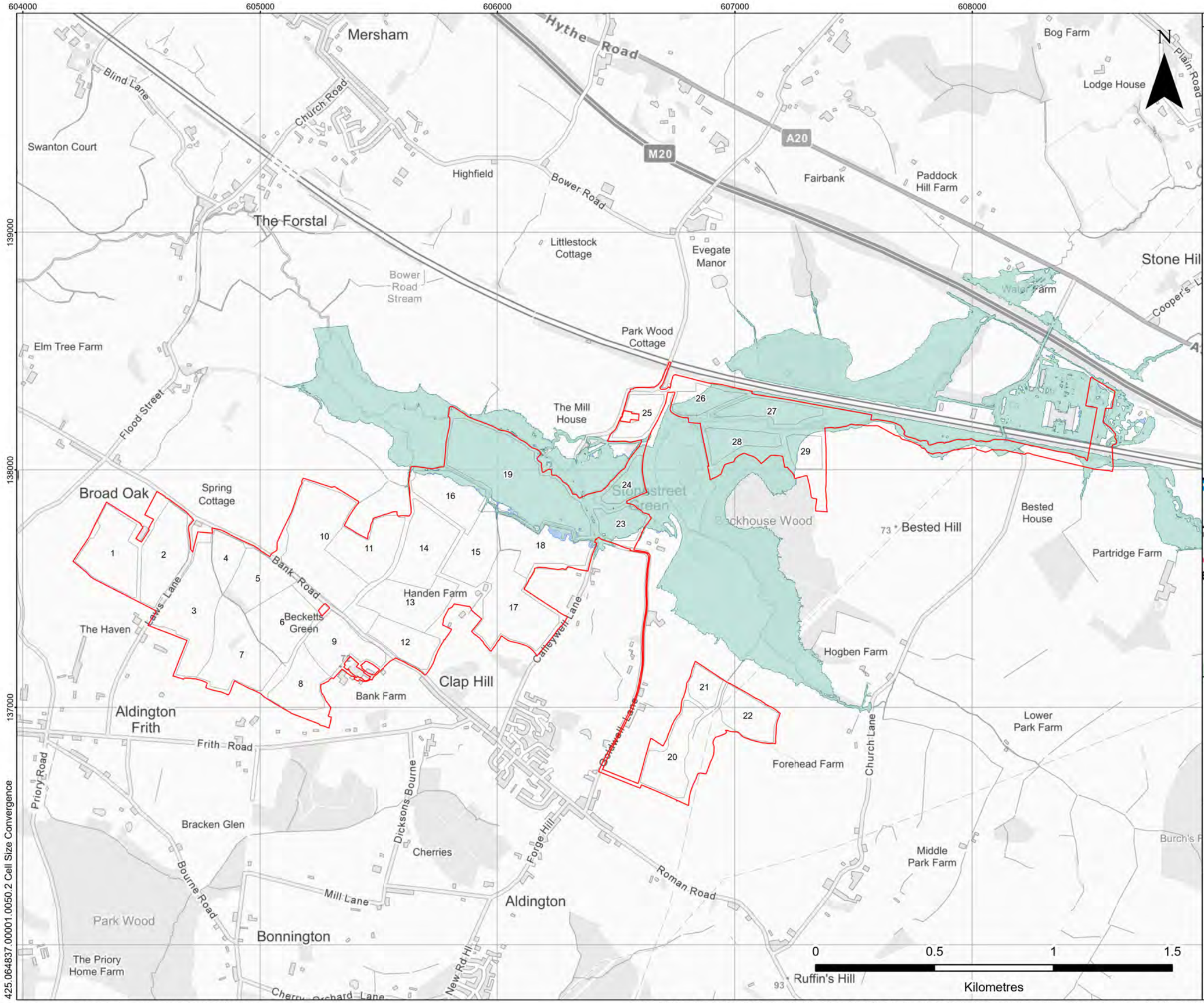
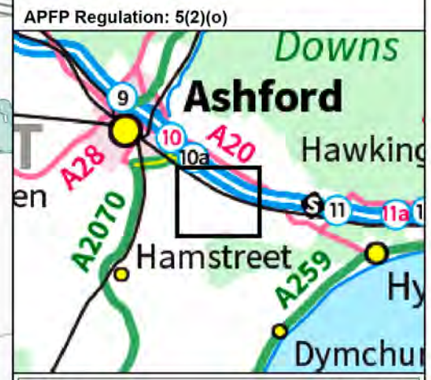


LEGEND

- Order limit
- Field
- Baseline Model Flood Extent: Defended 1:100 Upper End Allowance - 36.25 hr Rainfall Event - 2 m Grid
- Sensitivity Test Flood Extent: Defended 1:100 Upper End Allowance - 36.25 hr Rainfall Event - 1 m Grid

APFP Regulation: 5(2)(o)



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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

CELL SIZE CONVERGENCE

HMR Figure 10

Scale	Date
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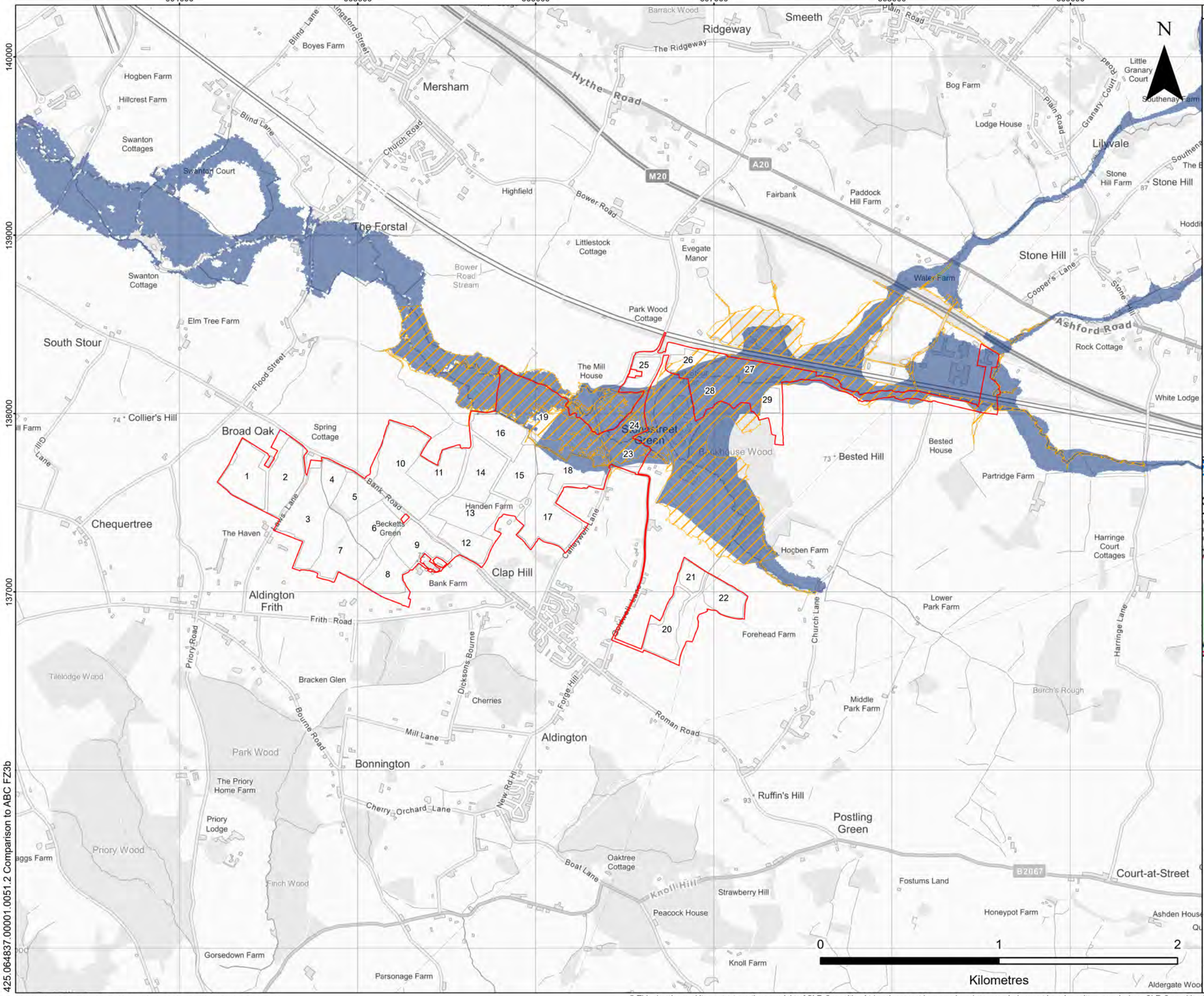

LEGEND

APFP Regulation: 5(2)(o)

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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

COMPARISON TO ASHFORD BOROUGH COUNCIL FLOOD ZONE 3B

HMR Figure 11

Scale 1:20,000 @ A3

Date MAY 2024

425.064837.00001.0051.2 Comparison to ABC FZ3b

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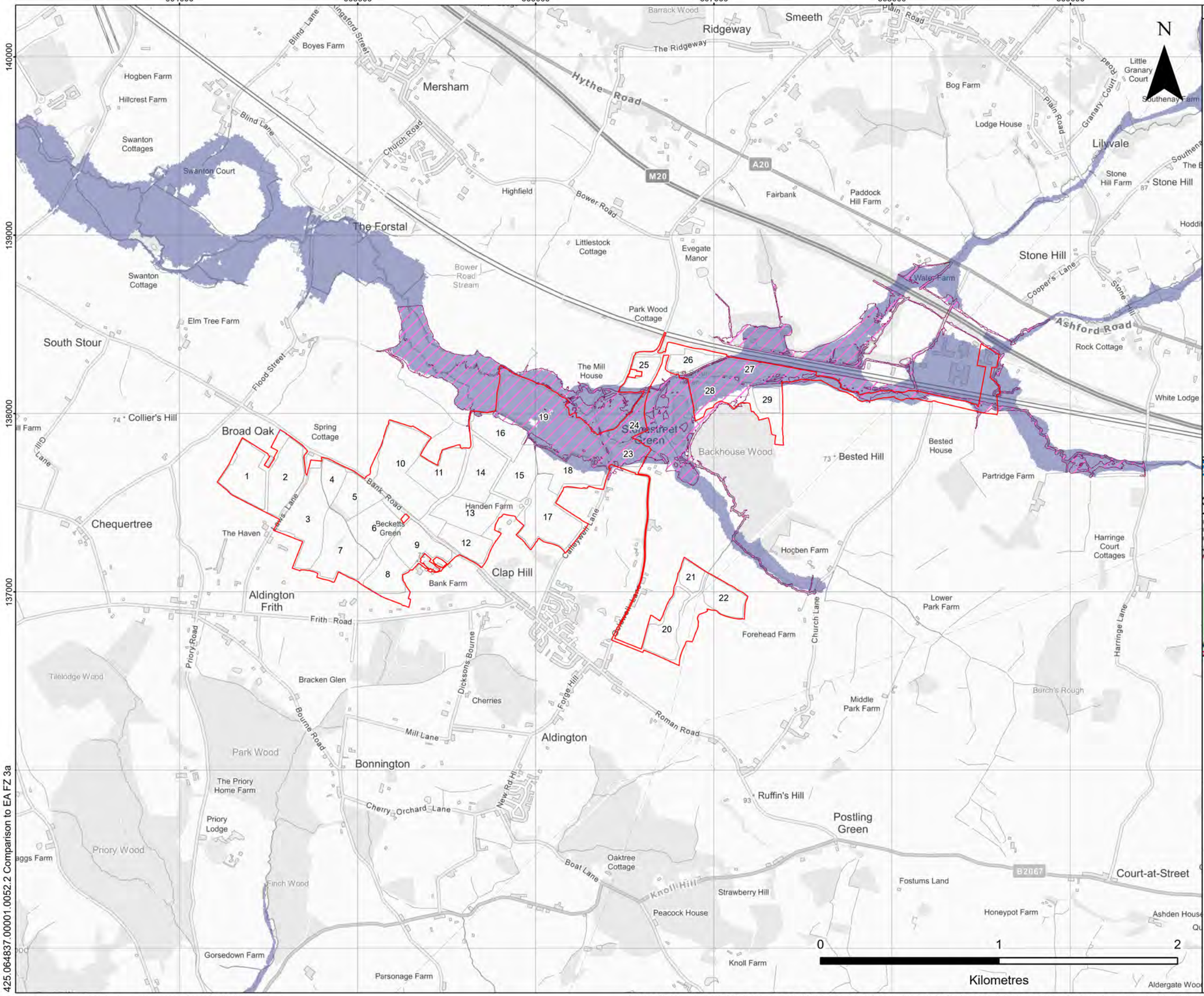

LEGEND

- Order limit
- Field
- Environment Agency Flood Zone 3
- SLR Modelled Flood Zone 3a

APFP Regulation: 5(2)(o)

SLR

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

COMPARISON WITH ENVIRONMENT AGENCY FLOOD ZONE 3A

HMR Figure 12

Scale	Date
1:20,000 @ A3	MAY 2024

425.064837.00001.0052.2 Comparison to EA FZ 3a

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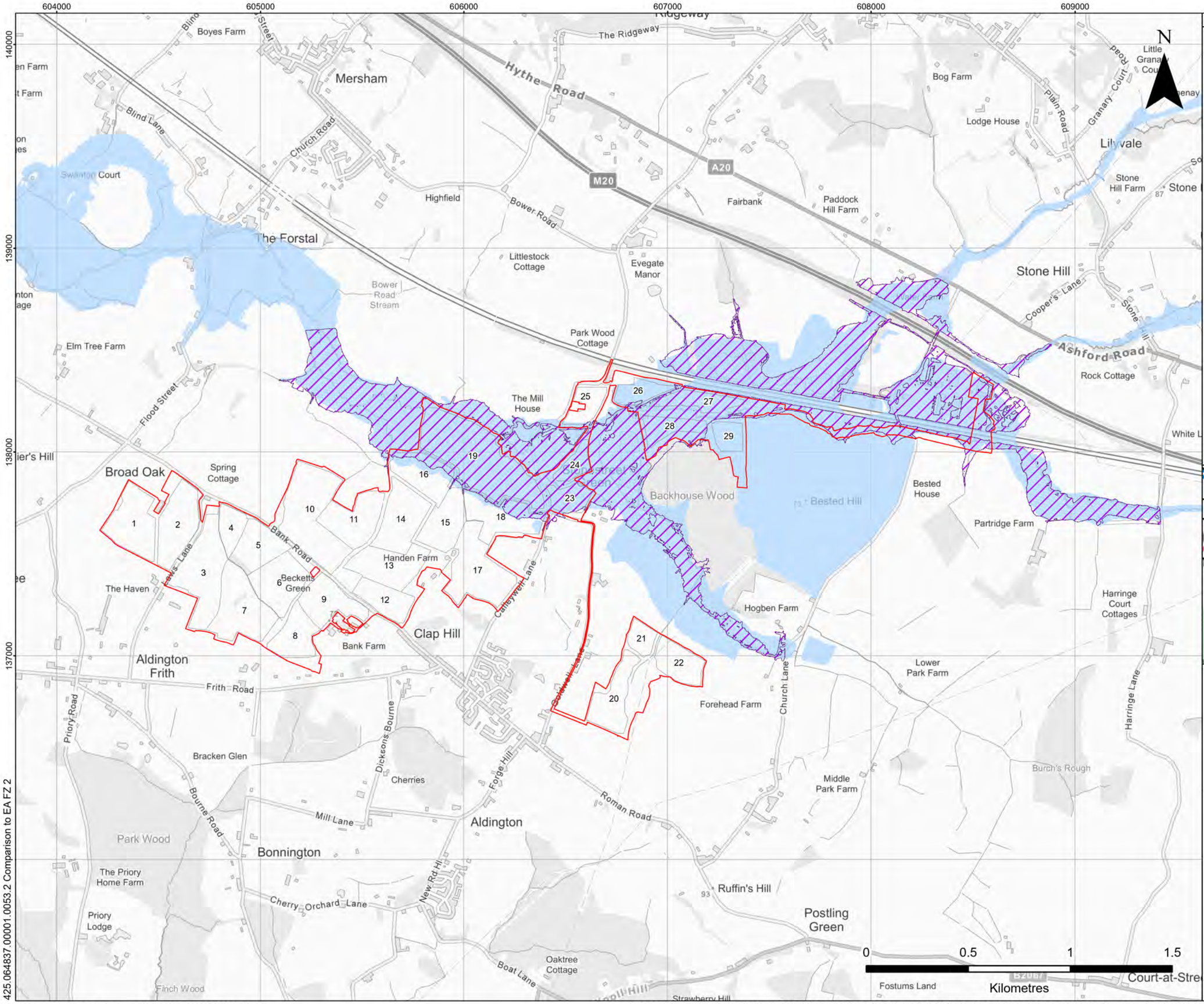
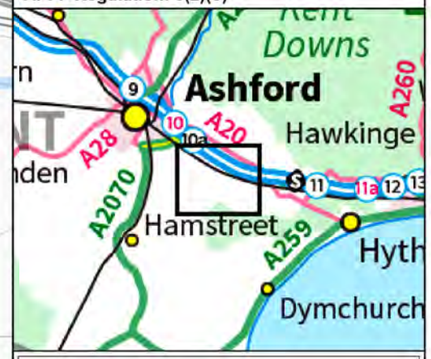


LEGEND

- Order limit
- Field
- Environment Agency Flood Zone 2
- SLR Modelled Flood Zone 2

APFP Regulation: 5(2)(o)



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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

COMPARISON TO ENVIRONMENT AGENCY FLOOD ZONE 2

HMR Figure 13

Scale	Date
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425.064837.00001.0053.2 Comparison to EA FZ 2

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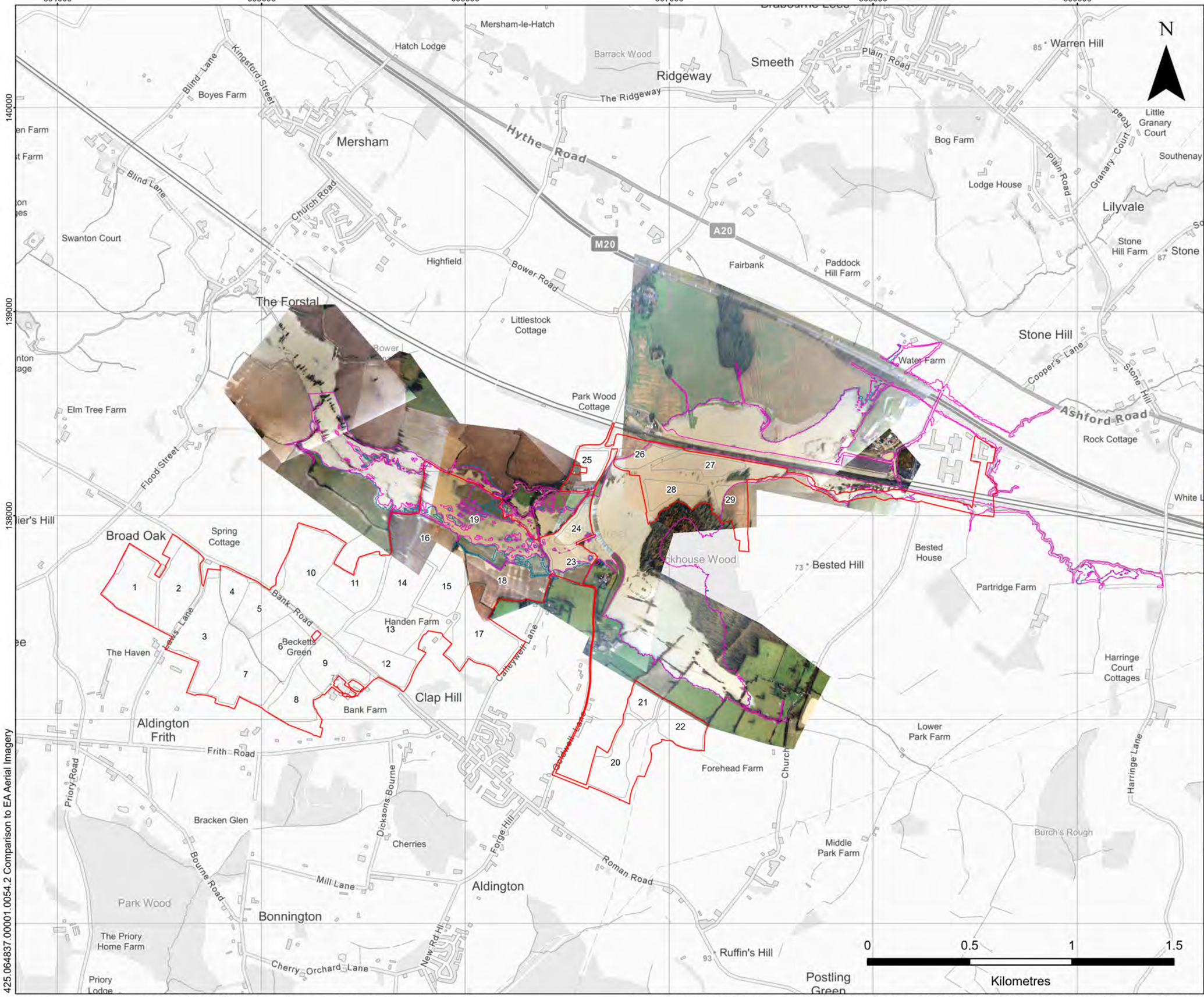

LEGEND

- Order limit
- Field
- Baseline Model Flood Extent: Defended 1:100 Upper End Allowance - 27.25 hr Rainfall Event - 2 m Grid
- Baseline Model Flood Extent: Defended 1:100 Upper End Allowance - 36.25 hr Rainfall Event - 2 m Grid

APFP Regulation: 5(2)(o)

NOTES

1. Flood extents shown on Environment Agency imagery are provided for indicative and comparative purposes only.

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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

COMPARISON WITH ENVIRONMENT AGENCY FLOOD AERIAL IMAGERY

HMR Figure 14

Scale	Date
1:17,500 @ A3	MAY 2024

425.064837.00001.0054.2 Comparison to EA Aerial Imagery

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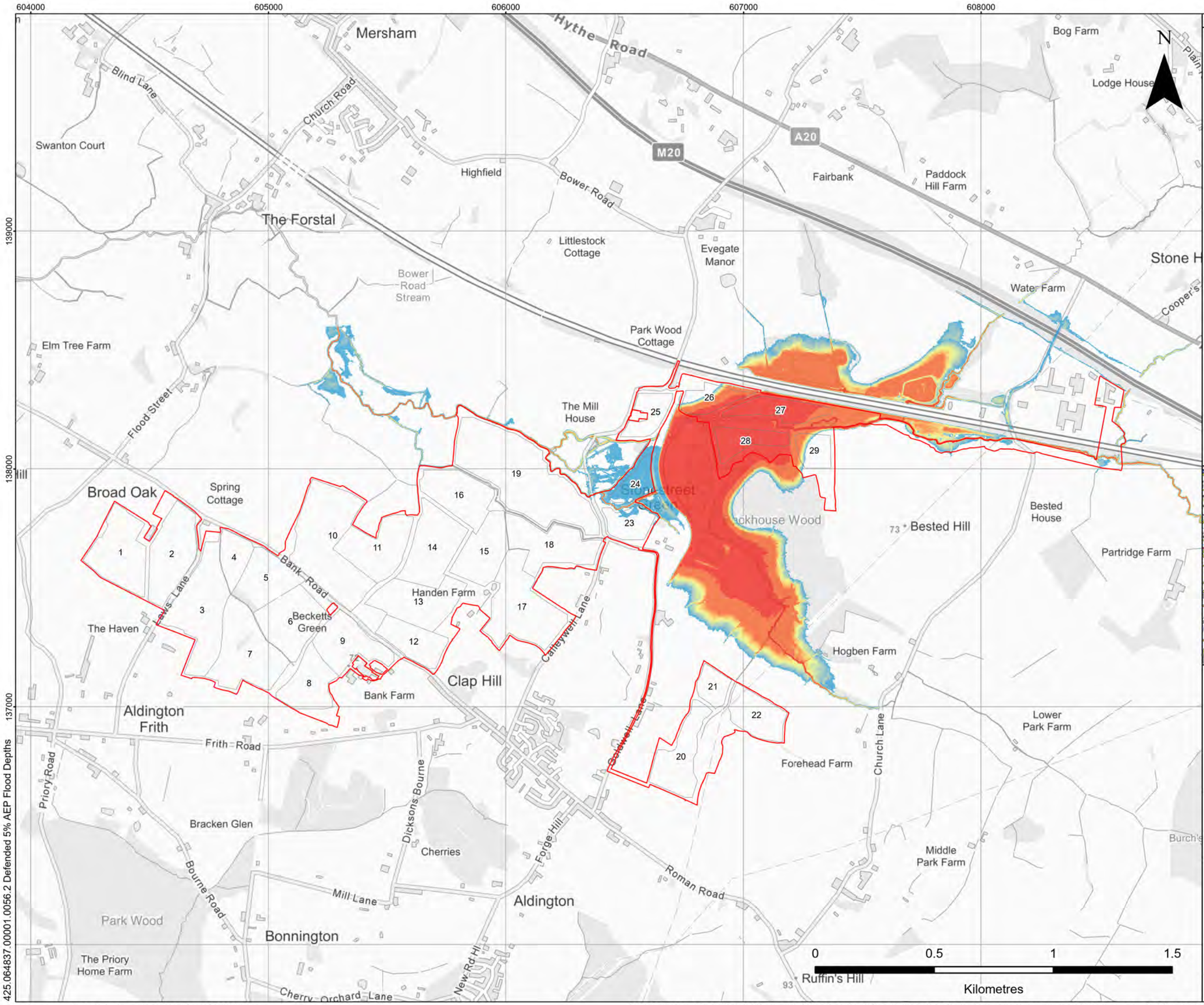

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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

DEFENDED 5% ANNUAL EXCEEDANCE PROBABILITY FLOOD DEPTHS

HMR Figure 15

Scale	Date
1:15,000 @ A3	MAY 2024

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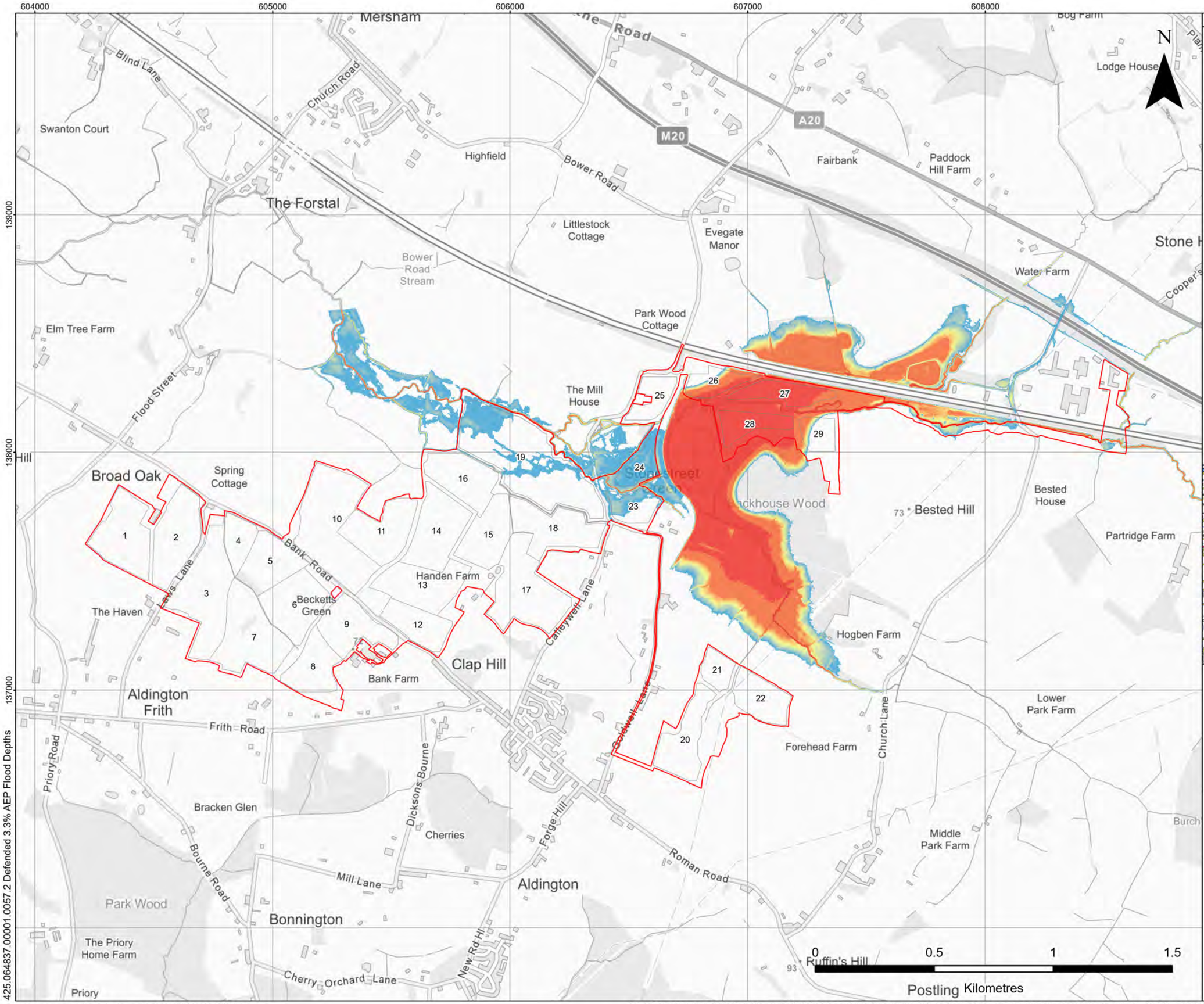

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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

DEFENDED 3.3% ANNUAL EXCEEDANCE PROBABILITY FLOOD DEPTHS

HMR Figure 16

Scale	Date
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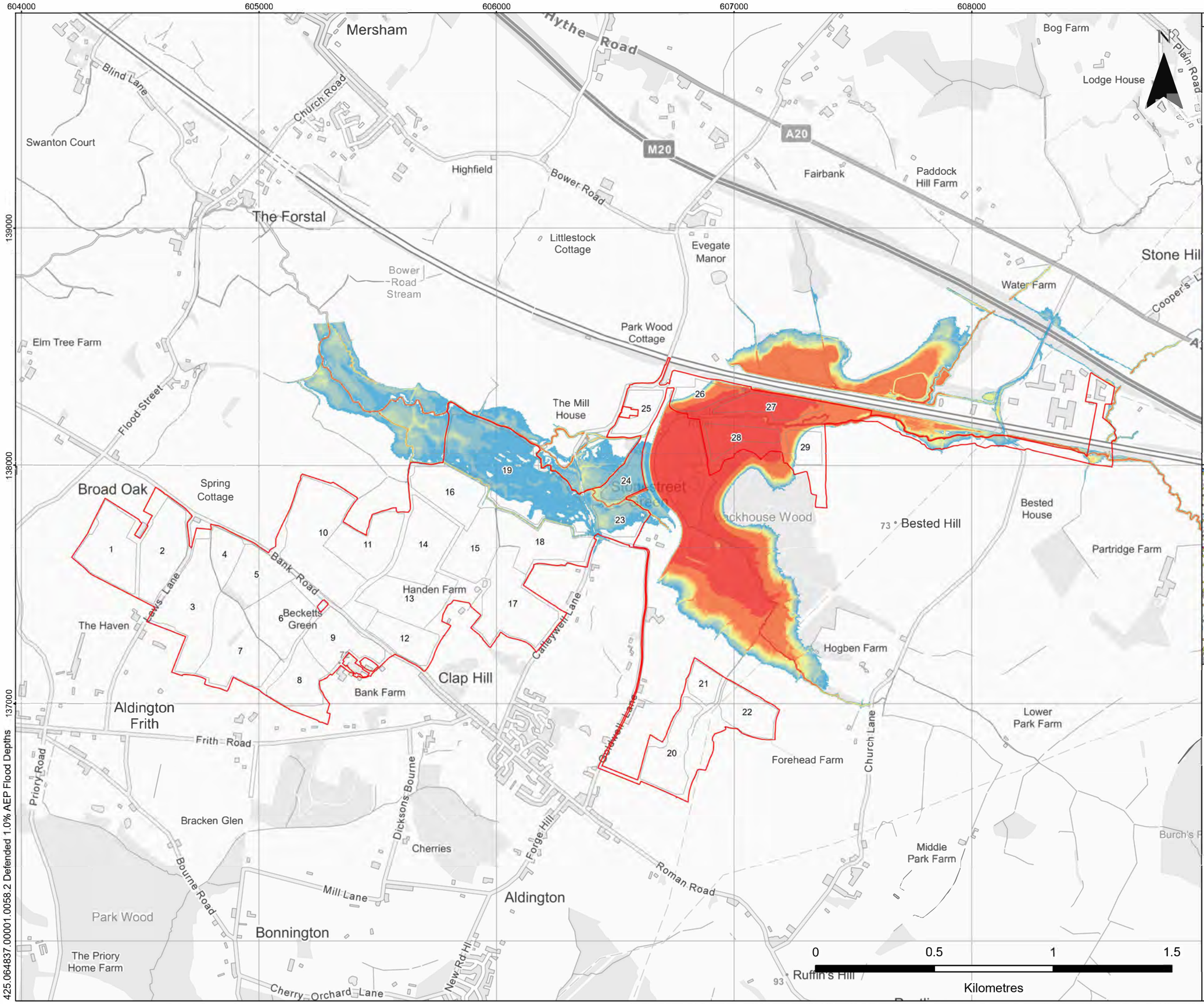

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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

DEFENDED 1.0% ANNUAL EXCEEDANCE PROBABILITY FLOOD DEPTHS

HMR Figure 17

Scale	Date
1:15,000 @ A3	MAY 2024

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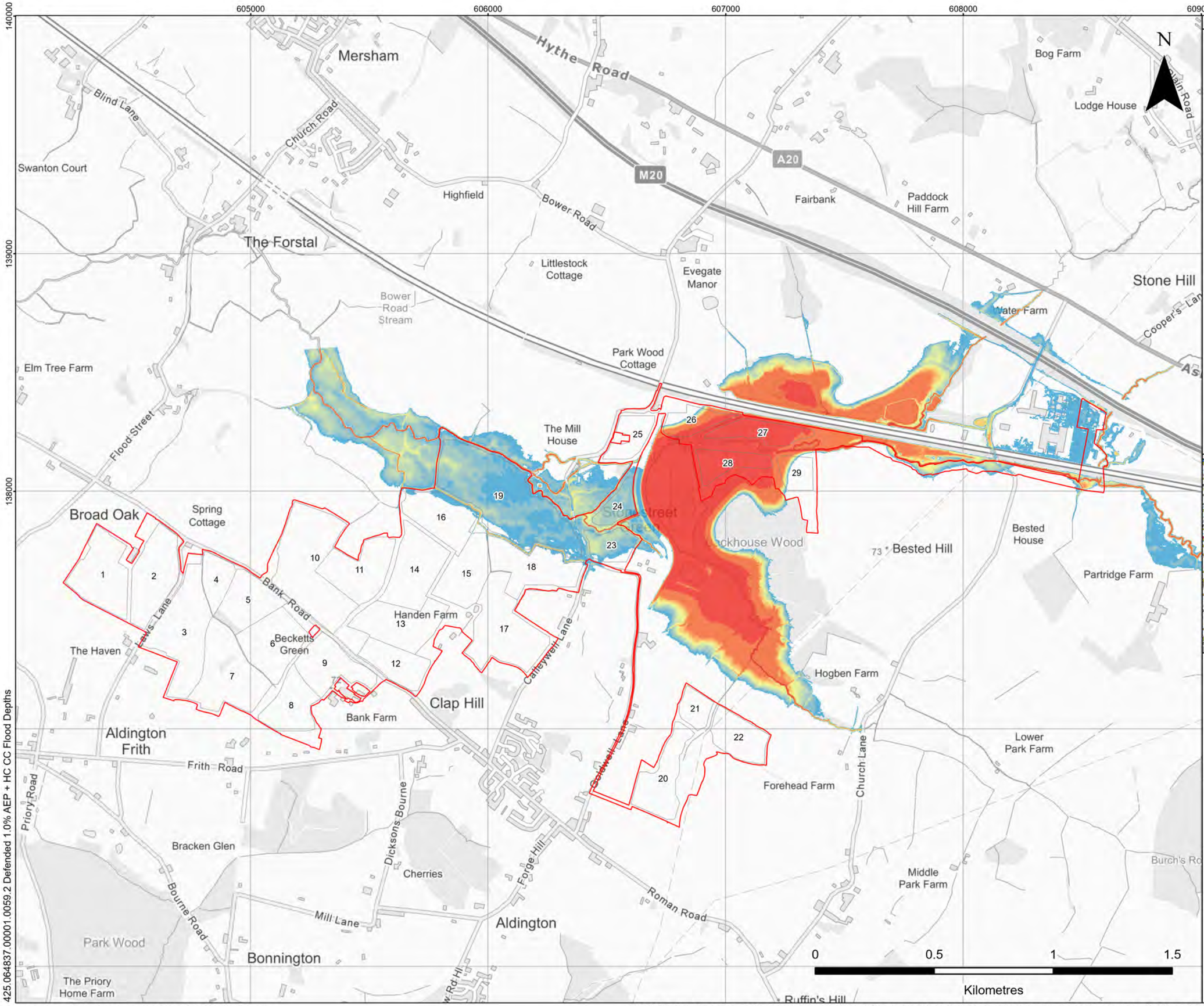

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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

DEFENDED 1.0% ANNUAL EXCEEDANCE PROBABILITY HIGHER CENTRAL CLIMATE CHANGE ALLOWANCE FLOOD DEPTHS

HMR Figure 18

Scale	Date
1:15,000 @ A3	MAY 2024

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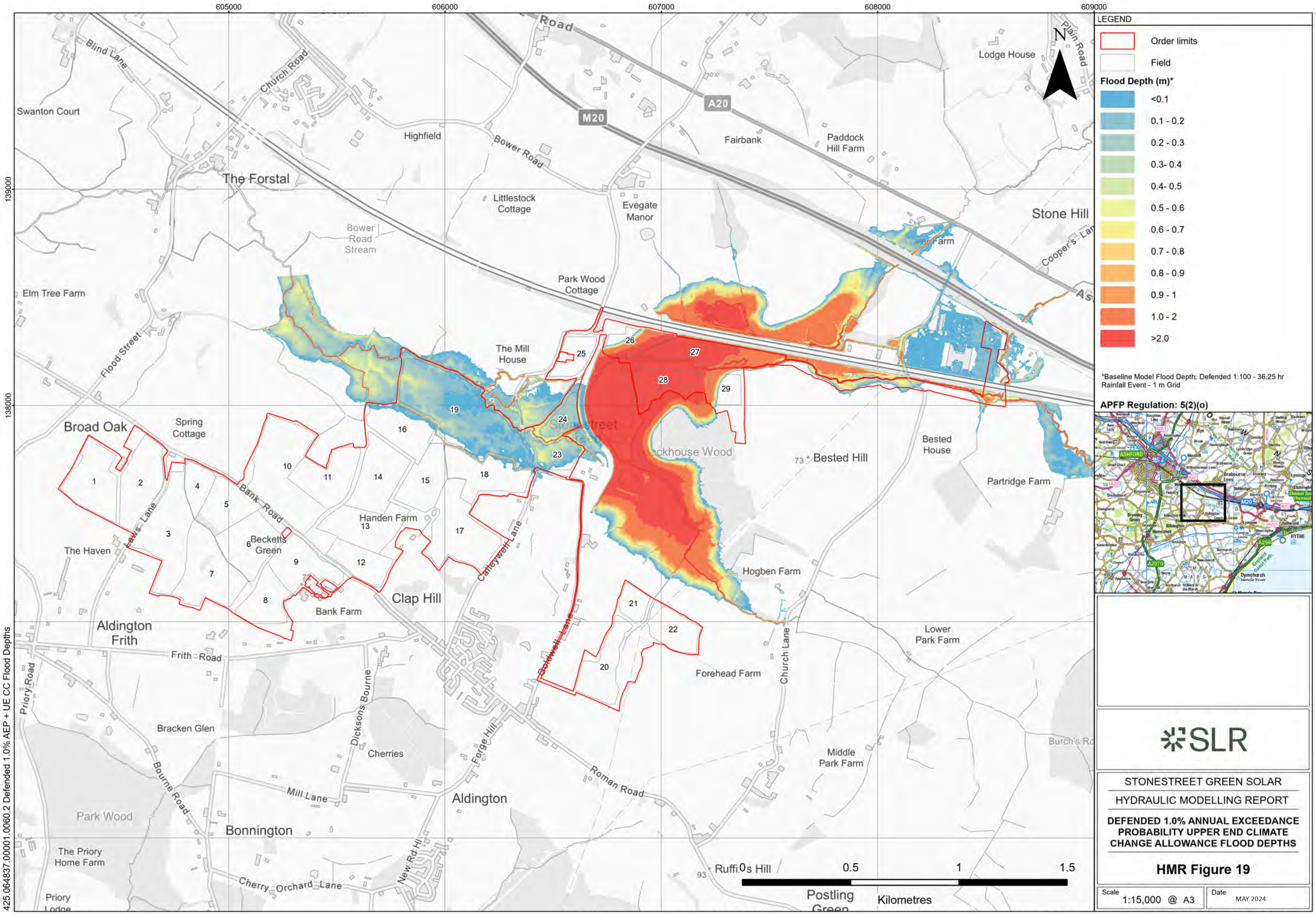

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

DEFENDED 1.0% ANNUAL EXCEEDANCE PROBABILITY UPPER END CLIMATE CHANGE ALLOWANCE FLOOD DEPTHS

HMR Figure 19

Scale 1:15,000 @ A3 | Date MAY 2024

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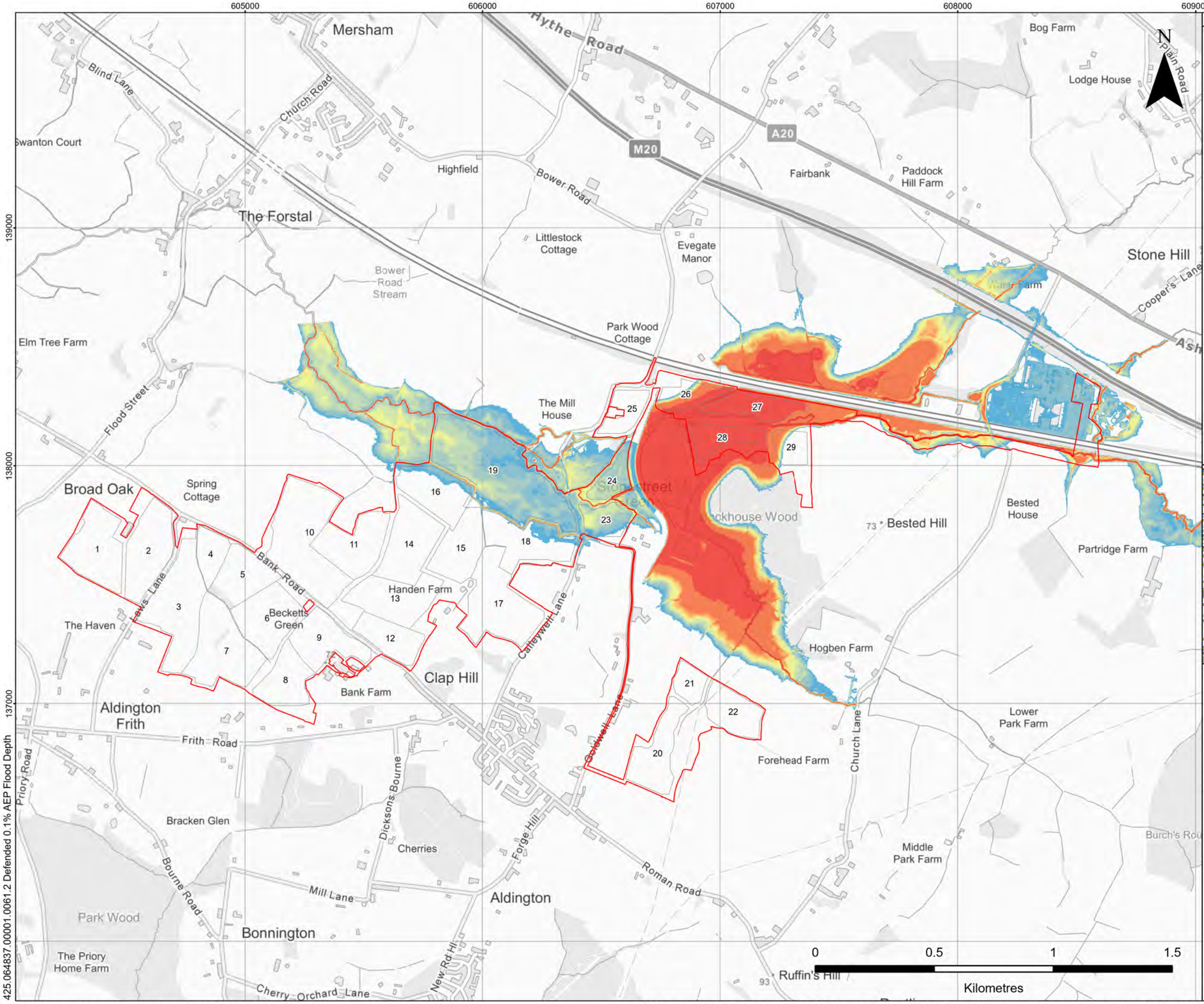

LEGEND

- Order limits
- Field

Flood Depth (m)*

- <0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3- 0.4
- 0.4- 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1.0 - 2
- >2.0

*Baseline Model Flood Depth: Defended 1:1000 - 27.25 hr Rainfall Event - 2 m Grid

APFP Regulation: 5(2)(o)

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STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

DEFENDED 0.1% ANNUAL EXCEEDANCE PROBABILITY FLOOD DEPTHS

HMR Figure 20

Scale	Date
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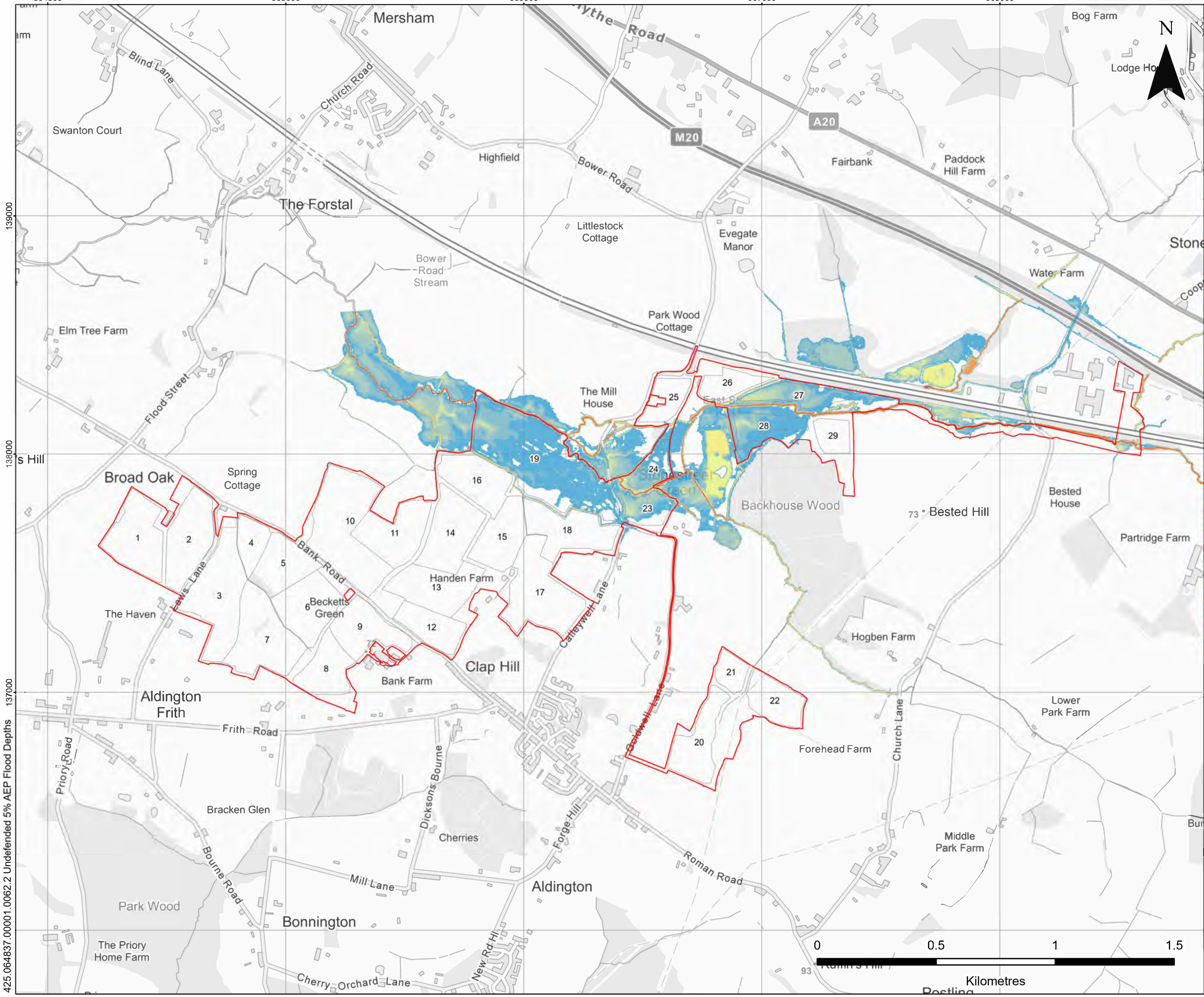


425.064837.00001.0062.2 Undefended 5% AEP Flood Depths

LEGEND

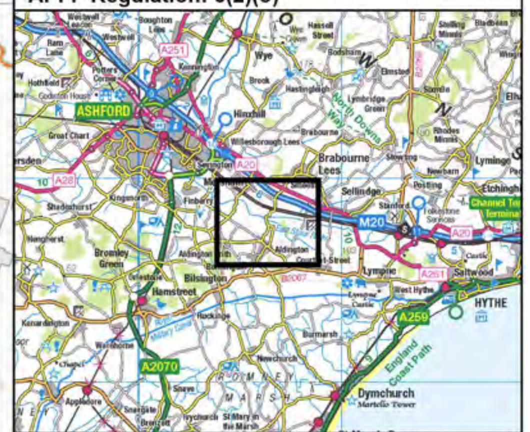
- Order limits
- Field

Flood Depth (m)*

- <0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3- 0.4
- 0.4- 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1.0 - 2
- >2.0

*Baseline Model Flood Depth: Defended 1:20 - 17.25 hr Rainfall Event - 2 m Grid

APFP Regulation: 5(2)(o)



SLR

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

UNDEFENDED 5% ANNUAL EXCEEDANCE PROBABILITY FLOOD DEPTHS

HMR Figure 21

Scale 1:15,000 @ A3

Date MAY 2024

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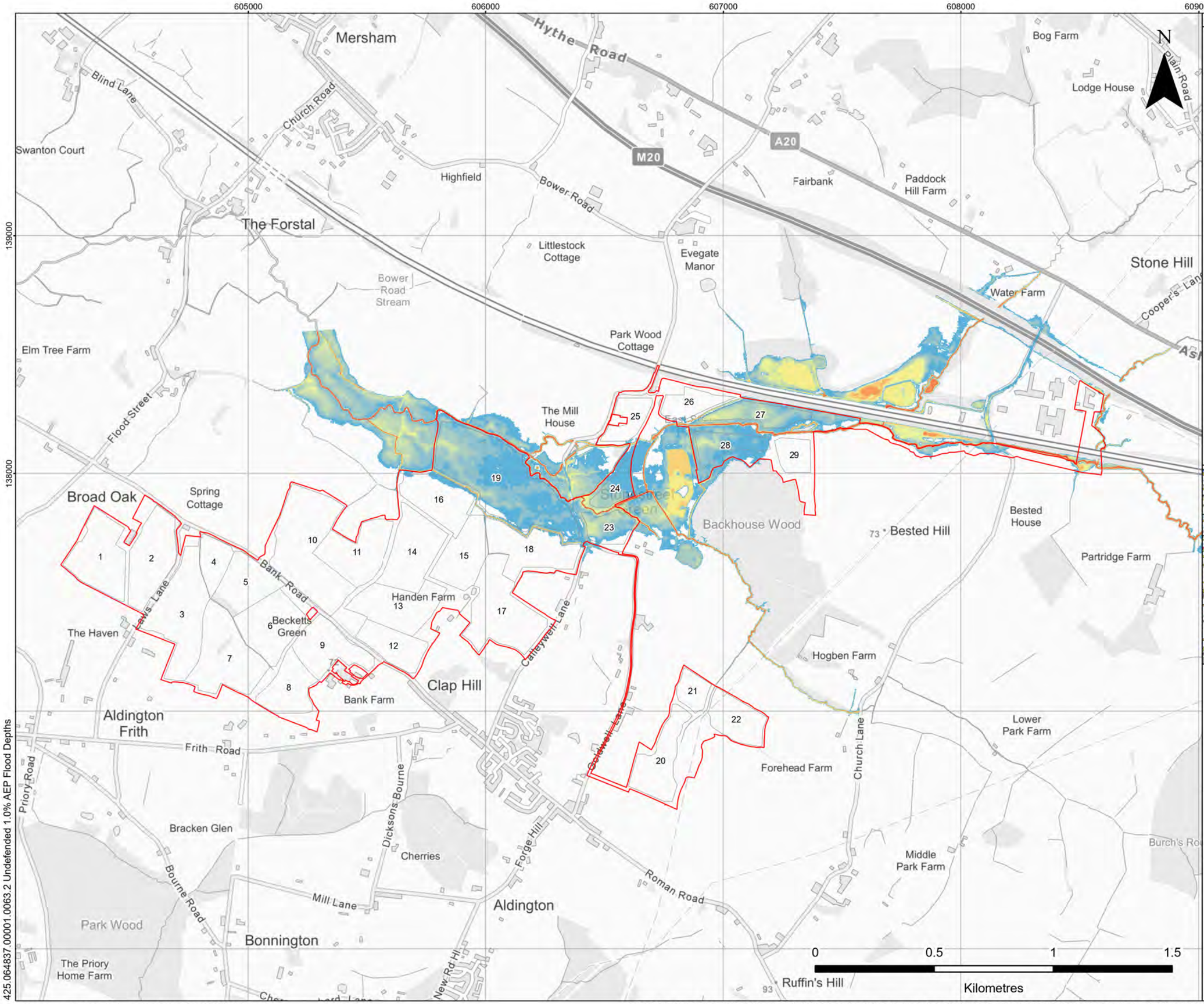

LEGEND

- Order limits
- Field

Flood Depth (m)*

- <0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3- 0.4
- 0.4- 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1.0 - 2
- >2.0

*Baseline Model Flood Depth: Defended 1:100 - 24.25 hr Rainfall Event - 2 m Grid

APFP Regulation: 5(2)(o)

SLR

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

UNDEFENDED 1.0% ANNUAL EXCEEDANCE PROBABILITY FLOOD DEPTHS

HMR Figure 22

Scale	Date
1:15,000 @ A3	MAY 2024

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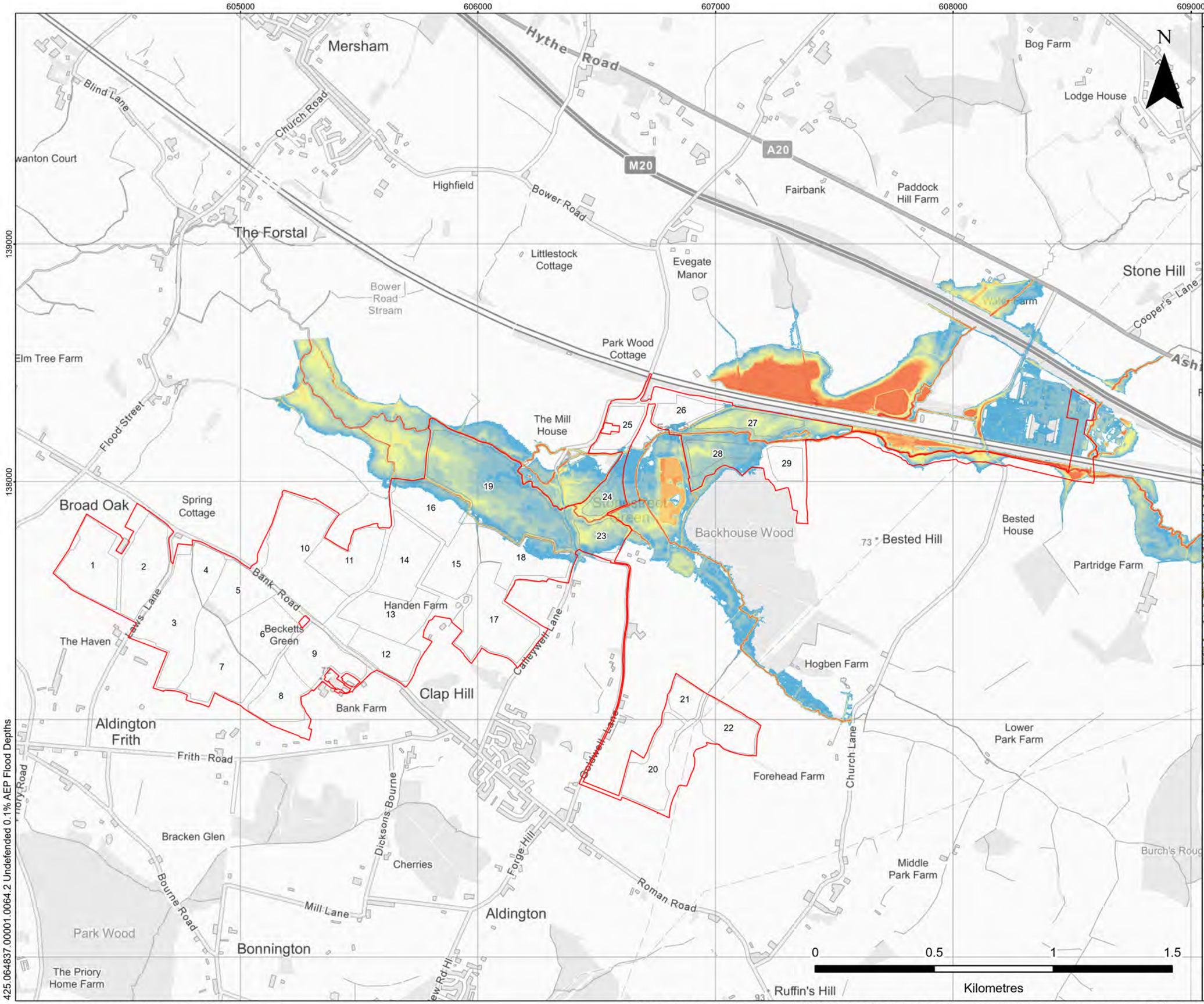


LEGEND

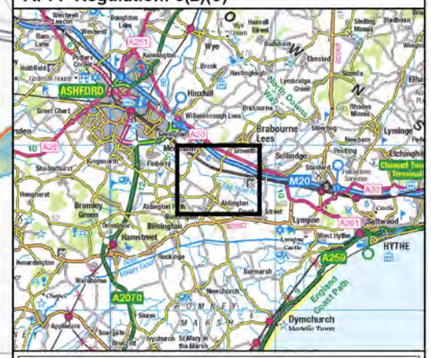
- Order limits
- Field

Flood Depth (m)*

- <0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3- 0.4
- 0.4- 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1.0 - 2
- >2.0

*Baseline Model Flood Depth: Defended 1:1000 - 24.25 hr Rainfall Event - 2 m Grid

APFP Regulation: 5(2)(o)



SLR

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

UNDEFENDED 0.1% ANNUAL EXCEEDANCE PROBABILITY FLOOD DEPTHS

HMR Figure 23

Scale	Date
1:15,000 @ A3	MAY 2024

425.064837.00001.0064.2 Undefended 0.1% AEP Flood Depths

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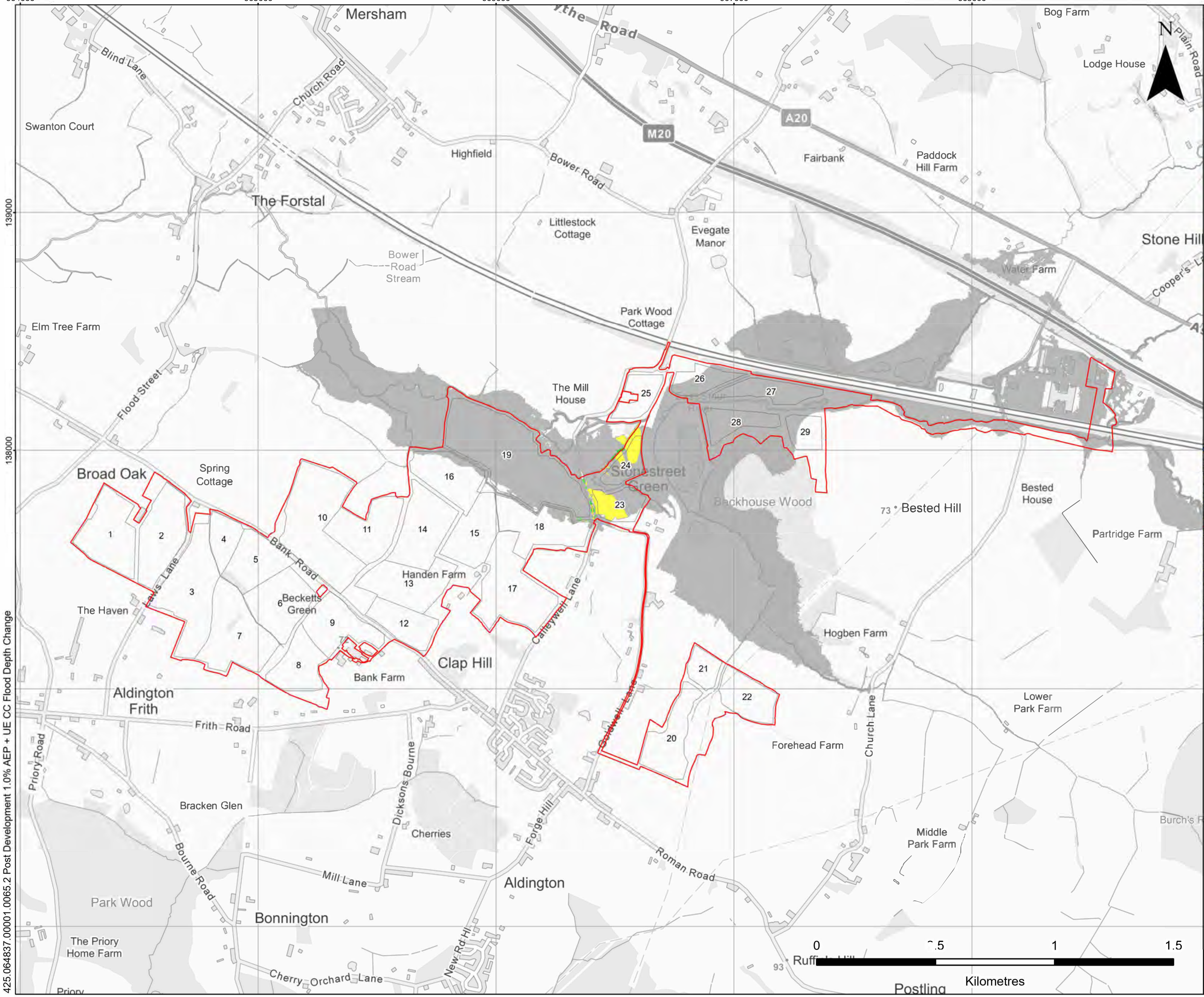


425.064837.00001.0065.2 Post Development 1.0% AEP + UE CC Flood Depth Change

LEGEND

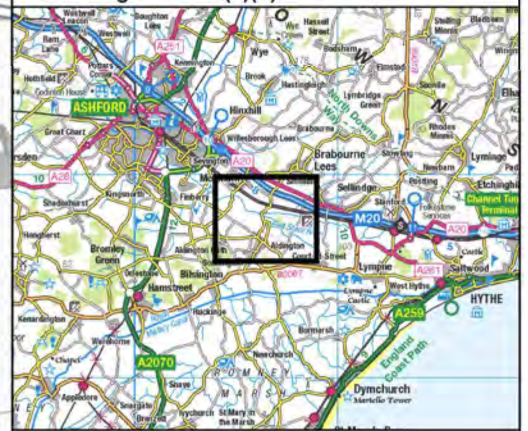
- Order limits
- Field

Depth Change (mm)

- <= -40
- -20 to -40
- -10 to -20
- -10 to -5
- -5 to -1
- -1 to 1
- 1 to 5
- 5 to 10
- 10 to 20
- 20 to 40
- >= 40

*Baseline vs Post Development Defended 1:100 - 36.25 hr Rainfall Event - 2 m Grid

APFP Regulation: 5(2)(o)



SLR

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

POST DEVELOPMENT 1.0% ANNUAL EXCEEDANCE PROBABILITY AND UPPER END CLIMATE CHANGE FLOOD DEPTHS

HMR Figure 24

Scale	Date
1:15,000 @ A3	MAY 2024

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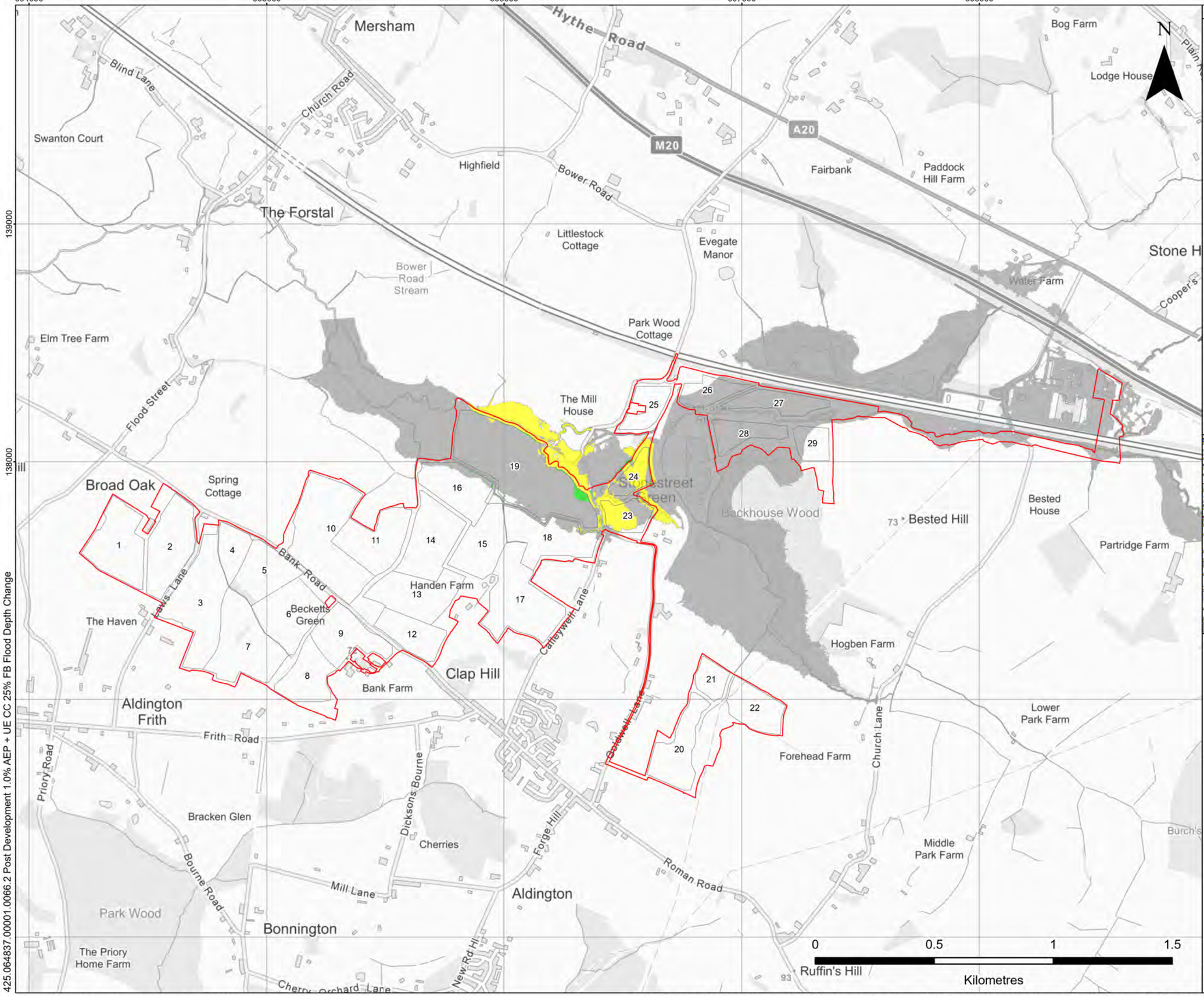


LEGEND

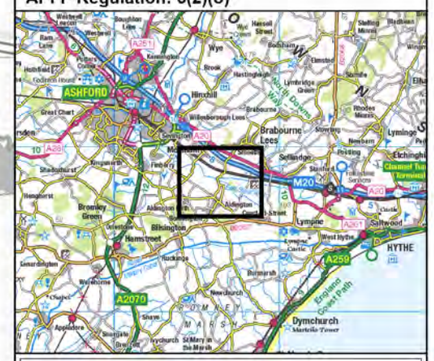
- Order limits
- Field

Depth Change (mm)

- <= -40
- -20 to -40
- -10 to -20
- -10 to -5
- -5 to -1
- -1 to 1
- 1 to 5
- 5 to 10
- 10 to 20
- 20 to 40
- >= 40

*Baseline vs Post Development 25% Fence Blockage
1:100 - 36.25 hr Rainfall Event - 2 m Grid

APFP Regulation: 5(2)(o)



SLR

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

POST DEVELOPMENT 1.0% ANNUAL EXCEEDANCE PROBABILITY AND UPPER END CLIMATE CHANGE 25% FENCE BLOCKAGE FLOOD DEPTHS

HMR Figure 25

Scale	Date
1:15,000 @ A3	MAY 2024

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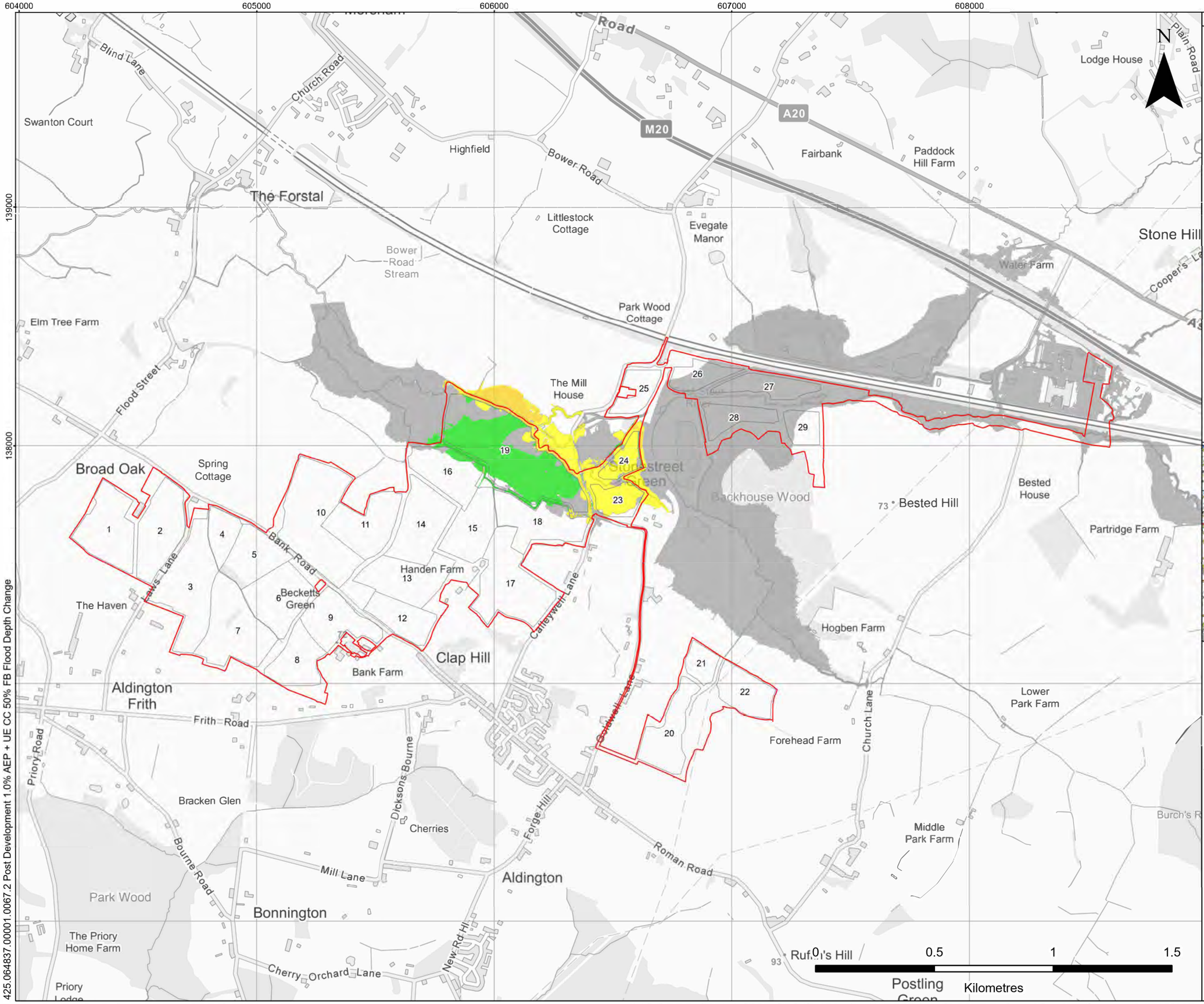

LEGEND

- Order limits
- Field

Depth Change (mm)

- <= -40
- -20 to -40
- -10 to -20
- -10 to -5
- -5 to -1
- -1 to 1
- 1 to 5
- 5 to 10
- 10 to 20
- 20 to 40
- >= 40

*Baseline vs Post Development 50% Fence Blockage
1:100 - 36.25 hr Rainfall Event - 2 m Grid

APFP Regulation: 5(2)(o)

SLR

STONESTREET GREEN SOLAR

HYDRAULIC MODELLING REPORT

POST DEVELOPMENT 1.0% ANNUAL EXCEEDANCE PROBABILITY AND UPPER END CLIMATE CHANGE 50% FENCE BLOCKAGE FLOOD DEPTHS

HMR Figure 26

Scale	Date
1:15,000 @ A3	MAY 2024

425.064837.00001.0067.2 Post Development 1.0% AEP + UE CC 50% FB Flood Depth Change

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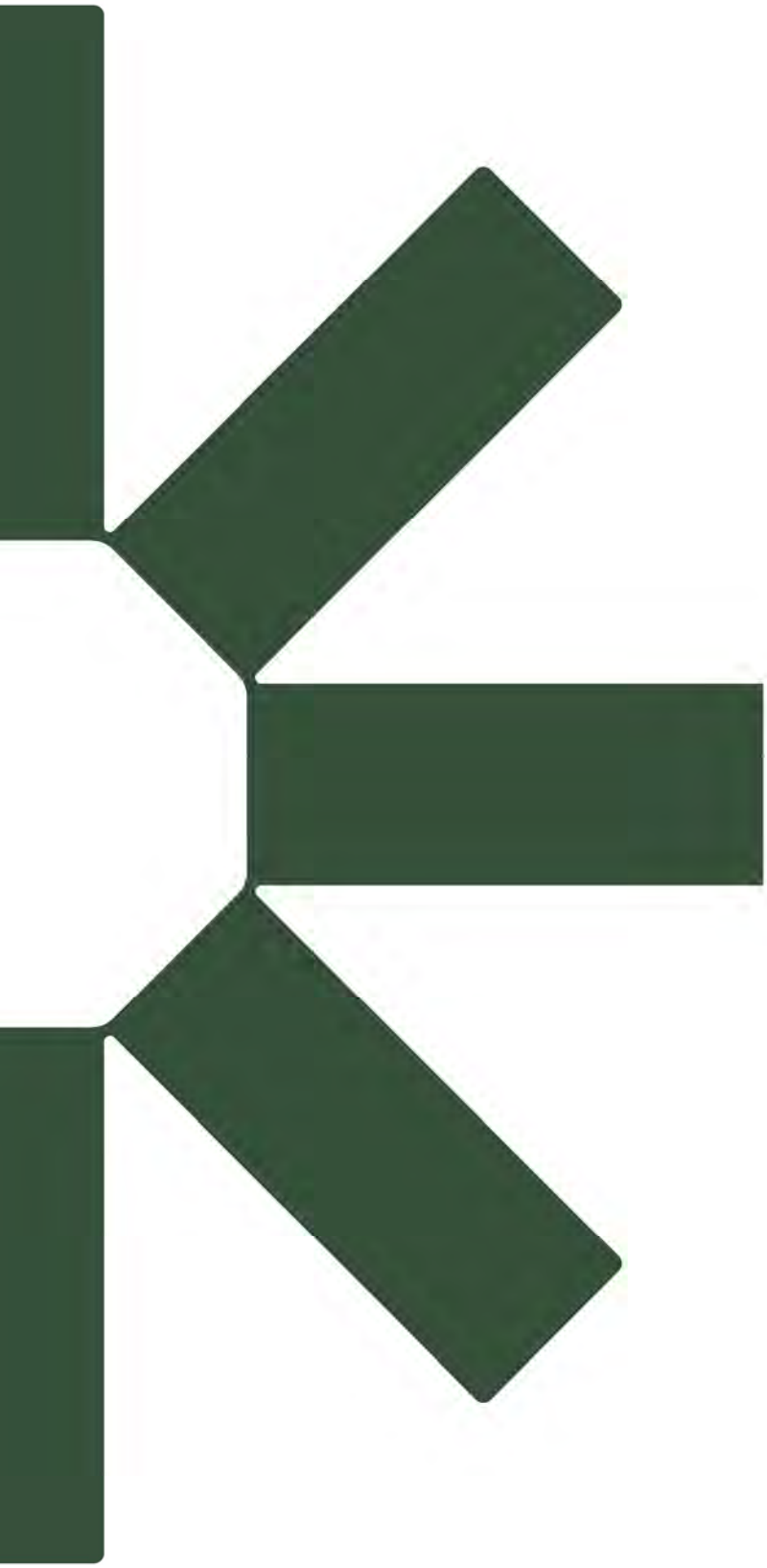


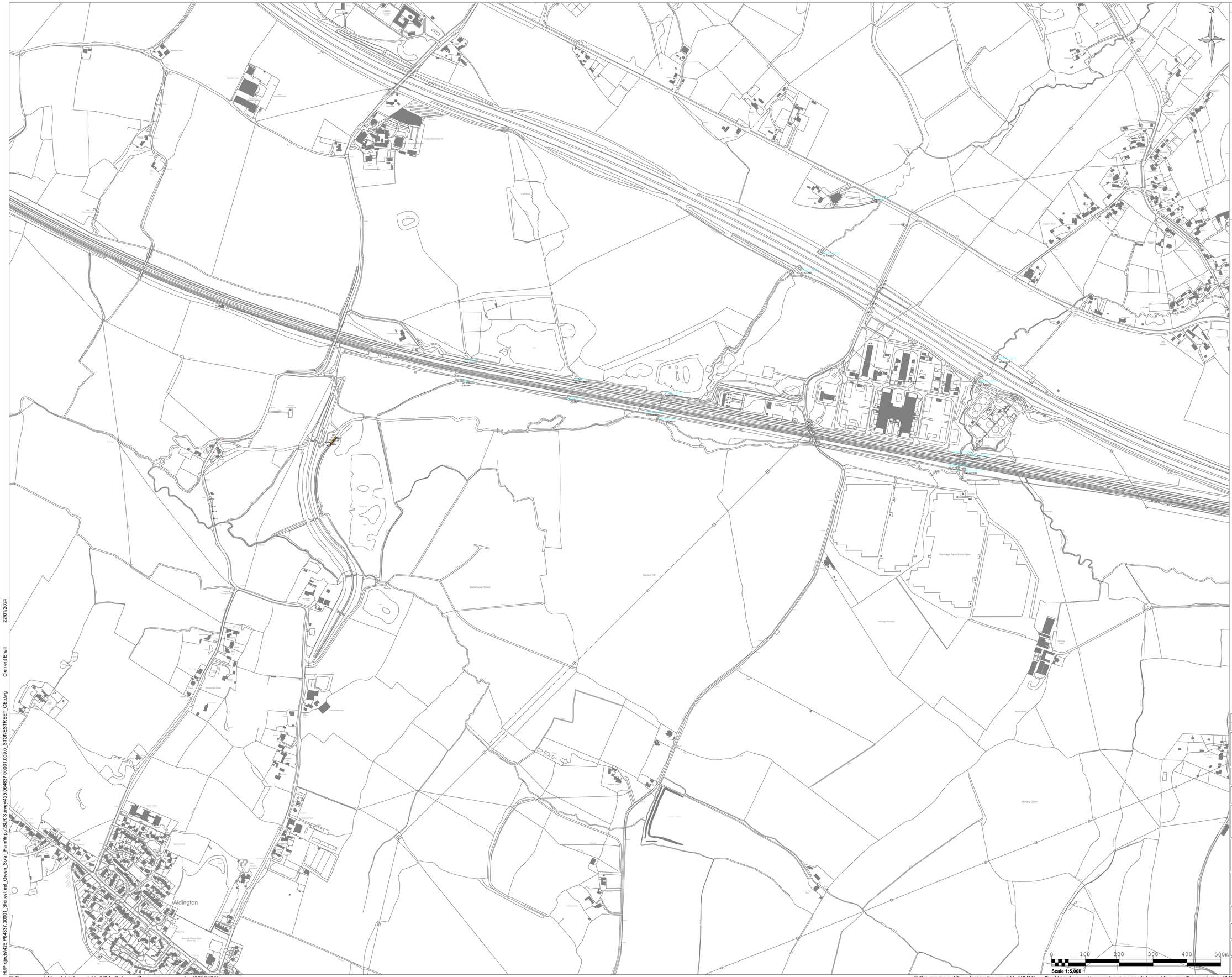
Making Sustainability Happen

Annex A SLR Topographic Survey

Annex B: East Stour Hydraulic Modelling Report

Stonestreet Green Solar Farm

EPL 001 Limited



Notes:

1. TOPOGRAPHICAL SURVEY CARRIED OUT BY SLR CONSULTING 24th-26t JULY 2023.

2. THIS PLAN IS ORIENTATED TO ORDNANCE SURVEY NATIONAL GRID PLAN AND HEIGHT DATUM DERIVED FROM THE ORDNANCE SURVEY ACTIVE NETWORK; OSGB36(OSGM15/OSTN15).

3. WHILST EVERY EFFORT HAS BEEN MADE TO INCLUDE ALL ACCESSIBLE DETAIL, SOME FEATURES MAY NOT BE SHOWN IF OBSCURED AT THE TIME OF SURVEY (e.g. PARKED VEHICLES/BOATS/OVERGROWN AREAS). ONLY MAJOR TREES SURVEYED IN WOODED/OVERGROWN AREAS.

4. THE ACCURACY OF THIS SURVEY IS COMMENSURATE WITH THE DRAWING SCALE SPECIFIED WITHIN THE TITLE BLOCK. ALL CRUCIAL DIMENSIONS SHOULD BE CHECKED ON-SITE.

5. THIS PLAN IS TO OSGB36 DATUM.

Legend:

- SPOT LEVEL
- SURVEY CONTROL STATION WITH ID
- KERB BOTTOM
- KERB TOP
- CHANGE IN SURFACE
- WALL BOTTOM
- FENCE
- GATE
- BUILDING HATCH
- FOLIAGE
- CANOPY

BB	Belisha Beacon	LR	Life Ring
BC	Building Ctrg Canopy	MH	Manhole
BH	Borehole	MKR	Marker
BM	Bench Mark	PO	Post
BDY	Boundary	PTH	Door Threshold Level
BOL	Bollard	IL	Pipe Invert
BT	British Telecom Manhole	RE	Rodding Eye
CCTV	Closed Circuit Television	RL	Ridge Level
CP	Chamber Pit	RNP	Road Name Plate
CTV	Cable Television Manhole	RS	Sign Post
CUL	Culvert	SL	Spot Light
DK	Drop Kerb	SO	Soffit Level
DP	Drain Pipe	ST	Stop Tap
DPC	Damp Proof Course	Stump	Stump (Tree)
DWB	Dog Waste Bin	SV	Stop Valve
EB	Electricity Box	SVP	Soil Vent Pipe
EL	Eaves Level	SW	Storm Water
EP	Electricity Pole	SY	Stay (e.g. Pylon, TP)
ER	Earthing Rod	TAP	Stand Pipe
IFL	Internal Floor Level	TCB	Telephone Call Box
INV	Invert	TCL	Tactile
FE	Fire Point	THL	Threshold Level
FA	Fire Alarm	TL	Traffic Light
GB	Grit Box	TOD	Top of Deck Level
GV	Gas Valve	TW	Top of Wall
GP	Gate Post	TP	Telegraph Pole
GRIT	Grit Bin	TPT	Trial Pit
G	Gully	UIB	Under Beam
FH	Hydrant	UTL	Unable To Lift
IC	Inspection Chamber	VP	Vent Pipe
IT	Intercom	WSL	Window Sill Level
KO	Kerb Outlet	WHL	Window Head Level
LB	Life Buoy	WL	Water Level
LP	Lamp Post	WM	Water Meter
		WO	Wash Out

Rev	Amendments	Date	By	Chk	Auth
0		28/07/23	JL	GJH	VQ

SLR

www.slrconsulting.com

Drawing Status & Suitability Code

Client
EPL 001 LIMITED

Project
STONESTREET GREEN
ASHFORD

Drawing Title
TOPOGRAPHICAL SURVEY
JULY 2023

Scale	SLR Project No.
1:5000 @ A1	425.064837.00001

Designed	Drawn	Checked	Authorised
	JL	GJH	VQ
Date	Date 28/07/2023	Date 28/07/2023	Date 28/07/2023

Drawing Number
425.064837.00001.09.01

Rev.

22/01/2024 Clement Ehall H:\Projects\425-P\64837.00001_Stonestreet_Green_Solar_Farm\Input\SLR Survey\425.064837.00001.009.0_STONESTREET_CE.dwg

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Annex B Environment Agency Supplied Topographic Survey

Annex B: East Stour Hydraulic Modelling Report

Stonestreet Green Solar Farm

EPL 001 Limited

J01058 - East Stour, Ashford to Stanford Channel Survey – C00322

December 2017 - March 2018

1) **WRITTEN REPORT**

   A) **Objectives**

   B) **Survey Control**

   C) **Topography**

   D) **Digital Data**

   E) **General Comments**

2) **STATION DESCRIPTIONS**

3) **EQUIPMENT LIST**

4) **DELIVERABLES**

5) **SELF CERTIFICATION SHEETS**

1. WRITTEN REPORT

To:	**Richard Groom, Orchard House, Endeavour Park, London Road, Addington, West Malling, Kent, ME19 5SH**
From:	**Maltby Land Surveys Limited**
Our Reference:	**17_322**
Survey Site:	**East Stour and Tributaries**
Date of Survey:	**January-March 2018**

A) Objectives

Further to your instruction, a river channel survey was carried out on the above watercourse in accordance with your survey specification.

Survey Extents

East Stour River (ESTO01) – TQ 0160 4286 Open Channel, Confluence with Great Stour to TQ 1316 3824 Culvert Exit, B2068.
East Stour River Tributary (ESTO02) – TQ 0235 4001 Open Channel, Confluence with ESTO01 to TQ 0298 3966 Open Channel, Confluence with ESTO01.
East Stour River Tributary (ESTO03) – TQ 0340 3938 Open Channel, Confluence with ESTO01 to TQ 0388 3883 Mill Face, Confluence with ESTO01.
East Stour River Tributary (ESTO04) – TQ 0379 3923 Open Channel, Confluence with ESTO01 to TQ 0432 3897 Sluice, Confluence with ESTO01.
East Stour River Tributary (ESTO05) – TQ 0492 3909 Open Channel, Confluence with ESTO01 to TQ 0496 3909 Culvert Entrance, Confluence with ESTO01.
East Stour River Tributary (ESTO05) – TQ 0492 3909 Open Channel, Confluence with ESTO01 to TQ 0496 3909 Culvert Entrance, Confluence with ESTO01.
East Stour River Tributary (ESTO06) – TQ 0620 3806 Open Channel, Confluence with ESTO01 to TQ 0643 3811 Open Channel, Confluence with ESTO01.
East Stour River Tributary (ESTO07) – TQ 0616 3804 Open Channel, Confluence with ESTO01 to TQ 0671 3814 Weir, Confluence with ESTO01.
East Stour River Tributary (ESTO08) – TQ 0471 3898 Open Channel, Confluence with ESTO01 to TQ 0475 3902 Culvert Entrance, Confluence with ESTO01.
Rail Culvert (ESTO09) – TQ 1116 3762 Culvert Entrance to TQ 1115 3756 Open Channel.
East Stour River Tributary (ESTO10) – TQ 0616 3804 Open Channel, Confluence with ESTO01 to TQ 0639 3810 Footbridge, Confluence with ESTO06.
Avocet Way Flood Relief Culvert (AFRC01-AFRC07) - Avocet Way

4) Specified Requirements

The *services* include, but are not limited to, the provision of the items specified in Section 2.

Project Management

Day to day management of project delivery shall be the responsibility of the *Consultant*.

In managing the *services* the *Consultant* shall undertake the following:

1. Maintain weekly contact with the *Employer's* Project Manager such that the *Employer* is fully informed of progress and issues.

Product Delivery

In delivering the *services* the *Consultant* shall:

1. Ensure all deliverables and products show evidence of a quality control system. General quality tolerances should consist of:
   a) All first draft deliverables shall be free from significant error and be consistent with other documents, avoiding repetition.
   b) All first draft products shall tell a logical story with a clear audit trail of consultation and decision making processes, supported by robust evidence, which can be easily transferred and interpreted by future users.
   c) All first draft deliverables shall be grammatically correct and clearly presented, with consistent formatting.
   d) All first draft deliverables shall satisfy the relevant latest guidance and legislative requirements.
   e) All first draft deliverables shall conform to the latest and necessary guidance and meet the template requirements, unless otherwise agreed with the *Employer* in advance of submission.
   f) Products shall be suitable for the audience and written using 'plain English'.
2. Ensure all drawings are produced at the scale described below in Section 2.4.

Previous Studies and Data Sources

The *Consultant* shall obtain Ordnance Survey mapping data and other relevant data products from the Partner Data Portal website and comply with the licensing of that site.

Survey

The *Consultant* shall:

1. Obtain all consents and approvals required for the survey to be undertaken.

2. When on site, carry with them at all times the letter of introduction, or similar, supplied by the *Employer*.
3. Deliver the survey as described in this Scope.
4. Ensure the *Employer's* estates lead is given 4 weeks advance notice of any land entry required.
5. Provide final outputs of the survey to the Employer in a digital format.
6. Ensure that all survey results including the survey report are to be delivered as a zipped file email attachment if the zipped file is smaller than 10Mb or via DEFRA Sharefile (link supplied by Employer upon request).

General Requirements applicable to all surveys, (Section I of Specifications)

The following is to be copied and pasted into the survey report as a record of the survey requirement.

The *Consultant* shall:

Submit all documents with the EA job number in the file name.

Name drawing files A-XXXXXX-BB.dwg where A may be:

Letter	Meaning
L	Long section
X	Cross sections
T	Topographic map
H	Hydrographic chart

BB is a sequential sheet number – 01, 02 etc.

And where XXXXXX is the job number - J01058

Submit weekly progress reports to EA Project Manager by email / telephone.

2.4.1 Survey Control (Section II of specifications)

The *Consultant* shall:

Take GNSS observations at existing stations shown on the contract map to E6 standard.

Establish permanent survey control stations in the approximate locations shown on C00322_Sheet1 to C00322_sheet5.pdf. When it is not possible to take GNSS observations at a permanent station, the surveyor shall establish a temporary station for the GNSS observations and a permanent E5 station on a suitable stable structure. He shall level from the GNSS station to the E5 station to determine the height.

GNSS observations shall be to E6 standard

Number EACS using the numbering system in Paragraph 3.2.5 of the National Technical Survey Specification.

Provide EACS description cards as .doc format files.

2.4.3 Channel Surveys (Section IV of specifications)

The *Consultant* shall:

Allow within their pricing for one day walkover of the site with the EA project manager / consultant.

Use the channel centreline as shown on the contract map.

Supply channel survey data in ISIS, formats. **Tenderers to state in the methodology if they will be supplying structure data automatically from survey data in ISIS format.**

Supply data in EACSD V3.2 format and include CES1 and CES2 data. EACSD shall be passed through the Environment Agency's on-line validator program (www.eacsd.co.uk) and the validation certificate presented in the survey report.

Survey open channel and structure cross sections in approximate locations indicated on the contract mapping.

Survey channel hard bed levels. Separate ISIS digital data files are to be provided for hard and for soft bed data.

Extend cross sections 5m beyond the river bank into the flood plain.

Number cross-sections in the format AAAABBCCCCC where AAAA is an alphanumeric watercourse identifier, BB is braid or side channel number and CCCCC is the cross-section chainage. These are marked on the contract mapping. Chainage for the East Stour is as shown on the contract mapping. For the side channels, chainage shall be 0+000 at the downstream confluence and increase upstream.

Present cross-sections at 1:100 natural scale, longitudinal sections at 1:2500 horizontal and 1:100 vertical scale or as agreed with the EA project manager.

Survey weirs and drop structures if their head of water is 0.2m or greater.

Survey a structure section for all pipes crossing the water course which have a diameter greater than 0.35m.

Survey and show on the long profile outfalls entering the watercourse of 350mm diameter or greater (re: para 9.3.5).

Produce gaugeboard description cards using template gaugeboard_blank.doc.

Survey surveyed in accordance with Clause 9.5 of the specification river banks which are raised above the floodplain.

B) Survey Control

Control for the survey was derived using Global Navigation Satellite Systems (GNSS) utilising Leica 'SmartNet', a Network Real Time Kinematic (RTK) survey method.
Two new Environment Agency Grade Control Stations (EACS) E50733004 & E50733005 were surveyed to E5 grade specification. Seventeen various previously installed EACS have been surveyed to various EA grades, for values relating to checks please see *J01058 – EACS Checks.xls and table B.2 for OSTN15 Check Values*. SmartNet was used to install control throughout the survey catchment where necessary, installing a minimum of two reference pegs for each set up. All supplied data is to the OSTN15.
GNSS techniques were deployed in accordance with the EA specification. Observations have been taken using Leica GS08+ receivers utilising the OSGM15 geoid model and OSTN15 transformation model to obtain OSGB36 co-ordinates. The data is imported into Leica Geo Office so a Mean Co-ordinates and Difference report can be created. The weighted average coordinates from the field are then used to derive the height of newly installed EACS with best fit levelling. See folder '13. Survey Control' for processing data.

Table B.1 –Details of New EACS.

EACS	Easting (NGm)	Northing (NGm)	Hgt (NGm)
E50733004	605042	139000	43.712
E50733005	610656	137517	60.587

Table B.2 –OSTN15 Values of existing EACS.

OSTN15 Values				Comments
Station	**Easting**	**Northing**	**Hgt**	
E20730012	601035.741	141073.248	35.975	
E20730401	601495.721	142538.993	35.267	
E20730403	602222.987	140275.473	38.489	
E20731536			51.806	Levelled only (No Position from Historic Data (OSTN02)
E50730013	601326.653	142026.358	38.489	Position Value Derived from 2 x 3min observation
E50730020	601592.794	140613.787	36.314	Position Derived from Section Resection
E50730021			36.337	Levelled only (No Position from Historic Data (OSTN02)
E50730500			38.486	Levelled only (No Position from Historic Data (OSTN02)
E50730503	603435.819	139359.525	40.259	Position Value Derived from 2 x 3min observation
E50731495	601526.000	140706.000	37.864	Levelled only (Position from Historic Data (OSTN02)
E50731496	601288.000	141992.000	37.732	Levelled only (Position from Historic Data (OSTN02)
E50731537	606676.066	137917.409	47.711	Position Value Derived from 2 x 3min observation
E50731538	606712.362	138424.528	63.022	Position Value Derived from 2 x 3min observation
E50731571	606662.807	138137.856	50.976	Levelled only (Position from Historic Data (OSTN02)
E60731483	601512.490	140701.055	35.916	
E60731484	601332.236	142006.215	37.463	
E60731539	606717.365	138286.468	52.251	

C) Topography

The topography has been surveyed using a Leica TS06 Total Station in accordance with the specification.

D) Digital Data

For list of data provided please see section 4. Deliverables

All data supplied has been run through the latest edition of AVG Anti – Virus software and is, to the best of our knowledge, virus – free.

E) General Comments

As per the contract mapping, reaches ESTO01 to ESTO07 have been completed. Addition reaches ESTO08 to ESTO10 have been created where single sections have been requested.
As previously stated, requested reach ESTO05 located at Hanover Mill has been surveyed as ESTO01 with the ESTO05 now going through the Mill House. See relevant long section drawings.

Numerous additional Structures surveyed to specification

Flood Modeller data which contains structure information is still being completed and will be delivered in due course.

East Stour River (ESTO01)

Requested Crest levels at TQ 0152 4224 have been surveyed and added to drawing L-J01058-01, with XYZ data (EMB01) supplied.

Due to access (Network Rail) historic data has been utilised on section ESTO01_01022, the main opening was surveyed with non-contact survey methods with the historic data referenced to these levels

Requested wall levels at TQ 0125 4164 have been surveyed and added to drawing L-J01058-01, with XYZ data (TOW01) supplied.

A ponding area was located at TQ 0323 3941, additional data has been surveyed to show area, see drawing L-J01058-03 and accompanying XYZ data (EMB02).

Unable to survey full extent of culvert exit at location TQ 1097 3761, this is due to culvert being located on network Rail land, non-contact survey methods have been utilised to collect data on structure with an open channel surveyed at the network rail boundary.

Unable to survey culvert entrance at location TQ 1144 3752, this is due to culvert being located on Network Rail land, non-contact survey methods have been utilised to collect long section structure data.

Unable to survey culvert entrance at TQ 1318 3826, this was due to dense foliage. MLS have surveyed the culvert exit (ESTO01_20131).

East Stour River Tributary (ESTO02))

Additional Access Bridge section ESTO02_0999 has been surveyed, no opening was found, and it appears the bridge is made up of earth which has been dropped in the channel to create an access point between ESTO01 and ESTO02.

East Stour River Tributary (ESTO03)

The water source is from the pipe on the left bank downstream of section ESTO03_0788. We were unable to survey the dimensions of Swanton Mill, due to confined space.

East Stour River Tributary (ESTO04)

Surveyed passed with-out incident.

East Stour River Tributary (ESTO05)

Reach has been surveyed through Hanover Mill.

East Stour River Tributary (ESTO06)

Surveyed passed with-out incident.

East Stour River Tributary (ESTO07)

Water levels were high during the survey. Due to this a large amount of debris were present on the trash screen on section ESTO07_0741. A silt trap and overflow structure were located between section ESTO07_0741 and ESTO07_0750, this is shown on long section and ESTO07_0750 Through Section.

East Stour River Tributary (ESTO08)

Additional reach surveyed to show full channel.

Rail Culvert (ESTO09)

Surveyed passed with-out incident.

East Stour River Tributary (ESTO10)

Surveyed passed with-out incident.

Avocet Way Flood Relief Culvert (AFRC01-AFRC07)

All data has been supplied in a separate folder 11. Flood Relief Culverts.

3 .EQUIPMENT LIST

- Leica GS08+ Series Dual Frequency Geodetic, RTK Receiver (x2)
  Serial numbers: 2884265,2884490
- Leica TS06 Total Station, serial number: 1391964,1392085

4. DELIVERABLES

		Format	File	Contents
1. ESTO01	**1. Cross Sections**	AutoCAD	X-J01058-01-30.dwg X-J01058-01-30.pdf	Cross Section Drawings
	2. Long Section & Location Plan	AutoCAD	L-J01058-01-09.dwg L-J01058-01-09.pdf	Long Section & Location plan
	3. Flood Modeller	.dat	J01058 - ESTO01_FMod_Hard.dat J01058 - ESTO01_FMod_Soft.dat	Flood Modeller
	4. XYZ	Excel	J01058 - ESTO01_XYZ_HardBed.xls J01058 - ESTO01_XYZ_SoftBed.xls J01058 - Additional XYZ Data.xls	XYZ Data
	5. EACSD	Various	J01058 - ESTO01_EACSD.txt J01058 - ESTO01_EACSD_Validator.pdf	EACSD & Validator
	6. Gauge Board	Word	Various	Gauge Board Description Sheet
	7. Photos	JPEG Excel	Various	Photos & Photo Schedule
1. ESTO02	**1. Cross Sections**	AutoCAD	X-J01058-31-32.dwg X-J01058-31-32.pdf	Cross Section Drawings
	2. Long Section & Location Plan	AutoCAD	L-J01058-10.dwg L-J01058-10.pdf	Long Section & Location plan
	3. Flood Modeller	.dat	J01058 - ESTO02_FMod_Hard.dat J01058 - ESTO02_FMod_Soft.dat	Flood Modeller
	4. XYZ	Excel	J01058 - ESTO02_XYZ_HardBed.xls J01058 - ESTO02_XYZ_SoftBed.xls	XYZ Data
	5. EACSD	Various	J01058 – EST002_EACSD.TXT J01058 – EST002_EACSD_Validator.pdf	EACSD & Validator
	6. Photos	JPEG Excel	Various	Photos & Photo Schedule
3. EST003	**1. Cross Sections**	AutoCAD	X-J01058-33.dwg X-J01058-33.pdf	Cross Section Drawings
	2. Long Section & Location Plan	AutoCAD	L-J01058-11.dwg L-J01058-11.pdf	Long Section & Location plan
	3. Flood Modeller	.dat	J01058 - ESTO03_FMod_Hard.dat J01058 - ESTO03_FMod_Soft.dat	Flood Modeller
	4. XYZ	Excel	J01058 - ESTO03_XYZ_HardBed.xls J01058 - ESTO03_XYZ_SoftBed.xls	XYZ Data

	5. EACSD	Various	J01058 – EST003_EACSD.TXT J01058 – EST003_EACSD_Validator.pdf	EACSD & Validator
	6. Photos	JPEG Excel	Various	Photos & Photo Schedule
4. ESTO04	**1. Cross Sections**	AutoCAD	X-J01058-34.dwg X-J01058-34.pdf	Cross Section Drawings
	2. Long Section & Location Plan	AutoCAD	L-J01058-12.dwg L-J01058-12.pdf	Long Section & Location plan
	3. Flood Modeller	.dat	J01058 - ESTO04_FMod_Hard.dat J01058 - ESTO04_FMod_Soft.dat	Flood Modeller
	4. XYZ	Excel	J01058 - ESTO04_XYZ_HardBed.xls J01058 - ESTO04_XYZ_SoftBed.xls	XYZ Data
	5. EACSD	Various	J01058 – EST004_EACSD.TXT J01058 – EST004_EACSD_Validator.pdf	EACSD & Validator
	6. Photos	JPEG Excel	Various	Photos & Photo Schedule
5. ESTO05	**1. Cross Sections, Long Section & Location Plan**	AutoCAD	X-J01058-35.dwg X-J01058-35.pdf	Cross Section, Long Section & Location plan
	2. Flood Modeller	.dat	J01058 - ESTO05_FMod_Hard.dat J01058 - ESTO05_FMod_Soft.dat	Flood Modeller
	3. XYZ	Excel	J01058 - ESTO05_XYZ_HardBed.xls J01058 - ESTO05_XYZ_SoftBed.xls	XYZ Data
	4. EACSD	Various	J01058 – EST005_EACSD.TXT J01058 – EST005_EACSD_Validator.pdf	EACSD & Validator
	5. Photos	JPEG Excel	Various	Photos & Photo Schedule
6. ESTO06	**1. Cross Sections**	AutoCAD	X-J01058-36.dwg X-J01058-36.pdf	Cross Section Drawings
	2. Long Section & Location Plan	AutoCAD	L-J01058-13.dwg L-J01058-13.pdf	Long Section & Location plan
	3. Flood Modeller	.dat	J01058 - ESTO06_FMod_Hard.dat J01058 - ESTO06_FMod_Soft.dat	Flood Modeller
	4. XYZ	Excel	J01058 - ESTO06_XYZ_HardBed.xls J01058 - ESTO06_XYZ_SoftBed.xls	XYZ Data
	5. EACSD	Various	J01058 – EST006_EACSD.TXT J01058 – EST006_EACSD_Validator.pdf	EACSD & Validator

	6. Photos	JPEG Excel	Various	Photos & Photo Schedule
7. ESTO07	**1. Cross Sections**	AutoCAD	X-J01058-37-38.dwg X-J01058-37-38.pdf	Cross Section Drawings
	2. Long Section & Location Plan	AutoCAD	L-J01058-14.dwg L-J01058-14.pdf	Long Section & Location plan
	3. Flood Modeller	.dat	J01058 - ESTO07_FMod.dat	Flood Modeller
	4. XYZ	Excel	J01058 - ESTO07_XYZ.xls	XYZ Data
	5. EACSD	Various	J01058 - ESTO07_EACSD.txt J01058 - ESTO07_EACSD_Validator.pdf	EACSD & Validator
	6. Gauge Board	Word	Various	Gauge Board Description Sheet
	7. Photos	JPEG Excel	Various	Photos & Photo Schedule
8. ESTO08	**1. Cross Sections**	AutoCAD	X-J01058-39.dwg X-J01058-39.pdf	Cross Section Drawings
	2. Long Section & Location Plan	AutoCAD	L-J01058-15.dwg L-J01058-15.pdf	Long Section & Location plan
	3. Flood Modeller	.dat	J01058 - ESTO08_FMod.dat	Flood Modeller
	4. XYZ	Excel	J01058 - ESTO08_XYZ.xls	XYZ Data
	5. EACSD	Various	J01058 – EST008_EACSD.TXT J01058 – EST008_EACSD_Validator.pdf	EACSD & Validator
	6. Photos	JPEG Excel	Various	Photos & Photo Schedule
9. ESTO09	**1. Cross Sections, Long Section & Location Plan**	AutoCAD	X-J01058-40.dwg X-J01058-40.pdf	Cross Section, Long Section & Location plan
	2. Flood Modeller	.dat	J01058 - ESTO09_FMod.dat	Flood Modeller
	3. XYZ	Excel	J01058 - ESTO09_XYZ.xls	XYZ Data
	4. EACSD	Various	J01058 – EST009_EACSD.TXT J01058 – EST009_EACSD_Validator.pdf	EACSD & Validator
	5. Photos	JPEG Excel	Various	Photos & Photo Schedule

10. ESTO10	**1. Cross Sections, Long Section & Location Plan**	AutoCAD	X-J01058-41.dwg X-J01058-41.pdf	Cross Section, Long Section & Location plan
	2. Flood Modeller	.dat	J01058 – ESTO10_FMod_Hard.dat J01058 – ESTO10_FMod_Hard.dat	Flood Modeller
	3. XYZ	Excel	J01058 – ESTO10_XYZ_HardBed.xls J01058 – ESTO10_XYZ_SoftBed.xls	XYZ Data
	4. EACSD	Various	J01058 – EST010_EACSD.TXT J01058 – EST010_EACSD_Validator.pdf	EACSD & Validator
	5. Photos	JPEG Excel	Various	Photos & Photo Schedule
11. Flood Relief Culverts	**1. Cross Sections**	AutoCAD	X-J01058-42-43.dwg X-J01058-42-43.pdf	Cross Section Drawings
	2. Location Plan	AutoCAD	L-J01058-16.dwg L-J01058-16.pdf	Location Plan
	3. Flood Modeller	.dat	AFRC01-07_Mod.dat	Flood Modeller
	4. XYZ	Excel	J01058_AFRC_XYZ	XYZ Data
	5. Photos	JPEG Excel	Various	Photos & Photo Schedule
	6.EACSD	Various	J01058 – AFRC01-07_EACSD.TXT J01058 – AFRC01-07_EACSD_Validator.pdf	EACSD & Validator
12. Survey Control	1. Level Runs & Adjustments	Excel	J01058 – Permanent Control Schedule.xls J01058 - Level Run.xls J01058 - EACS Adjustments.xls J01058 - Temporary Control Schedule.xls J01058 - EACS Checks.xls	E6 Control Data
	2.Description Sheets	Word	Various	Description Sheets
	3.Temporary E6 Photos	.JPG	Various	Photos
	4. GNSS Report	Word	J01058 – GNSS Report (Existing).docx J01058 – GNSS Report (New).docx	GNSS Report
13. Report		Word	J01058 East Stour Survey Report.doc	Written Survey Report

5. Self Certification Forms

ENVIRONMENT AGENCY ISSUE 03/03.2

SELF CERTIFICATION CHANNEL SURVEY CHECK LIST

Job number	J01058	Company	Maltby Land Surveys		
Task	East Stour				
Surveyor	JB-RC	Checker	its	Date	29/03/2018

COPIES OF THE FOLLOWING WILL BE PROVIDED TO THE SURVEYOR'S CHECKER
YES

Survey Brief & mapping	x	Equipment list	x
OS & EA Control Sheets	x	GNSS Report	x
Vertical Control Field Sheets	x		
Channel Profile Sheets	x		

VERTICAL CONTROL
NO YES

Check control values against Control Data		x
Check level comparisons between heighting by GNSS and from BMs		x
Check other level misclosures and Two Peg Test results		x

5)

PLOTS
NO YES

Does survey meet specification? IS IT DOWNSTREAM?		x
Check Title Box is complete and contains the correct Agency Region		x
Check control values and descriptions on longitudinal sections		x
Check for incomplete features		x
Check for correct sequence of section numbers on longitudinal section		x
Check height labels on cross-section for gross errors		x
Check cross-section feature heights with longitudinal section heights		x

CROSS SECTION LABELLING SHEET

Fence type/height	XJ01058_01-43
Bridge widths	XJ01058_01-43
Soffits/Invert heights	XJ01058_01-43
Skew Diagrams	XJ01058_01-43

Bed and Bank Material	XJ01058_01-43

EA Control Stations

Check originating control values _____ and EA CS value _____
Check grid square _____Check diagram _____

CHECK KEY PLAN

	NO	YES
Correct sequence of sections		x
Do the sections plotted from co-ordinate data fall in the right place on the OS background		x
Co-ordinates, scale, north point		x
Check digital location plan.		x
Legend on longitudinal section		

REPORT

	NO	YES
Standard written format used		x
Landowner plan or schedule		
EACS, TBM and Structure photographs adequate		x
All required appendices present		x

REMEDIAL ACTION

Please action the following:

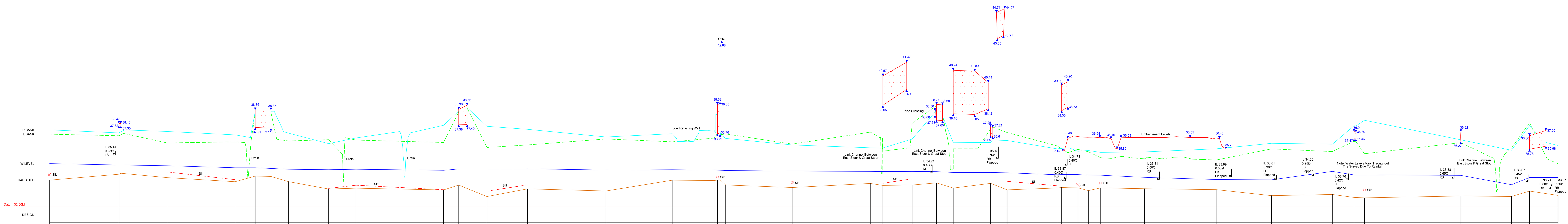
I CERTIFY THAT ALL THE REQUIRED CHECKS HAVE BEEN CARRIED OUT AND ALL REMEDIAL ACTIONS HAVE BEEN COMPLETED.

SIGNED: PRINT NAME: RICHARD MALTBY

POSITION: COMMERCIAL DIRECTOR

DATE: 29/03/2018

SCALE = 1:2500 H, 1:100 V



SECT NO.	CHAINAGE	DESIGN	W.LEVEL	HARD BED	GROUND	L.BANK	R.BANK	WATER DATE	
ESTO01_02500	2499.6		34.84	33.76	34.14	36.77	37.05	02/01/18	Open Channel
ESTO01_02386	2386.4		34.75	34.14		36.66	36.85	01/02/18	Footbridge
ESTO01_02308	2307.6		34.70	33.93	34.30	36.19	36.94	02/01/18	Open Channel
ESTO01_02196	2196.4		34.57	33.66	33.79	36.26	36.72	02/01/18	Open Channel
ESTO01_02163	2163.5		34.57	34.02		38.13	38.25	07/02/18	A2042 Road Bridge
ESTO01_02109	2109.1		34.47	33.66		36.32	36.83	02/01/18	Open Channel
ESTO01_02043	2043.5		34.44	33.18	33.22	36.41	36.15	02/01/18	Open Channel
ESTO01_01999	1998.6		34.47	33.23	33.43	36.38	36.52	02/01/18	Open Channel
ESTO01_01855	1855.5		34.40	33.12	33.13	36.22	37.35	02/01/18	Open Channel
ESTO01_01831	1830.7		34.49	33.44		38.21	38.27	07/02/18	Norman Road Road Bridge
ESTO01_01785	1784.6		34.49	32.69	33.04	35.90	37.28	07/02/18	Open Channel
ESTO01_01718	1718.3		34.50	33.19	33.45	36.06	37.08	02/01/18	Open Channel
ESTO01_01590	1589.8		34.42	33.05		36.45	36.58	07/02/18	Open Channel
ESTO01_01482	1481.5		34.44	33.75		36.26	36.80	07/02/18	Open Channel
ESTO01_01414	1413.5		34.42	33.74		36.51	36.98	07/02/18	Open Channel
ESTO01_01408	1407.7		34.41	33.76	33.97	36.81	38.05	07/02/18	Rugby Garden Road Bridge
ESTO01_01394	1394.3		34.39	33.44		36.78	36.49	07/02/18	Open Channel
ESTO01_01285	1285.4		34.35	33.28	33.60	36.11	36.06	07/02/18	Open Channel
ESTO01_01158	1157.7		34.33	33.54		36.90	35.87	06/02/18	Open Channel
ESTO01_01137	1137.2		34.32	33.41	33.55	35.73	35.86	06/02/18	A2042 Road Bridge
ESTO01_01089	1089.3		34.33	33.44	33.85	37.49	36.45	06/02/18	Open Channel
ESTO01_01049	1049.4		34.31	33.58		38.63	38.32	06/02/18	Newtown Road Bridge
ESTO01_01022	1022.1		34.26	33.24		34.51	36.21	06/02/18	Railway Bridge
ESTO01_00961	961.1		34.26	33.55		37.13	36.22	06/02/18	Footbridge
ESTO01_00934	933.9		34.24	33.12	33.68	36.87	36.35	06/02/18	Open Channel
ESTO01_00852	852.2		34.11	33.25	33.39	36.00	35.80	06/02/18	Open Channel
ESTO01_00844	844.9		34.12	33.28		35.81	35.84	06/02/18	Access Road Bridge
ESTO01_00818	818.4		34.12	33.26	33.45	35.77	35.65	06/02/18	Open Channel
ESTO01_00801	801.1		34.09	33.07		35.61	35.70	06/02/18	Open Channel
ESTO01_00781	781.1		34.08	33.25	33.57	35.22	35.57	06/02/18	Open Channel
ESTO01_00709	709.3		33.94	33.20		35.15	35.61	06/02/18	Open Channel
ESTO01_00592	592.1		33.80	33.14		35.08	35.81	06/02/18	Open Channel
ESTO01_00502	501.8		33.78	32.74		35.80	36.17	06/02/18	Open Channel
ESTO01_00402	402.2		34.33	32.82		35.63	36.11	03/01/18	Open Channel
ESTO01_00367	366.8		34.10	32.63		36.30	37.31	02/01/18	Footbridge
ESTO01_00350	349.7		34.10	32.60	33.12	35.49	37.68	02/01/18	Open Channel
ESTO01_00192	192.1		34.07	32.72		36.21	36.40	02/01/18	Pipe Crossing
ESTO01_00109	109.3		33.46	32.69		35.85	35.71	29/01/18	Open Channel
ESTO01_00080	79.8		33.93	33.04		37.51	37.32	02/01/18	Mace Lane Road Bridge
ESTO01_00033	33.3		33.93	32.76		34.83	36.03	02/01/18	Open Channel

Continues On L-J01058-02

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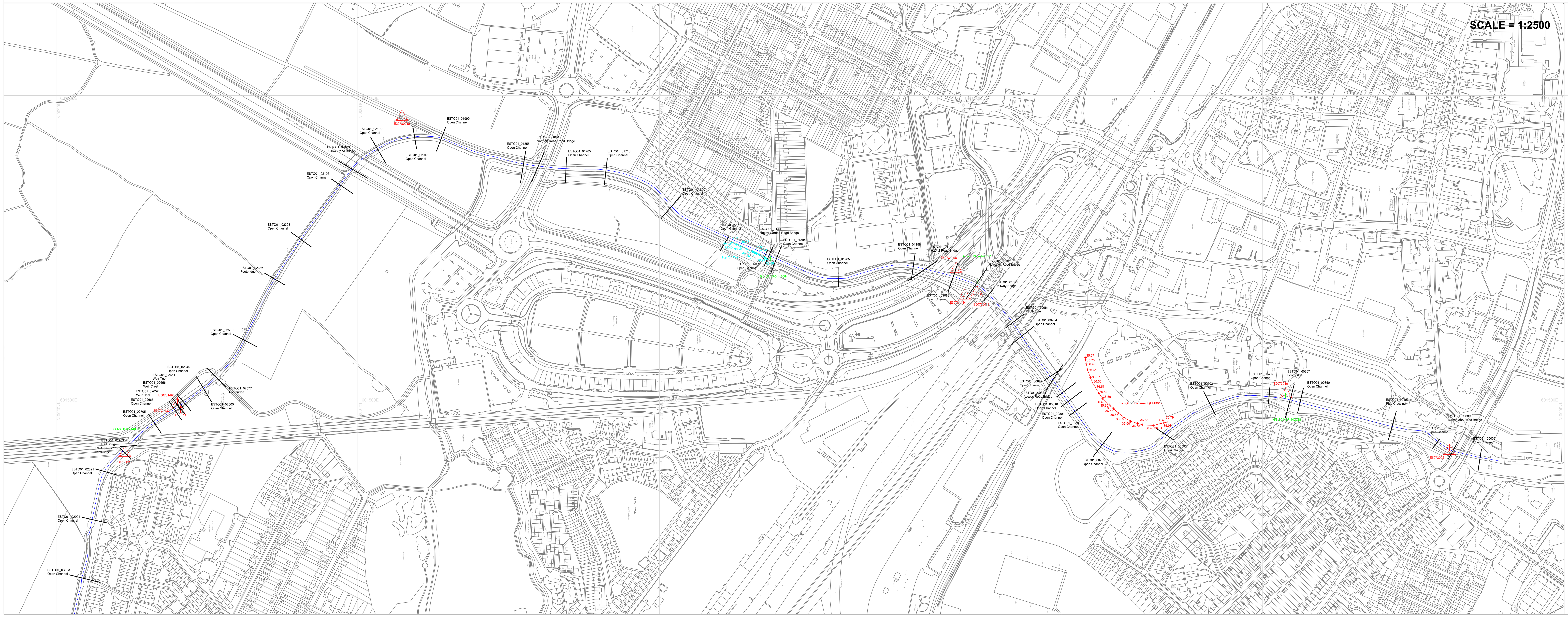


Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

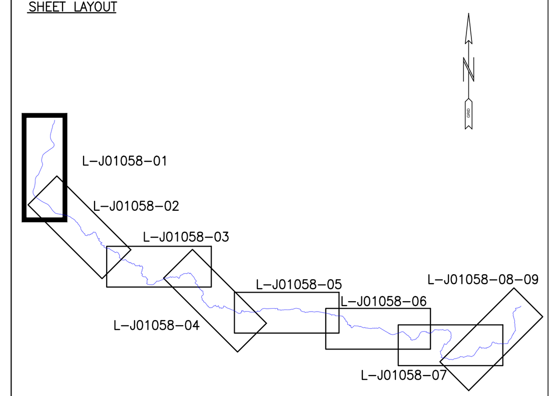
KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

- GAUGE BOARD LOCATION
- TOP OF WALL
- TOP OF EMBANKMENT

SHEET LAYOUT



LOCATION PLAN ORIENTATION

GRID

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELISHA BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BUS STOP	GP	GATE POST	SK	SOAKAWAY
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BW	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CBF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CIF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION
CL	COVER LEVEL	IWF	INTERWOVEN FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KIG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LB	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LC	LEFT CREST	TCB/TCP	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DL	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DP	DOWNPIPE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ER	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		

(Abbreviations apply to EA survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E50730013	TR 0132 4202	38.489
E50730020	TR 0159 4061	36.314
E50730021	TR 0159 4291	36.337
E50730500	TR 0223 4025	38.486
E50730503	TR 0343 3935	40.259
E50731495	TR 0152 4070	37.864
E50731496	TR 0128 4199	37.732
E50731537	TR 0667 3791	47.711
E50731538	TR 0671 3842	63.022
E50731571	TR 0666 3813	50.976
E50733004	TR 0504 3900	43.712
E50733005	TR 1056 3751	60.587
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION
Orchard House, Endeavour Park, London Road, Addington, West Malling, Kent, ME19 5SH

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PROJECT/WATERCOURSE
EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS
EAST STOUR (ESTO01)
LONG SECTION & LOCATION PLAN
ESTO01_00033 TO ESTO01_02500

SURVEYED BY: MALTBY LAND SURVEYS LTD	Ref: 17_332	
SURVEY DATE: DECEMBER 2018 – MARCH 2018		
SCALE: AS SHOWN	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. L-J01058-01	REV. —
CAD FILENAME: L-J01058-01-09.dwg		

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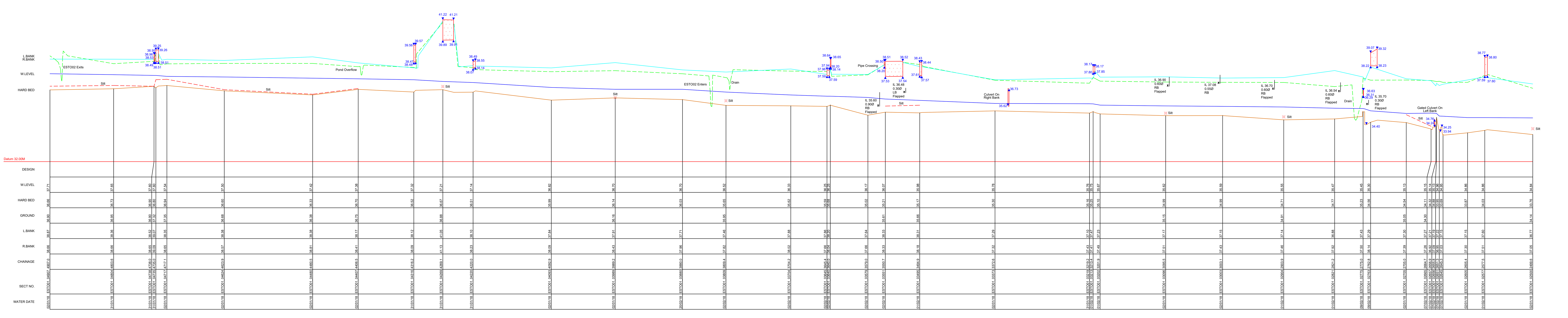

SECT NO.	CHAINAGE	W.LEVEL	HARD BED	GROUND	L.BANK	R.BANK	WATER DATE	DESIGN / TYPE
ESTO01_04907	4907.0	37.71	36.66	36.90	38.87	38.66	02/01/18	Open Channel
ESTO01_04804	4803.6	37.65	36.73	36.95	38.36	38.66	31/01/18	Open Channel
ESTO01_04738	4738.0	37.60	36.90	36.90	38.52	38.65	31/01/18	Footbridge
ESTO01_04735	4735.0	37.60	36.80	37.32	39.07	39.09	31/01/18	Footbridge
ESTO01_04717	4717.1	37.54	36.94	37.35	38.35	38.65	02/01/18	Open Channel
ESTO01_04624	4623.9	37.50	36.60	36.68	38.38	38.57	02/01/18	Open Channel
ESTO01_04480	4480.5	37.42	36.33	36.38	38.38	38.81	02/01/18	Open Channel
ESTO01_04407	4406.5	37.38	36.70	36.75	38.17	38.41	02/01/18	Open Channel
ESTO01_04316	4316.2	37.32	36.52		38.12	38.09	31/01/18	Footbridge
ESTO01_04269	4269.1	37.21	36.67	36.88	41.05	41.13	31/01/18	Avocet Way Road Bridge
ESTO01_04220	4220.0	37.14	36.51		38.10	38.23	31/01/18	Access Bridge
ESTO01_04093	4092.9	36.82	35.99		37.84	38.09	02/01/18	Open Channel
ESTO01_03989	3989.2	36.70	36.14	36.16	37.91	38.43	02/01/18	Open Channel
ESTO01_03880	3880.0	36.70	36.03		37.71	37.96	20/02/18	Open Channel
ESTO01_03809	3809.4	36.52	35.65	35.95	37.46	37.82	02/02/18	Open Channel
ESTO01_03704	3704.2	36.33	35.62		37.88	38.02	02/02/18	Open Channel
ESTO01_03645	3645.4	36.25	35.59		37.86	37.66	02/02/18	Access Bridge
ESTO01_03640	3640.0	36.25	35.58		38.20	38.04	02/02/18	Footbridge
ESTO01_03579	3579.0	36.17	35.02		37.64	37.66	02/02/18	Open Channel
ESTO01_03551	3550.7	36.07	35.21	35.61	38.33	38.33	02/02/18	A2070 Road Bridge
ESTO01_03495	3494.9	35.98	35.17	35.66	38.31	38.18	01/02/18	Access Bridge
ESTO01_03373	3372.6	35.78	35.30		37.29	37.32	02/01/18	Open Channel
ESTO01_03219	3219.2	35.76	35.16		37.10	37.43	31/01/18	Open Channel
ESTO01_03213	3213.4	35.75	35.25		37.47	37.41	01/02/18	Footbridge
ESTO01_03202	3201.9	35.67	35.10		37.23	37.49	01/02/18	Open Channel
ESTO01_03096	3095.5	35.62	34.99	35.15	37.17	37.51	02/01/18	Open Channel
ESTO01_03003	3003.1	35.59	34.99		37.15	37.43	02/01/18	Open Channel
ESTO01_02904	2903.9	35.55	34.71	34.91	37.14	37.46	01/02/18	Open Channel
ESTO01_02821	2821.2	35.47	34.77		36.88	37.92	01/02/18	Open Channel
ESTO01_02775	2775.0	35.45	35.23		37.43	37.50	09/02/18	Footbridge
ESTO01_02763	2762.8	35.30	34.56		37.29	38.14	09/02/18	Rail Bridge
ESTO01_02705	2705.0	35.13	34.54	35.05	37.30	37.39	02/01/18	Open Channel
ESTO01_02665	2664.7	35.15	34.11	34.30	37.27	37.26	07/02/18	Open Channel
ESTO01_02657	2656.9	35.14	34.32		37.21	36.92	07/02/18	Weir Heel
ESTO01_02656	2655.8	35.13	34.88		37.19	37.09	07/02/18	Weir Crest
ESTO01_02651	2651.3	34.96	33.95		37.22	36.95	07/02/18	Weir Toe
ESTO01_02645	2645.3	34.95	33.69		37.15	37.03	07/02/18	Open Channel
ESTO01_02605	2605.4	34.86	33.87		37.15	37.30	02/01/18	Open Channel
ESTO01_02577	2577.5	34.86	34.03		37.60	37.51	01/02/18	Footbridge
ESTO01_02500	2499.6	34.84	33.76	34.14	36.77	37.05	02/01/18	Open Channel

← Continues On L-J01058-03

Continues On L-J01058-01 →

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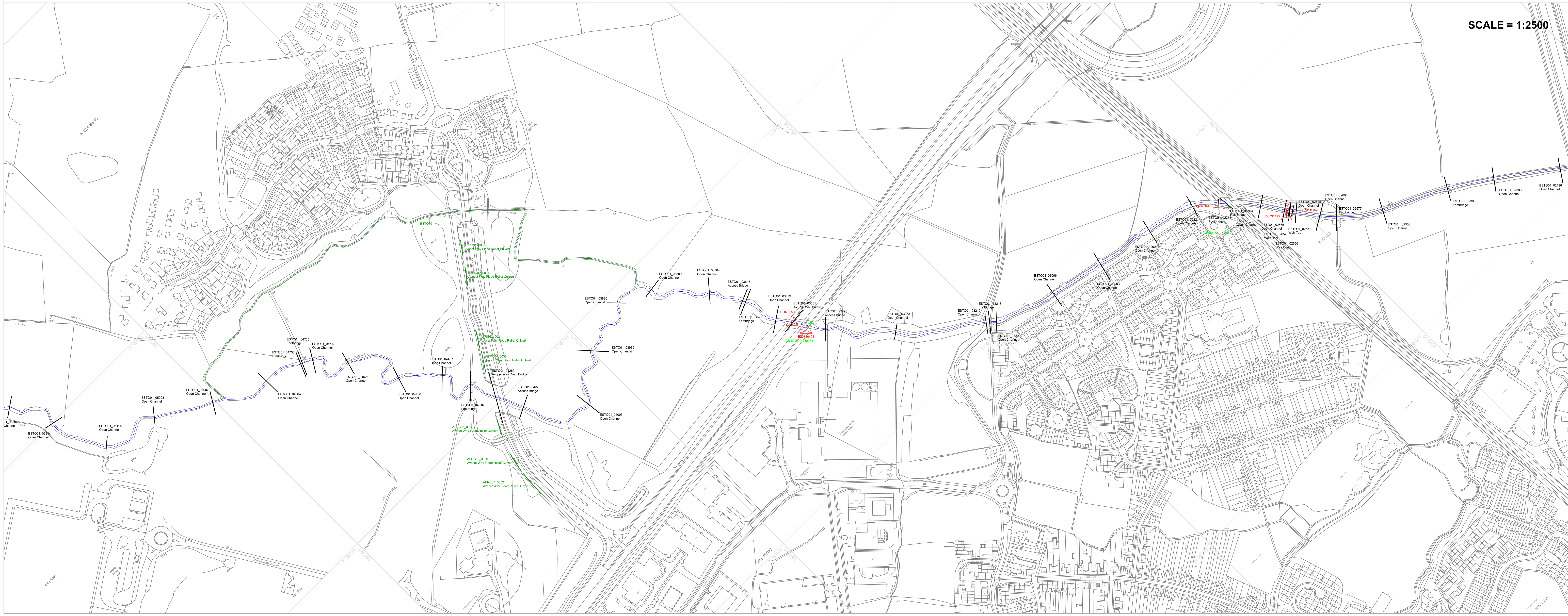


Original Drawing Size: A0

KEY TO SECTIONS:

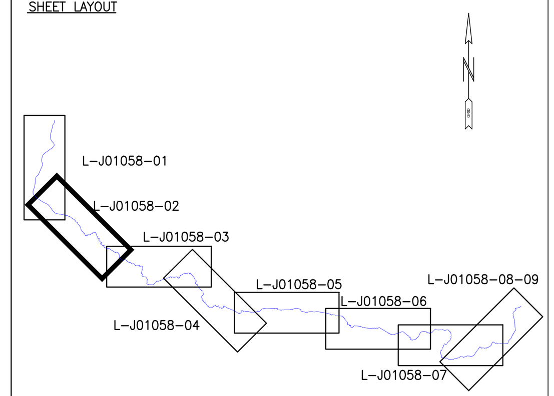
- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

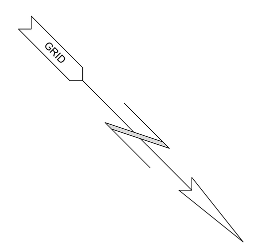
- LEFT BANK CREST
- RIGHT BANK CREST
- GAUGE BOARD LOCATION

VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

SHEET LAYOUT



LOCATION PLAN ORIENTATION



NOTES:
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELISHA BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BUS STOP	GP	GATE POST	SK	SOAKAWAY
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BW	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CBF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CIF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION
CL	COVER LEVEL	IWF	INTERWOVEN FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KIG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LB	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LC	LEFT CREST	TCB/TCP	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DL	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DP	DOWNPIPE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ER	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		

(Abbreviations apply to EA survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E50730013	TR 0132 4202	38.489
E50730020	TR 0159 4061	36.314
E50730021	TR 0159 4291	36.337
E50730500	TR 0223 4025	38.486
E50730503	TR 0343 3935	40.259
E50731495	TR 0152 4070	37.864
E50731496	TR 0128 4199	37.732
E50731537	TR 0667 3791	47.711
E50731538	TR 0671 3842	63.022
E50731571	TR 0666 3813	50.976
E50733004	TR 0504 3900	43.712
E50733005	TR 1056 3751	60.587
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (ESTO01)
LONG SECTION & LOCATION PLAN
ESTO01_02500 TO ESTO01_04907

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332
SURVEY DATE: DECEMBER 2018 – MARCH 2018		
SCALE: AS SHOWN	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. L-J01058-02	REV. —
CAD FILENAME: L-J01058-01-09.dwg		

SCALE = 1:2500 H, 1:100 V

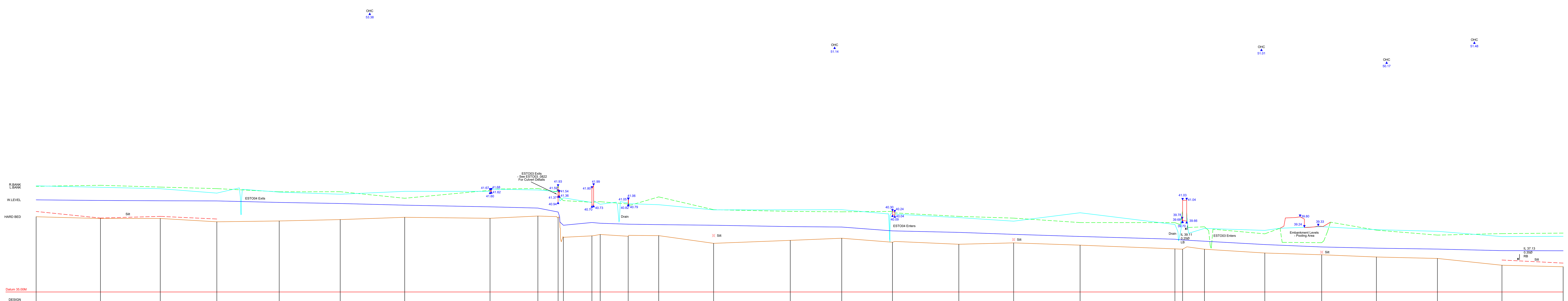
Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST
- } VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS
- GAUGE BOARD LOCATION
- TOP OF EMBANKMENT



SECT NO.	CHAINAGE	DESIGN	W.LEVEL	HARD BED	GROUND	L.BANK	R.BANK	WATER DATE	
ESTO01_07416	7415.8		41.06	39.95	40.30	41.95	41.98	16/01/18	Open Channel
ESTO01_07310	7310.1		41.02	39.83	39.86	42.02	41.89	16/01/18	Open Channel
ESTO01_07212	7211.9		41.00	39.84	39.97	41.90	41.80	16/01/18	Open Channel
ESTO01_07119	7118.9		40.99	39.62	39.80	41.80	41.50	02/01/18	Open Channel
ESTO01_07016	7016.4		40.89	39.67		41.59	41.57	02/01/18	Open Channel
ESTO01_06916	6916.2		40.82	39.76		41.60	41.43	16/01/18	Open Channel
ESTO01_06810	6810.3		40.71	39.91		41.17	41.62	02/01/18	Open Channel
ESTO01_06670	6670.1		40.60	39.85		41.69	41.62	18/01/18	Dilapidated Access Bridge
ESTO01_06591	6591.5		40.52	40.00		41.81	41.71	16/01/18	Open Channel
ESTO01_06558	6558.2		42.02	39.89		40.51	41.60	08/02/18	Swanton Mill Sluice Gate
ESTO01_06550	6549.5		39.39	38.60		41.01	41.19	08/02/18	Open Channel
ESTO01_06503	6502.7		39.57	38.69		40.90	40.89	18/01/18	Footbridge
ESTO01_06489	6489.0		39.52	38.78		40.94	40.77	18/01/18	Open Channel
ESTO01_06443	6443.1		39.46	38.67		40.79	40.86	18/01/18	Footbridge
ESTO01_06393	6392.9		39.43	38.71		41.25	40.74	18/01/18	Open Channel
ESTO01_06303	6302.7		39.39	38.20	38.71	40.41	40.40	18/01/18	Open Channel
ESTO01_06177	6176.8		39.30	38.39		40.30	40.40	02/01/18	Open Channel
ESTO01_06092	6092.2		39.27	38.53		40.27	40.41	02/01/18	Open Channel
ESTO01_06009	6008.9		39.02	38.27		40.30	40.27	19/01/18	Access Bridge
ESTO01_05900	5899.9		38.92	38.14		39.97	39.89	02/01/18	Open Channel
ESTO01_05810	5809.8		38.79	38.23	38.45	39.86	39.66	19/01/18	Open Channel
ESTO01_05701	5700.6		38.65	38.08		39.57	40.21	19/01/18	Open Channel
ESTO01_05545	5544.9		38.47	37.84		39.56	39.44	02/01/18	Open Channel
ESTO01_05532	5532.2		38.42	37.81		40.32	40.23	30/01/18	Cheeseman's Green Lane Road Bridge
ESTO01_05496	5496.3		38.34	37.81		39.29	39.18	30/01/18	Open Channel
ESTO01_05397	5397.2		38.12	37.56		38.83	39.05	30/01/18	Open Channel
ESTO01_05304	5303.7		37.96	37.45	37.62	38.24	39.30	30/01/18	Open Channel
ESTO01_05214	5213.8		37.88	37.30		39.07	39.10	30/01/18	Open Channel
ESTO01_05114	5113.6		37.82	37.21		38.74	38.99	02/01/18	Open Channel
ESTO01_05008	5007.5		37.72	36.76	37.10	38.84	38.64	31/01/18	Open Channel
ESTO01_04907	4907.0		37.71	36.66	36.90	38.87	38.66	02/01/18	Open Channel

← Continues On L-J01058-04

Continues On L-J01058-02 →

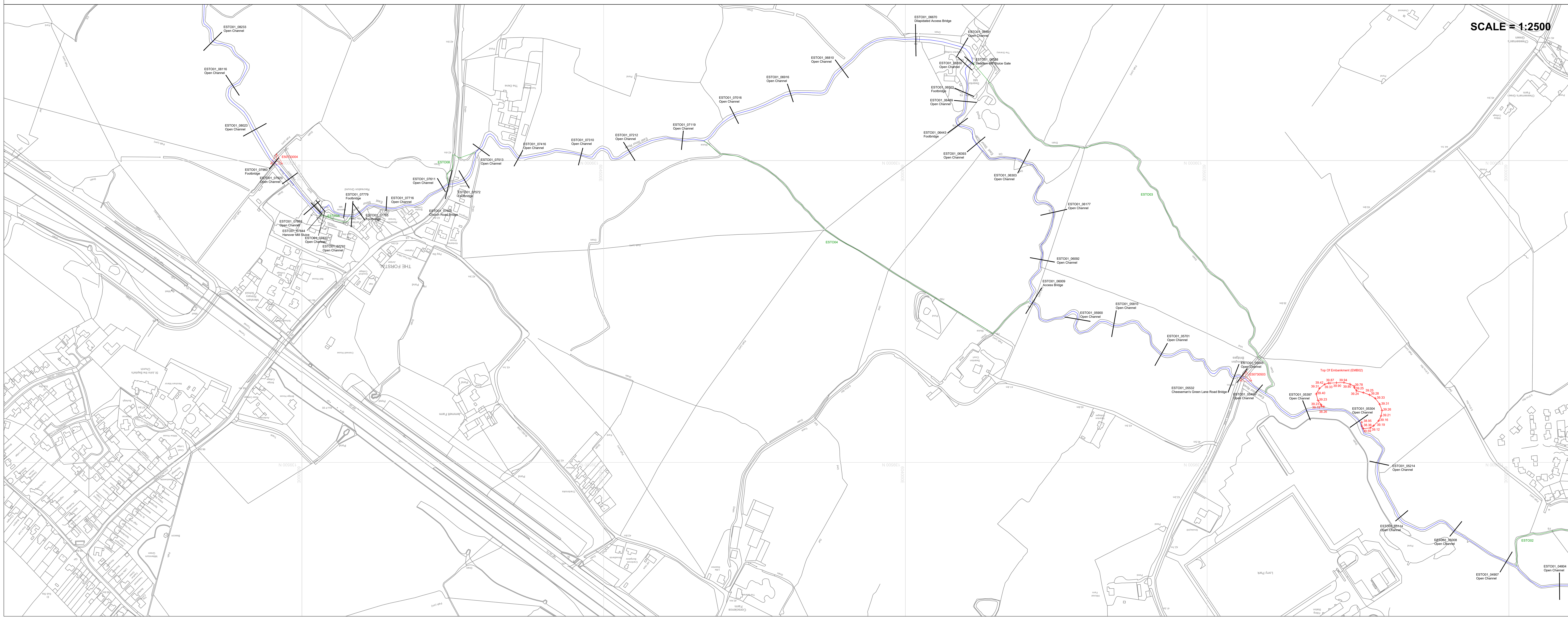
SHEET LAYOUT

L-J01058-01, L-J01058-02, L-J01058-03, L-J01058-04, L-J01058-05, L-J01058-06, L-J01058-07, L-J01058-08-09

LOCATION PLAN ORIENTATION

GRID N

SCALE = 1:2500



NOTES:

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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELISHA BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BUS STOP	GP	GATE POST	SK	SOAKAWAY
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BW	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CBF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CIF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION
CL	COVER LEVEL	IWF	INTERWOVEN FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KIG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LB	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LC	LEFT CREST	TCB/TCP	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DL	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DP	DOWNPIPE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ER	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		

(Abbreviations apply to EA survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E50730013	TR 0132 4202	38.489
E50730020	TR 0159 4061	36.314
E50730021	TR 0159 4291	36.337
E50730500	TR 0223 4025	38.486
E50730503	TR 0343 3935	40.259
E50731495	TR 0152 4070	37.864
E50731496	TR 0128 4199	37.732
E50731537	TR 0667 3791	47.711
E50731538	TR 0671 3842	63.022
E50731571	TR 0666 3813	50.976
E50733004	TR 0504 3900	43.712
E50733005	TR 1056 3751	60.587
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

Orchard House, Endeavour Park, London Road, Addington, West Malling, Kent, ME19 5SH

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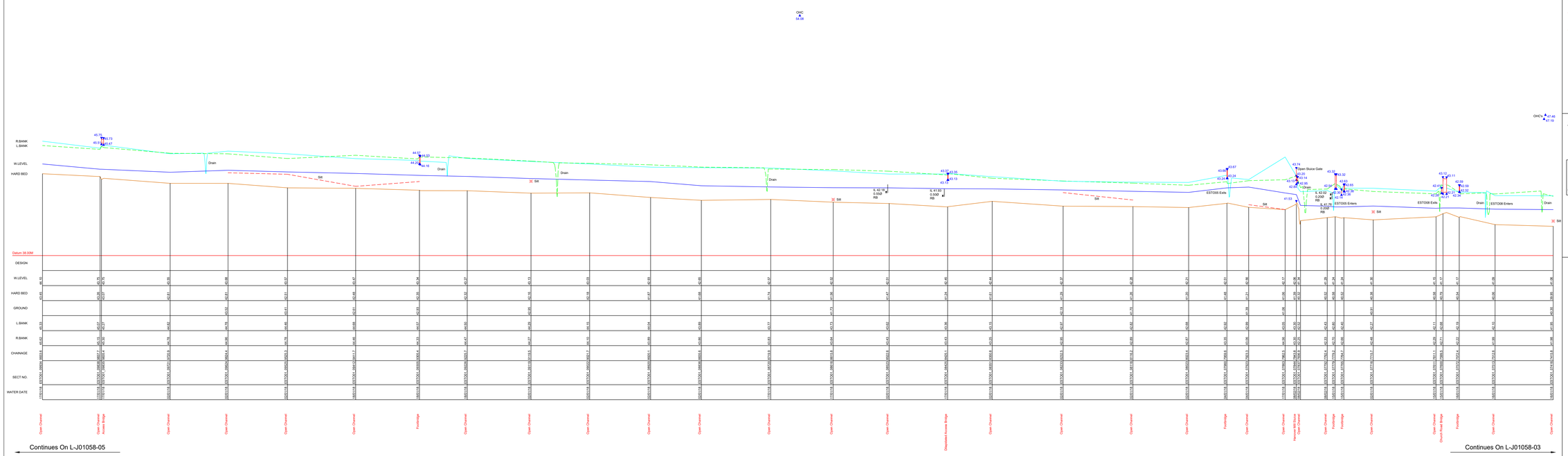
PROJECT/WATERCOURSE: EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS: EAST STOUR (ESTO01) LONG SECTION & LOCATION PLAN ESTO01_04907 TO ESTO01_ 07416

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332
SURVEY DATE: DECEMBER 2018 – MARCH 2018		
SCALE: AS SHOWN	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. L-J01058-03	REV. —
CAD FILENAME: L-J01058-01-09.dwg		

SCALE = 1:2500 H, 1:100 V



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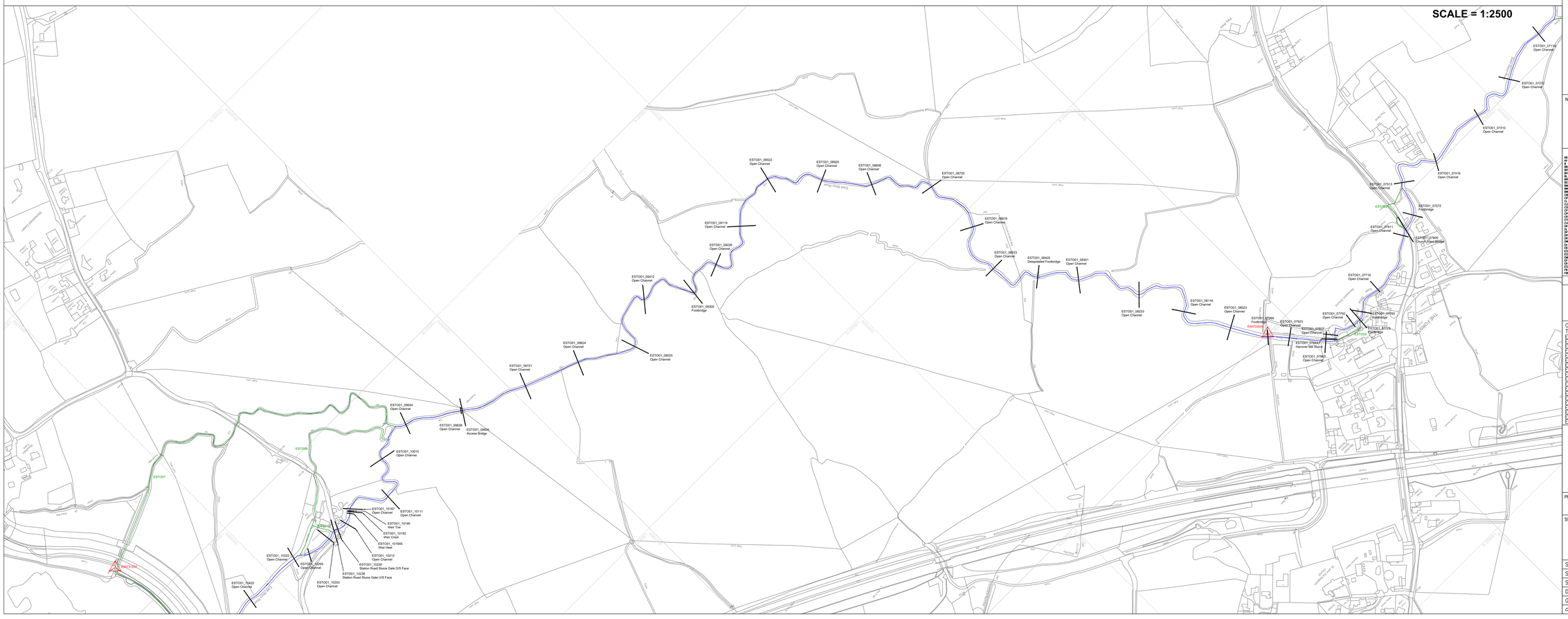


Original Drawing Size: A0

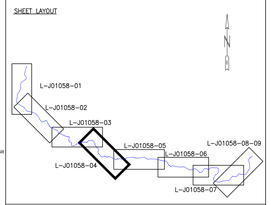
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST
  (VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS)
- GAUGE BOARD LOCATION

SHEET LAYOUT



LOCATION PLAN ORIENTATION

NOTES:
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SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
B	BOLLARD	FM	FLOW METER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RD	RIGHT DREDGE
BE	BELGIAN BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BH	BOREHOLE	FW	FIRE FIGHTING WATER MANHOLE	RM	RAINWATER
BH	BOREHOLE	FY	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BM	BENCH MARK	GI	GRATED INLET	SC	STOP COCK
BS	BLIND STOP	GJ	GATE JOINT	SF	SOFFIT
BW	BEACH WARN	GM	GAS MARKER	SL	SOFFIT LEVEL
BWP	BARBED WIRE	GP	GATE POST	SMH	SEWER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SWP	SHEET METAL PILING
CBF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	ST	SIGN POST
CF	CHAIN LINK FENCE	LF	LOW FRONT FENCE	ST	STOP TAP
CL	CONER LEVEL	MF	MOTORWAY FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SWP	SOIL VENT PIPE
CP	CONCRETE POST	JG	JUNCTION GULLY	TF	TRIPLE BAR FENCE
CP	CONCRETE POST	LG	LEFT GRAV	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LC	LEFT CRESTS	TCB/TCP	TELEPHONE CALL BOX/POST
CR	CROSS RAIL FENCE	LP	LEFT PIPE	TL	TRACK LEVEL
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	Tel	TELECOM MANHOLE
DUL	CULVERT	MF	MISCELLANEOUS FENCING	TRL	THRESHOLD LEVEL
E	ELECTRIC BOX	MH	MANHOLE	TS	TRAFFIC SIGN
EL	DECK LEVEL	MR	MIRROR	TJ	TRAFFIC LIGHT BOX
EP	EDGE PROTECTION	MT	MOORING TIMBER	TP	TELEGRAPH POLE
GPC	GRAP PROOF COURSE	MWF	MESH WIRE FENCE	TPS	TEMPORARY PIPING STRP
GW	GOOSENECK	NC	NECK STONE	TS	TREE SIGNPOST
HR	HOSE REEL BOX	NF	NOTICE FIXING	TSL	TRAFFIC SIGNAL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRIC BOX/PILLAR	OC	OVERHEAD CABLE	VS	VERTICAL SUNK
EF	ELECTRIC CABLE FENCE	OG	OVERHEAD GURDEY	WL	WATER LEVEL/WATER LINE
EOP	ELCTRICITY CABLE WT	OGR	OPEN STEEL RAILINGS	WM	WATER METER
EP	ELECTRICITY POLE/PILLAR	P	PIPE	WP	WOODEN PARTITIONCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WPF	WOODEN POSTS
EX	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
FB	FLOWER BED	PO	PUMP OUT	WS	WATER STOP
FL	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to DX survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	36.267
E20730403	TR 0227 4027	38.489
E20731536	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	36.337
E20730500	TR 0221 4026	38.486
E20730003	TR 0343 3935	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.002
E20731571	TR 0666 3813	50.976
E20733004	TR 0504 3900	43.717
E20733005	TR 1056 3751	60.587
E20731483	TR 0151 4020	37.916
E20731484	TR 0131 4209	37.451
E20731539	TR 0671 3826	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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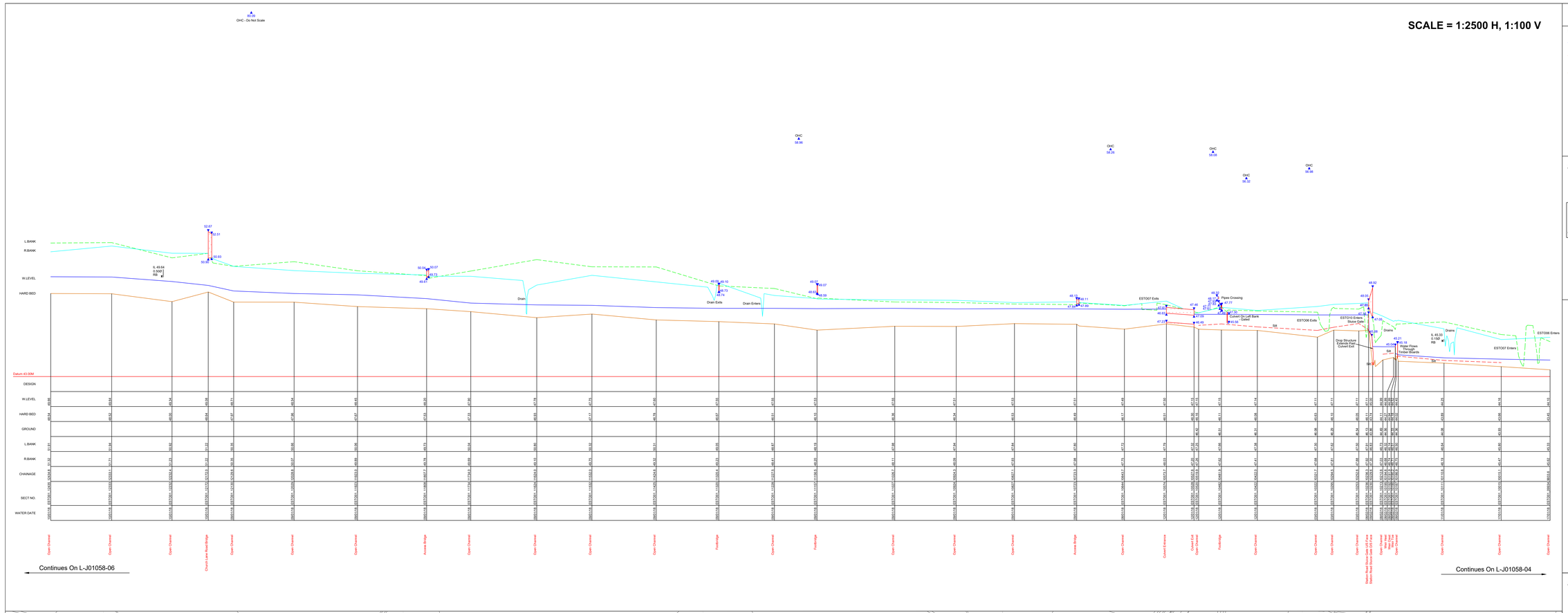
PROJECT/WATERCOURSE

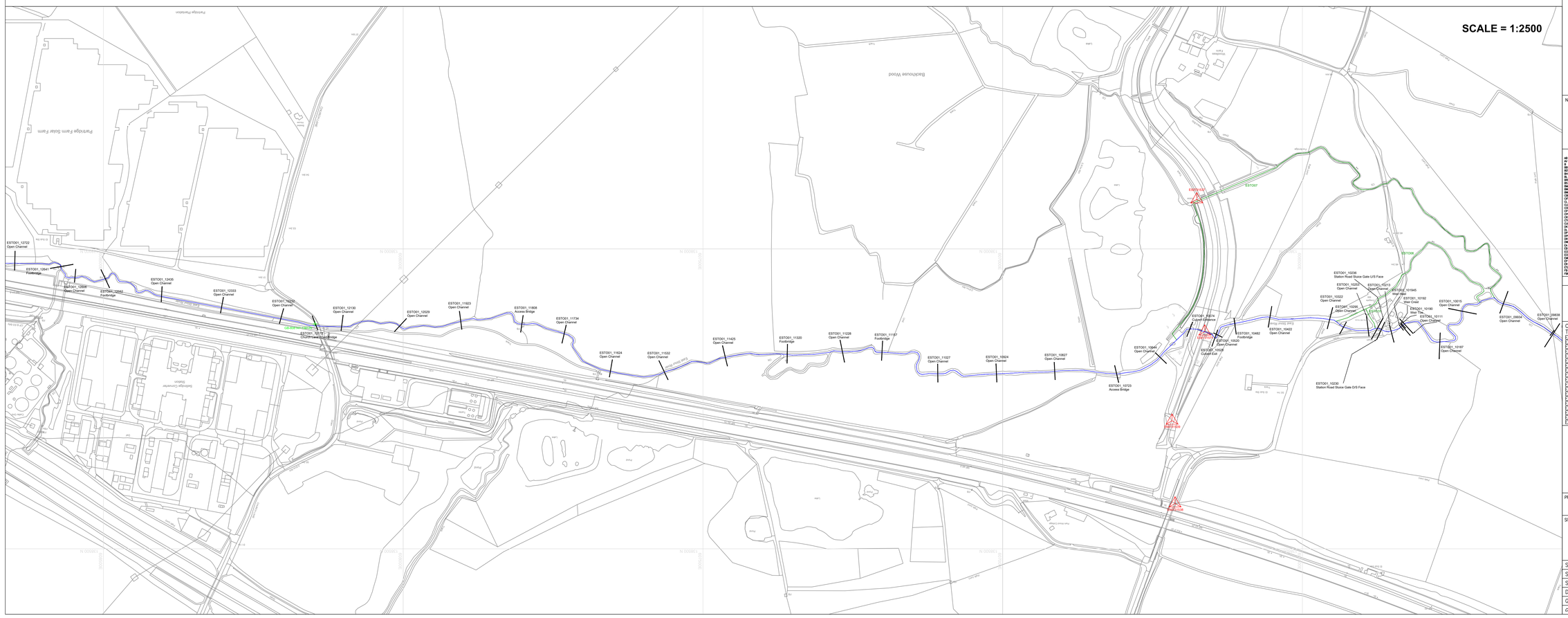
EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
LONG SECTION & LOCATION PLAN
EST001_07416 TO EST001_09934

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_157
SURVEY DATE: DECEMBER 2018 - MARCH 2018		
SCALE: AS SHOWN	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. L-J01058-04	REV. —
CAD FILENAME: L-J01058-01-08.dwg		





Original Drawing Size: A0

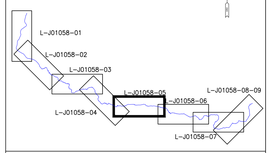
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

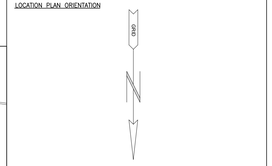
KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST
  (VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS)
- GAUGE BOARD LOCATION

SHEET LAYOUT



LOCATION PLAN ORIENTATION



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SURVEY LEGEND

AB	AIR BROV	FH	FIRE HYDRANT	PM	PARKING METER
AV	AIR VALVE	FHW	FIRE HYDRANT MARKER	RP	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RL	REFLECTOR
BA	BUS ARRIVAL DEPARTURE	FS	FOUL SEWER	RC	ROCKS/PEBBLES, JOIST
BDY	BOUNDARY	FWV	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GATE	RW	RAINWATER PIPE
BL	BOLLARD	GB	GRASSBANK	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SGP	SIGNS PIPE
BS	BUS STOP	GM	GAS METER	SL	SOFFIT LEVEL
BW	BLOCK WORK	GV	GAS VARVER	SLV	SLEEVE VALVE
BWK	BRICK WALL	HW	HEAD WALL	SMH	SURVEY MARKER MANHOLE
CAB	CABLE TV BOX/ CHAMBER	IC	INSPECTION CHAMBER	SP	SIGN POST
CBF	CLOSE BOARDED FENCE	L	SHORT LEVEL	SPP	SIGN PLATE
CF	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	STN	STATION
CH	CHAINAGE	JB	JUNCTION BOX	SV	SOIL VENT PIPE
CLF	CHAIN LINK FENCE	JE	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	L	LEVEL	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LC	LEFT CREST	TCP/CP	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LV	LAMP POST	TC	TELECOM CABINET
CVM	CABLE TV MANHOLE	LB	LOCKABLE BOLLARD	TEL	TELEPHONE POLE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MK	MARKER	TB	TELECOM BOX
D	DOMESTIC	MP	ACORNS PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DRN	DRAINAGE	NB	NOTICE BOARD	TW	TIMBER WALL
DWB	DOG WASTE BIN	NS	NOTICE SIGNS	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	OAC	OVERHEAD CABLE AUTHORITY	UPS	UPSTAND
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTL	UTILITIES SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EGF	ELECTRIC GATE FENCE	PR	PALE RAILINGS FENCING	WM	WATER METER
EMH	ELECTRICITY MANHOLE	PT	PILE TEST	WMP	WIRE MESH FENCE
EP	ELECTRICITY POLE	PX	PILE TEST	WP	WOODEN POST
LT	ELECTRICITY BLOCK	PB	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIBREGLASS	PP	POST & RAIL FENCE	YG	YARD GULLY
FBH	FLOWBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to OS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	36.757
E20730403	TR 0222 4227	38.489
E20730406	TR 0255 3814	51.808
E20730013	TR 0132 4202	38.489
E20730020	TR 0158 4081	36.314
E20730021	TR 0159 4291	38.337
E20730020	TR 0223 4026	38.486
E20730503	TR 0343 3936	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0667 3791	47.711
E20731538	TR 0671 3842	63.022
E20731271	TR 0666 3813	50.976
E20733004	TR 0504 3900	43.712
E20733005	TR 1056 3751	60.587
E20731483	TR 0151 4070	35.916
E20731484	TR 0133 4200	37.463
E20731539	TR 0671 3828	52.251

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PROJECT/WATERCOURSE

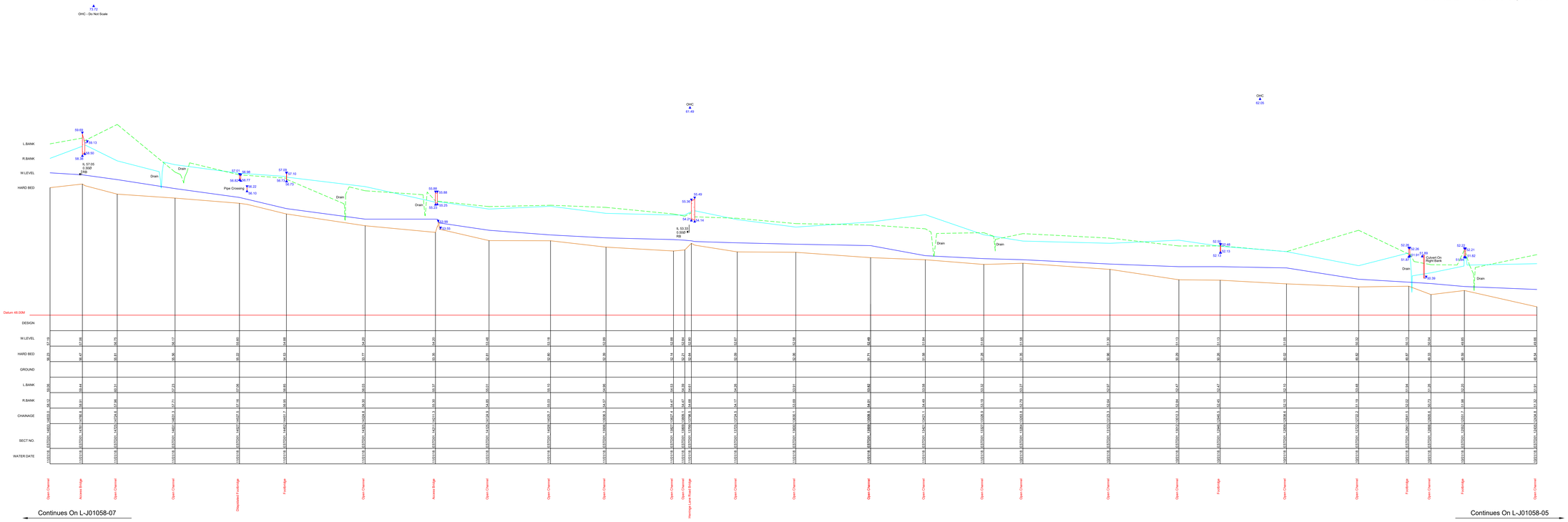
EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
LONG SECTION & LOCATION PLAN
EST001_09934 TO EST001_12435

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_532	
SURVEY DATE: DECEMBER 2018 – MARCH 2018			
SCALE: AS SHOWN	DRN: RC	CHKD: ITS	
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18	
GRID: NATIONAL GRID	DRAWING NO.		REV.
CAD FILENAME: L-J01058-01-09.dwg	L-J01058-05		—

SCALE = 1:2500 H, 1:100 V



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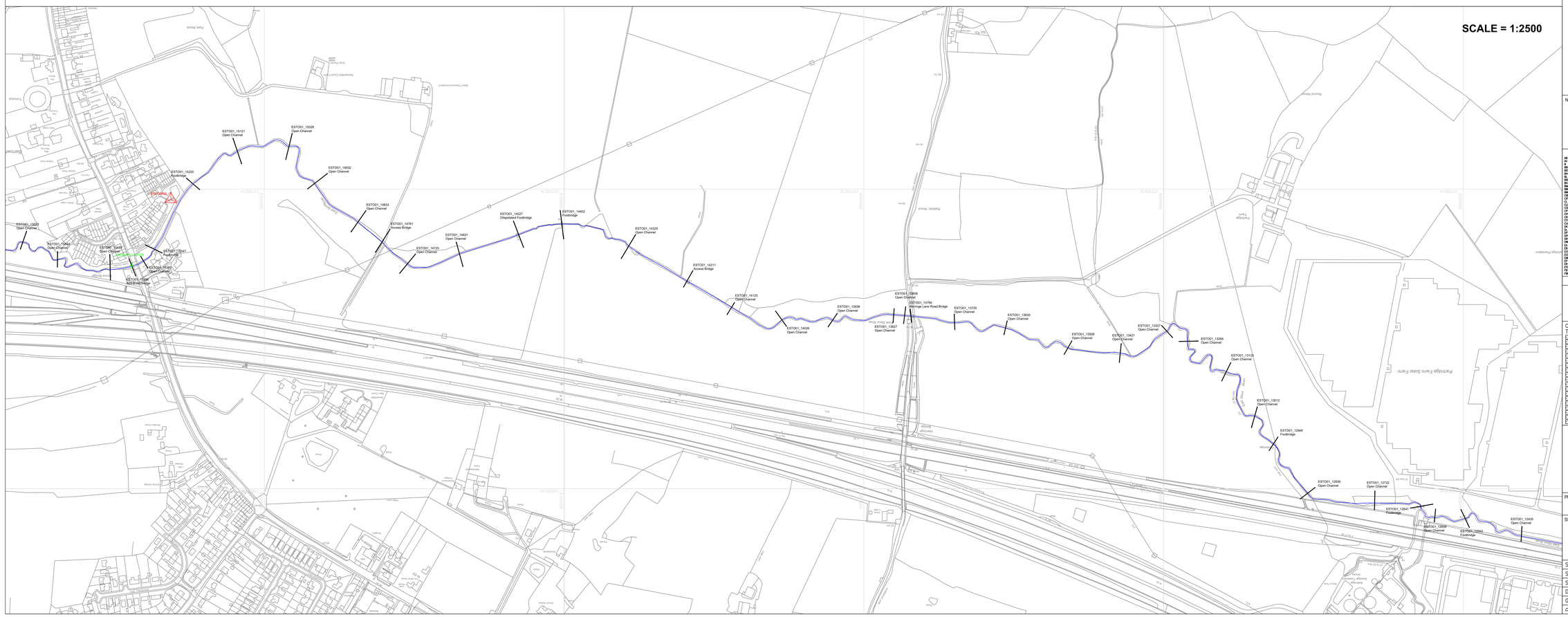


Original Drawing Size: A0

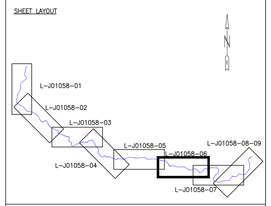
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

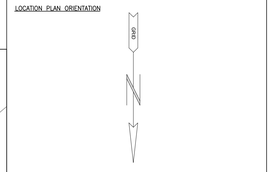
KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST
  (VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS)
- GAUGE BOARD LOCATION

SHEET LAYOUT



LOCATION PLAN ORIENTATION



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SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
B	BOLLARD	FM	FLOW METER / MARKER	R	RIVER GAUGE
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELGIAN BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BH	BOREHOLE	FW	FOUL WATER MANHOLE	RM	RAINWATER METER
BH	BOREHOLE	G	GULLY	RMP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BL	BED LEVEL	GI	GRATED INLET	SC	STOP COCK
BO	BLIG STOP	GP	GATE POST	SK	SHAKEMAN
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BP	BOLLARD PLAIN	GV	GAS VALVE	SM	SOFFIT METER MANHOLE
BWF	BARBED WIRE FENCE	C	INSPECTION CHAMBER	SMP	SHEET METAL PLANC
CBF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CHF	CHAIN LINK FENCE	BF	IRON RAILING FENCE	STN	STATION
CL	COVER LEVEL	MF	MASONRY FENCE	SV	SLUICE VALVE
CL	COVER LEVEL	MH	MANHOLE	TB	TELEGRAPH POLE
CONC	CONCRETE	KG	KERB GULLY / GULLY	SMF	SHEET WIRE FENCE
CP	CONCRETE POST	LC	LEVEL CROSS	TBM	TEMPORARY BENCH MARK
CP	CONCRETE PALING FENCE	LE	LEFT EDGE	TCB/TCP	TELEPHONE BOX / KIOS/POST
CR	CYCLE RACK	LP	LAMP POST	TL	TELECOM CABINET
CV	CLEAN OUT / MANHOLE	LB	LAMP POST / BOLLARD	TP	TRAFFIC LIGHT POST
DA	DAMPER	MF	MISCELLANEOUS FENCING	TW	THRESHOLD (DOG)
DK	DROP KERB	MK	MARKER	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MP	MAST POST	TB	TELEPHONE BOX
D	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
EL	ELEVATION	NB	NATIVE BOARD	TS	TRAFFIC SIGNAL
EWB	DOG WASTE BIN	NS	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EN	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	UT	UPSTREAM
ET	ELECTRIC TIME SWITCH	OS	ORDNANCE SURVEY	UTS	UNCLIMBABLE SURVEY
ELP	ELECTRIC CABLE CHECK	OS	ORDNANCE SURVEY	VL	WATER LEVEL/WATER LINE
EOP	ELECTRICITY CABLE PIT	OOR	OPEN STEEL RAILINGS	WM	WATER METER
EP	ELECTRICITY POLE	P	PIPE	WF	WOVEN WIRE FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
EN	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETS	ELECTRIC TIME TRANSMISSION LINE	PO	PUMP	WT	WATER TAP
FG	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to DI survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E40730012	TR 0103 4107	35.975
E40730401	TR 0149 4253	35.287
E40730403	TR 0222 4027	35.489
E40731536	TR 0666 3814	51.806
E40730013	TR 0132 4202	36.469
E40730020	TR 0159 4061	36.314
E40730021	TR 0159 4291	36.332
E40730500	TR 0323 4025	38.456
E40730501	TR 0324 4026	38.259
E40731495	TR 0152 4070	37.864
E40731496	TR 0126 4199	37.717
E40731938	TR 0691 3242	62.022
E40731937	TR 0666 3811	52.076
E40733004	TR 0594 3900	53.712
E40733005	TR 1054 3751	62.647
E40731483	TR 0151 4070	36.916
E40731484	TR 0133 4200	37.463
E40731539	TR 0671 3828	52.251

Environment Agency

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
LONG SECTION & LOCATION PLAN
EST001_12435 TO EST001_14833

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332
SURVEY DATE: DECEMBER 2018 - MARCH 2018		
SCALE: AS SHOWN	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO.	REV.
CAD FILENAME: L-J0105B-01-06.dwg	L-J01058-06	--

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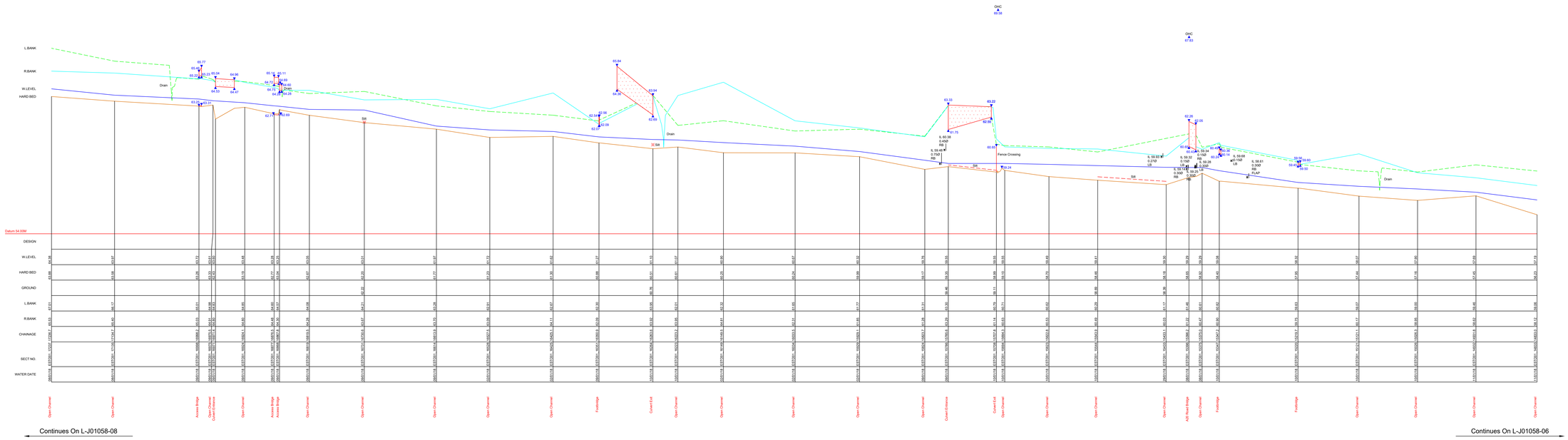

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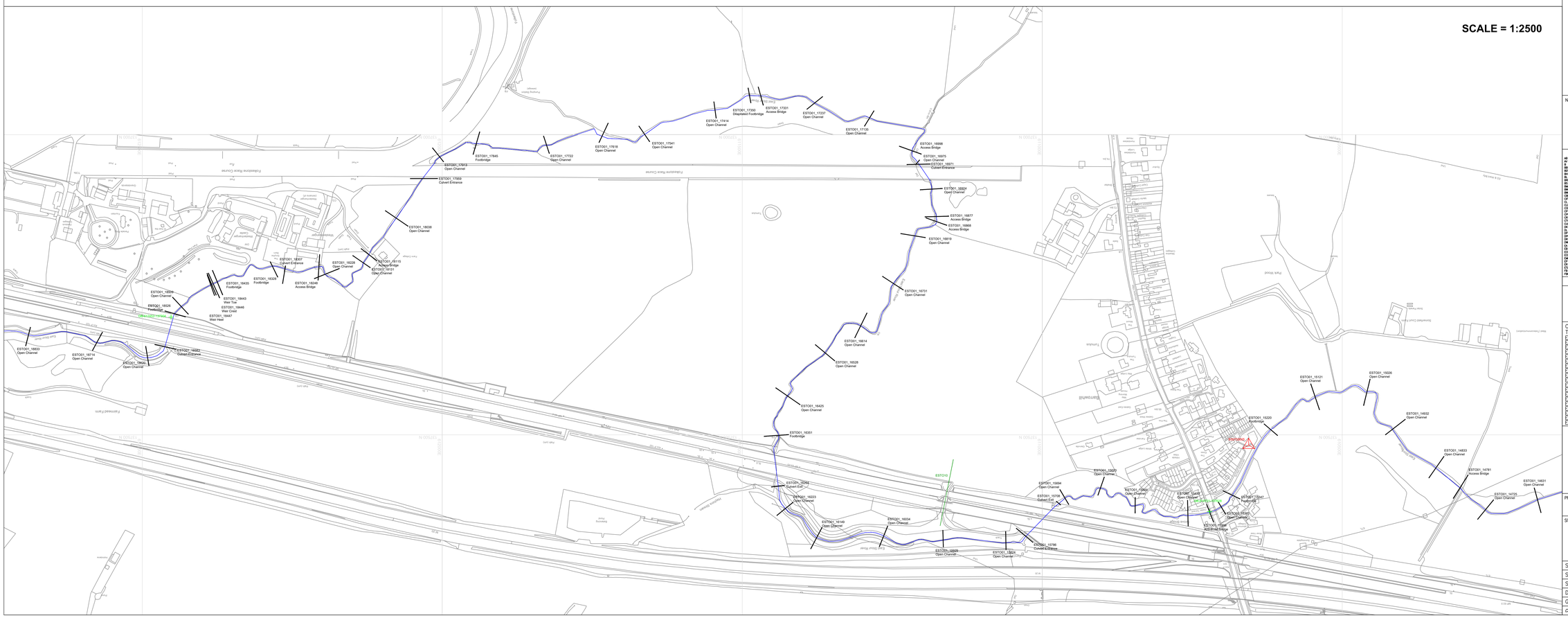


Original Drawing Size: A0

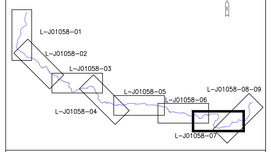
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

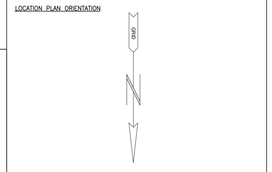
KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST
  (VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS)
- GAUGE BOARD LOCATION

SHEET LAYOUT



LOCATION PLAN ORIENTATION



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SURVEY LEGEND

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B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
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BH	BOREHOLE	G	GULLY	RMP	RAINWATER PIPE
BL	BED LEVEL	GD	GAUGEBOARD	SC	STOP COCK
BM	BENCH MARK	GI	GRATED INLET	SC	SERVICE COVER
BS	BLIC STOP	GP	GATE POST	SK	GRAVAMMT
BW	BEACH MARK	GW	GAS MARKER	SL	SOFFIT LEVEL
CBF	CLOSE BOARD FENCE	H	HYDRANT	SMH	SHEET METER MANHOLE
CBF	CLOSE BOARDED FENCE	IC	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CC	CONCRETE COLUMN	J	JUNCTION BOX	SP	SIGN POST
CF	CHAIN LINK FENCE	JW	IRON RAILING FENCE	STN	STATION
CL	COVER LEVEL	KF	KICKBOARD FENCE	SV	SLUICE VALVE
CL	CENTRE LINE OF RIVER	MF	MESH FENCE	TB	TRAFFIC BOX
CONC	CONCRETE	KG	KERB GULLY / GULLY	SMF	SHEET WIRE FENCE
CP	CONCRETE POST	L	LAMP	TBM	TEMPORARY BENCH MARK
CP	CONCRETE PALING FENCE	LP	LEFT CREST	TCB/TCB	TELEPHONE BOX / BULLPOST
CR	CYCLE RACK	LT	LAMP POST	TC	TELECOM CABINET
CS	CLEAN OUT MANHOLE	LV	LOCKABLE BOLLARD	TC	TELEPHONE CABINET
CTL	CULVERT	MF	MISCELLANEOUS FENCING	TH	THRESHOLD (FFL)
DK	DROP KERB	MK	MARKOUT	TL	TRAFFIC LIGHT
D	DOWN PIPE	MP	MOORING POST	TL	TELEPHONE BOX
D	DUMPSITE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DR	DOOR/GATE	N	NOTICE BOARD	TS	TRAFFIC SIGNAL
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	UT	UPSTREAM
EC	ELECTRIC CABLE	OS	ORDNANCE SURVEY	VB	VIEWING BOX / SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	W	WATER LEVEL/WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EP	ELECTRICITY POLE	P	PIER	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
EN	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ET	ELECTRIC TRANSMISSION LINE	PP	PIPE POST	WS	WATER STOP
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to EA survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E40730012	TR 0103 4107	35.975
E40730401	TR 0149 4253	35.787
E40730403	TR 0222 4027	35.489
E40731536	TR 0666 3814	51.806
E40730013	TR 0132 4202	36.469
E40730020	TR 0159 4061	36.314
E40730021	TR 0159 4291	36.332
E40730500	TR 0323 4026	36.456
E40731495	TR 0152 4070	37.864
E40731496	TR 0268 4199	37.717
E40731938	TR 0691 3242	62.022
E40731971	TR 0666 3811	52.076
E40733004	TR 1004 3900	53.712
E40733005	TR 1004 3751	52.647
E40731483	TR 0151 4070	36.916
E40731484	TR 0133 4200	37.463
E40731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

Orchard House, Endeavour Park, London Road, Addington, West Malling, Kent, ME19 5SH

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PROJECT/WATERCOURSE

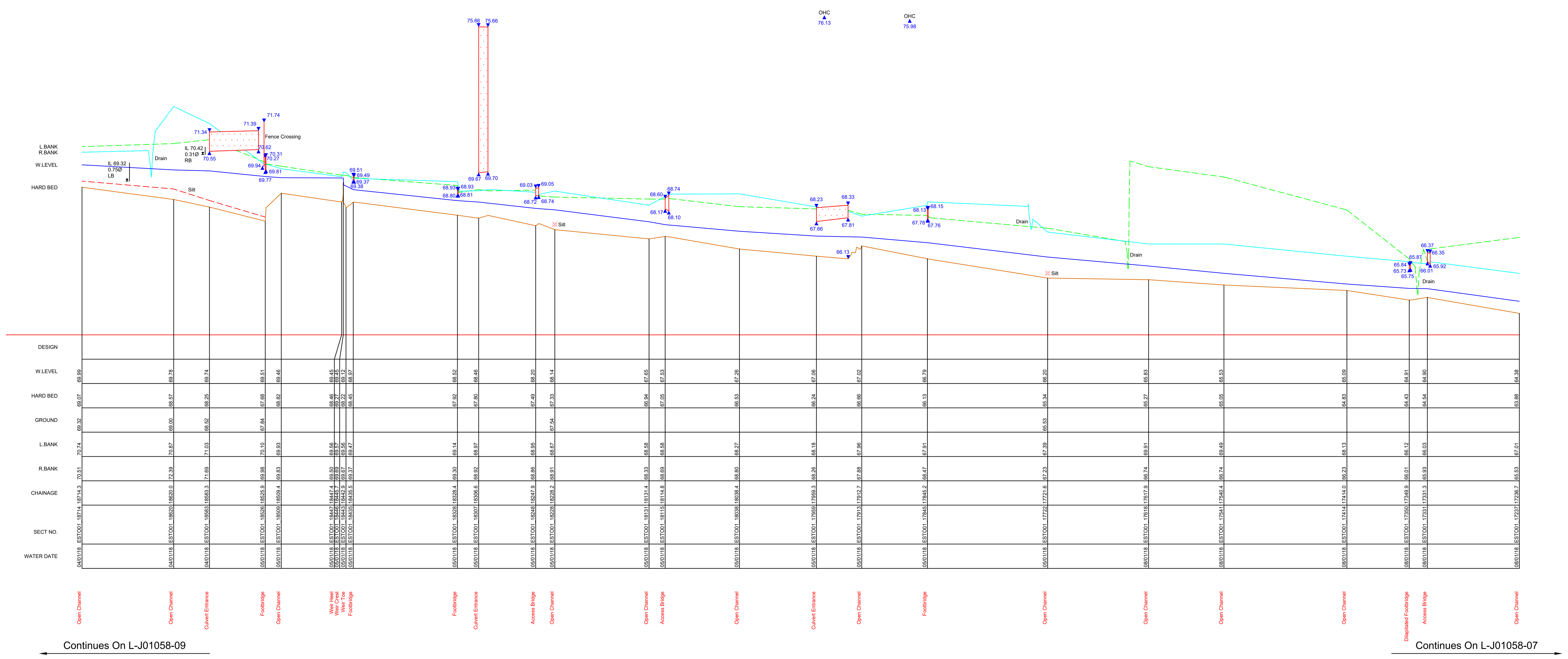
EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
LONG SECTION & LOCATION PLAN
EST001_14833 TO EST001_17237

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332
SURVEY DATE: DECEMBER 2018 – MARCH 2018		
SCALE: AS SHOWN	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO.	REV.
CAD FILENAME: L-J0105B-01-09.dwg	L-J01058-07	–

SCALE = 1:2500 H, 1:100 V



SECT NO.	WATER DATE	CHAINAGE	W.LEVEL	HARD BED	GROUND	L.BANK	R.BANK	Feature
ESTO01_18714	04/01/18	18714.3	69.99	69.07	69.32	70.74	70.51	Open Channel
ESTO01_18620	04/01/18	18620.0	69.78	68.57	69.00	70.87	72.39	Open Channel
ESTO01_18583	04/01/18	18583.3	69.74	68.25	68.52	71.03	71.69	Culvert Entrance
ESTO01_18526	05/01/18	18525.9	69.51	67.68	67.84	70.10	69.98	Footbridge
ESTO01_18509	05/01/18	18509.4	69.46	68.82		69.93	69.83	Open Channel
ESTO01_18447	05/01/18	18447.4	69.45	68.46		69.56	69.50	Weir Heel
ESTO01_18446	05/01/18	18445.7	69.45	69.27		69.57	69.69	Weir Crest
ESTO01_18443	05/01/18	18442.9	69.12	68.22		69.56	69.67	Weir Toe
ESTO01_18435	05/01/18	18435.5	68.97	68.45		69.47	69.37	Footbridge
ESTO01_18328	05/01/18	18328.4	68.52	67.92		69.14	69.30	Footbridge
ESTO01_18307	05/01/18	18306.6	68.46	67.80		68.97	68.92	Culvert Entrance
ESTO01_18248	05/01/18	18247.9	68.20	67.49		68.95	68.86	Access Bridge
ESTO01_18228	05/01/18	18228.2	68.14	67.33	67.54	68.67	68.91	Open Channel
ESTO01_18131	05/01/18	18131.4	67.65	66.94		68.58	68.33	Open Channel
ESTO01_18115	05/01/18	18114.8	67.53	67.05		68.58	68.69	Access Bridge
ESTO01_18038	05/01/18	18038.4	67.26	66.53		68.27	68.80	Open Channel
ESTO01_17959	05/01/18	17959.3	67.06	66.24		68.18	68.26	Culvert Entrance
ESTO01_17913	05/01/18	17912.7	67.02	66.66		67.96	67.88	Open Channel
ESTO01_17845	05/01/18	17845.2	66.79	66.13		67.91	68.47	Footbridge
ESTO01_17722	05/01/18	17721.6	66.20	65.34	65.53	67.39	67.23	Open Channel
ESTO01_17618	08/01/18	17617.9	65.83	65.27		69.91	66.74	Open Channel
ESTO01_17541	08/01/18	17540.4	65.53	65.05		69.49	66.74	Open Channel
ESTO01_17414	08/01/18	17414.0	65.09	64.83		68.13	66.23	Open Channel
ESTO01_17350	08/01/18	17349.9	64.91	64.43		66.12	66.01	Dilapitated Footbridge
ESTO01_17331	08/01/18	17331.3	64.90	64.54		66.03	65.93	Access Bridge
ESTO01_17237	08/01/18	17236.7	64.38	63.88		67.01	65.53	Open Channel

Continues On L-J01058-09

Continues On L-J01058-07

SCALE = 1:2500

Original Drawing Size: A0

KEY TO SECTIONS:
- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:
- LEFT BANK CREST
- RIGHT BANK CREST

VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS
- GAUGE BOARD LOCATION

SHEET LAYOUT

L–J01058–01, L–J01058–02, L–J01058–03, L–J01058–04, L–J01058–05, L–J01058–06, L–J01058–07, L–J01058–08–09

LOCATION PLAN ORIENTATION

GRID

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELISHA BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BUS STOP	GP	GATE POST	SK	SOAKAWAY
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BW	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CBF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CIF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION
CL	COVER LEVEL	IWF	INTERWOVEN FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KIG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LB	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LC	LEFT CREST	TCB/TCP	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DL	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DP	DOWNPIPE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
ECP	ELECTRIC CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ER	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		

(Abbreviations apply to EA survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E50730013	TR 0132 4202	38.489
E50730020	TR 0159 4061	36.314
E50730021	TR 0159 4291	36.337
E50730500	TR 0223 4025	38.486
E50730503	TR 0343 3935	40.259
E50731495	TR 0152 4070	37.864
E50731496	TR 0128 4199	37.732
E50731537	TR 0667 3791	47.711
E50731538	TR 0671 3842	63.022
E50731571	TR 0666 3813	50.976
E50733004	TR 0504 3900	43.712
E50733005	TR 1056 3751	60.587
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
LONG SECTION & LOCATION PLAN
EST001_17237 TO EST001_18714

SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_332

SURVEY DATE: DECEMBER 2018 – MARCH 2018

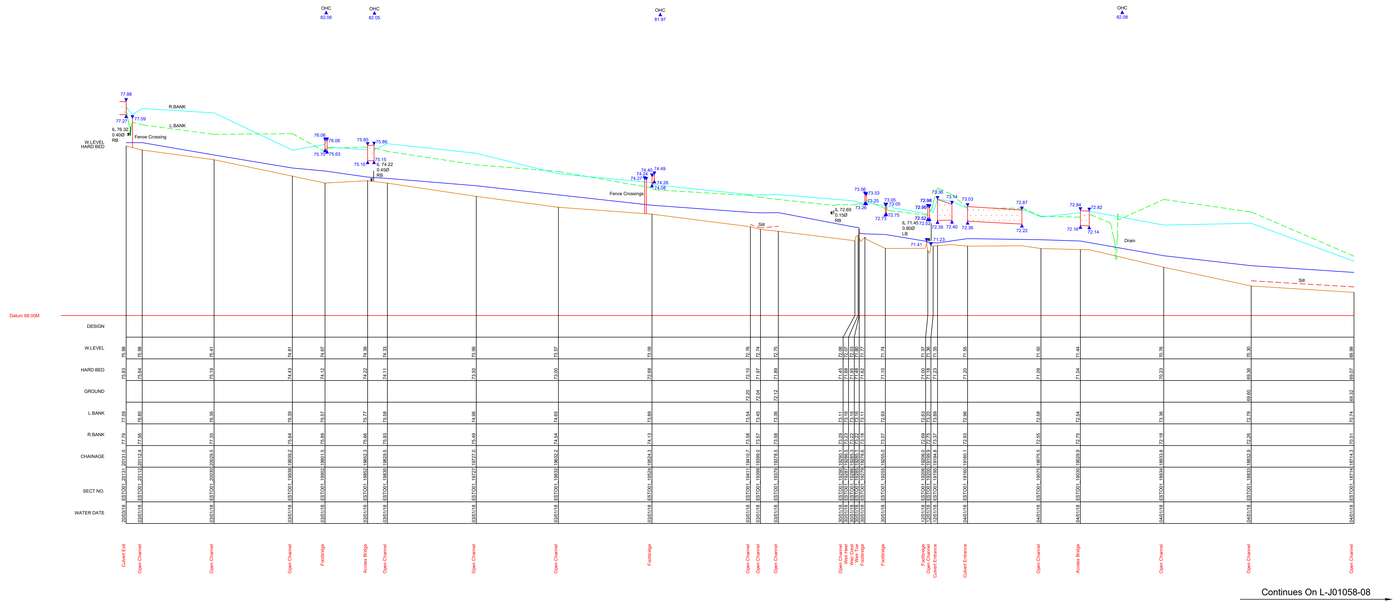
SCALE: AS SHOWN | DRN: RC | CHKD: ITS

DATUM: OS GPS ACTIVE | DATE: MAR 18 | DATE: MAR 18

GRID: NATIONAL GRID | DRAWING NO. L–J01058–08 | REV. —

CAD FILENAME: L-J01058-01-09.dwg

SCALE = 1:2500 H, 1:100 V



SCALE = 1:2500

Original Drawing Size: A0

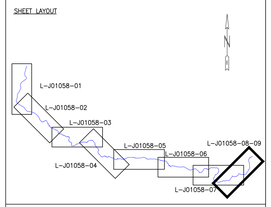
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST
  (VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS)
- GAUGE BOARD LOCATION

SHEET LAYOUT



LOCATION PLAN ORIENTATION

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHW	FIRE HYDRANT MARKER	RB	RIGHT BANK
BH	BOREHOLE	FL	FLOOD LEVEL	RC	RECTANGULAR
BS	BUOJON BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BL	BOLLARD	G	GATE	SA	SOAKAWAY PITS
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BRK	BREAKBACK	GL	GROUND LEVEL	SCP	STAND PIPE
BM	BENCH MARK	GO	GAS OUTLET	SP	SUPPORT POST
BN	BEACH MARK	GM	GAS MARKER	SL	SUPPLY LEVEL
BWP	BARBED WIRE	H	HEDGE	SMH	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	HC	HIGHWAY DRAIN CHAMBER	SMP	SLATED METAL PLINGE
CEF	CLOSE BOARDED FENCE	L	MARKER LEVEL	SP	SIGN POST
CF	CHAIN LINK FENCE	LF	LOOSE WIRE FENCE	SV	SLUICE VALVE
CT	COVER LEVEL BOX FENCE	MF	INTERMEDIN FENCE	SV	SLICE VALVE
CLF	CHAIN LINK	MH	MANHOLE COVER	SWP	SHEET WIRE FENCE
CLF	CHAIN LINK FENCE	AS	ASPH VALVE (SLILT	SWF	SHEET WIRE FENCE
CP	CONCRETE POST	LE	LEFT BANK	TB	TEMPORARY BENCH MARK
CPF	CONCRETE PANEL FENCE	LP	LAMP POST	TC	TELEPHONE CABLE/POST
CY	CYCLE RACK	LV	LAMP POST	TCV	TELECOM CABINET
CTV	CABLE TV MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
DA	DRAIN ARROW	MF	MOORING BOLLARDS FENCING	TL	TELEPHONE LEVEL
DA	DROP ACESS	MK	MARKER	TL	TRAFFIC LEVEL
D	DECK LEVEL	MKB	MARKER	T.B	TRAFFIC LIGHT BOX
DP	DRAIN PIPE	MP	METAL PALING PILE FENCE	TP	TRAFFIC POST
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBERS STRIP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DS	DOWN STEAM	NB	NATIONAL BOUNDARY	TW	TIMBER WALL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	UC	UPSTREAM
ES	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
EF	ELECTRICITY BOX FENCE	OHL	OVERHEAD LINE	WL	WATER LEVEL/WATER LINE
EcP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	Wa	WATER (AFTER)
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
ER	ELECTRIC RISER	PB	PARKING BOX	WP	WOODEN POST
EX	EARTHING AUG	PM	PARKING METER	WPF	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIBRE BOX	PPF	POST & RAIL FENCE	WW	WOODEN WALL
FMB	FOOTBRIDGE	PTM	PARKING TICKET MECHINE		(Abbreviations apply to OS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730220	TR 0159 4061	36.314
E20730021	TR 0159 4291	36.137
E20730500	TR 0223 4020	38.486
E20730503	TR 0343 3936	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731571	TR 0666 3813	50.978
E20733004	TR 0504 3900	43.475
E20733005	TR 1096 3751	60.267
E20731483	TR 0151 4070	35.916
E20731484	TR 0133 4200	37.863
E20731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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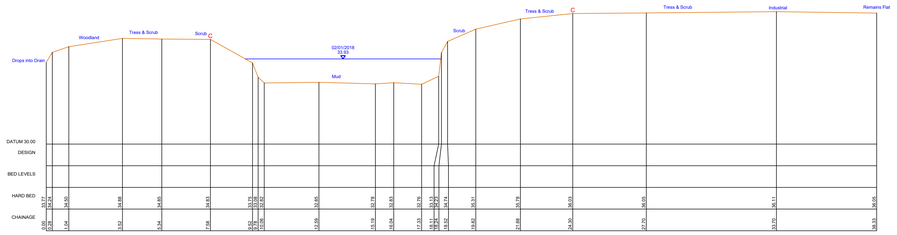
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

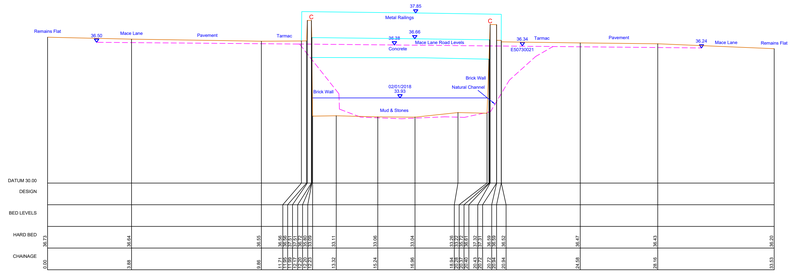
SITE/LIMITS

EAST STOUR (EST001)
LONG SECTION & LOCATION PLAN
EST001_18714 TO EST001_20131

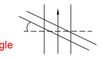
SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332
SURVEY DATE: DECEMBER 2018 – MARCH 2018		
SCALE: AS SHOWN	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. L-J01058-09	REV. —
CAD FILENAME: L-J01058-01-09.dwg		

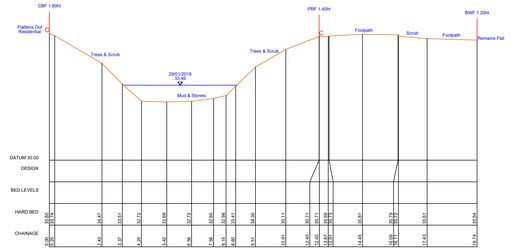


ESTO01_00033
601586.53mE 142862.68mN Brg 99
Open Channel

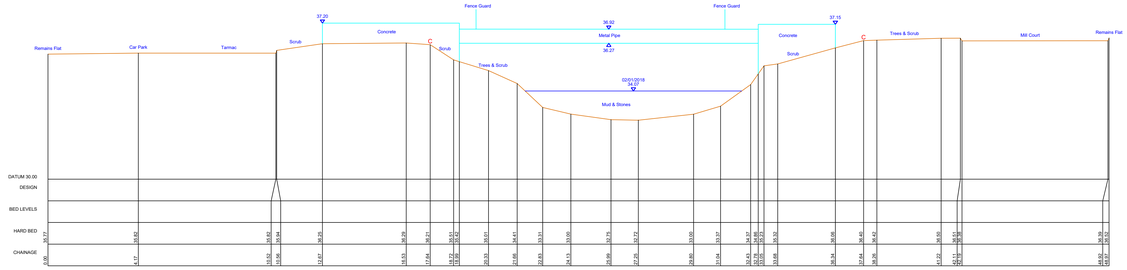


ESTO01_00080
601575.08mE 142823.29mN Brg 119
Mace Lane Road Bridge
Tunnel Length = 26.80m
Skew Angle = 15°

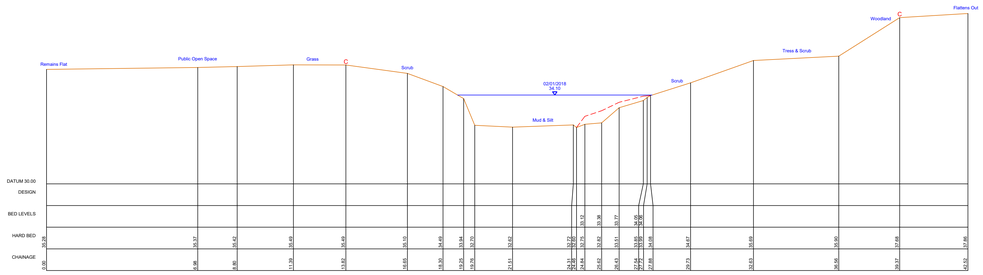




ESTO01_00109
601569.7mE 142793.75mN Brg 128
Open Channel



ESTO01_00192
601523.91mE 142721.49mN Brg 106
Pipe Crossing
Tunnel Length = 0.65m



ESTO01_00350
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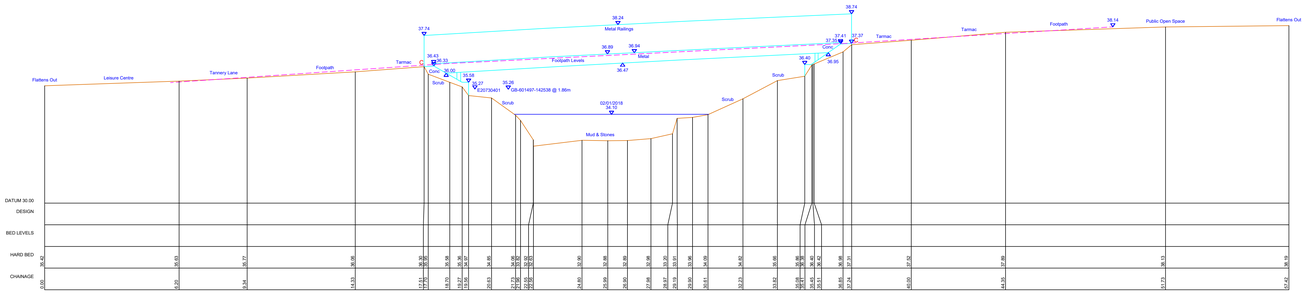
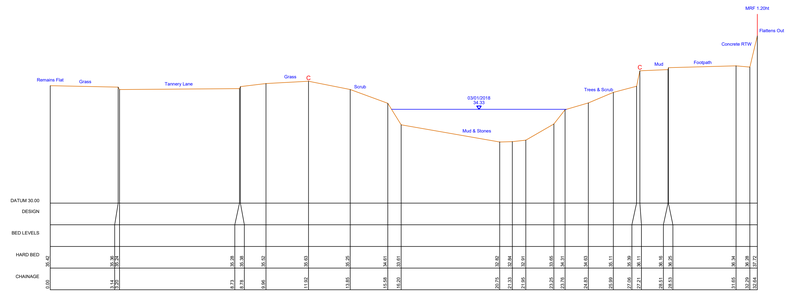
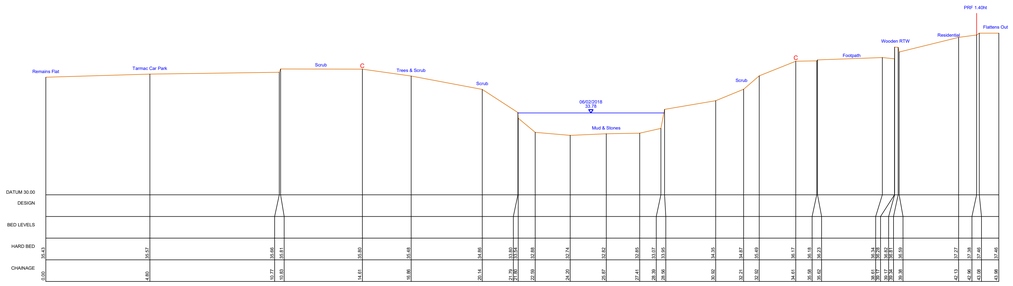
Open Channel



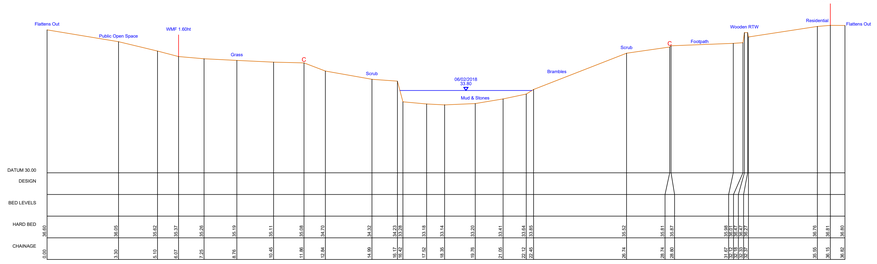
ESTO01_00367
601478.72mE 142552.38mN Brg 105
Footbridge
Tunnel Length = 3.18m



ESTO01_00402
601479.13mE 142512.41mN Brg 95
Open Channel



ESTO01_00502
601490.83mE 142402.14mN Brg 63
Open Channel



ESTO01_00592
601551.61mE 142322.86mN Brg 33
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PM	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
BH	BOREHOLE	FL	FLAG POLE	RC	RECTANGULAR
BS	BELLISH BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BSY	BOARDSIT	FW	FOUL WATER MANHOLE	RM	REINFORCED MAIN
BT	BOREHOLE TEST	G	GATE	RPM	REINWATER PIPE
BL	BED LEVEL	GB	GRASSBANK	S	STOP VALVE
BLL	BOLLARD LIGHT	GC	GAS CONTROL	SC	SCREW COVER
BSS	BUS STOP	GF	GATE POST	SV	SOWARSHIT
BTM	BENCH MARK	GM	GAS MANHOLE	SW	SOFT WATER
BW	BRICK WALL	GW	HEAD WALL	SWM	SUPPLY METER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CBF	CORRUGATED BRIDGE FENCE	IL	INVERT LEVEL	SP	SIGN POST
CF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	CN	CONDUIT
CL	COVER LEVEL	IMF	INTERMEDIN FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	K	KERB (ROAD)	SWP	SHEET WIRE PIT
CONC	CONCRETE	KG	KERB HALF FULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LS	LEFT SMAY	TBM	TEMPORARY BENCH MARK
CPF	CONCRETE PANEL FENCE	LP	LAMP POST	TP	TELEGRAPH POLE/POST
CK	CYCLE RACK	LT	LAMP POST	TC	TELECOM CABINET
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
D	DRAIN	MF	MOORING FENCING	TL	TELEGRAPH LEVEL
DP	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DL	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DS	DOWNSPOUT	MP	METAL PIPE FLZ	TP	TRAFFIC POST
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TARGER RUBBING STRIP
DR	DORMOTTEN	MS	MILE STONE	TS	TREE STUMP
DT	DRAIN TRENCH	NB	NATIONAL BUS	TSR	TRAMWAY STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	UC	UPSTREAM
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTC	UNABLE TO SURVEY
ECF	ELECTRICITY CABLE FENCE	OP	OVERHEAD POWER LINE	WL	WATER LEVEL/WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILLAR	WMP	WOOD MEDIN FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOOD POST
EV	EARTHING VLVE	PM	PARKING METER	WPF	WOODEN POST & RAIL FENCE
FO	FIBRE OPTIC TRANSMISSION LINE	PS	PUMP	YL	YARD LEVEL
FG	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to CS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	32.267
E20730403	TR 0222 4027	38.489
E20731036	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	38.137
E20730500	TR 0323 4020	38.496
E20730503	TR 0343 3970	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731524	TR 0667 3791	47.711
E20731538	TR 0671 3842	53.092
E20731539	TR 0666 3828	52.251
E20730004	TR 0004 3900	43.979
E20731483	TR 0125 4070	36.687
E20731484	TR 0131 4069	35.915
E20731539	TR 0671 3828	52.251

Environment Agency
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PROJECT/WATERCOURSE
EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS
EAST STOUR (EST001)
CROSS SECTIONS
EST001_00033 TO EST001_00592

SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_332
SURVEY DATE: DECEMBER 2017 – MARCH 2018
SCALE: 1:100 — DRN: RC — CHKD: ITS
DATUM: OS GPS ACTIVE — DATE: MAR 18 — DATE: MAR 18
GRID: NATIONAL GRID — DRAWING NO. X-J01058-01 — REV. —
CAD FILENAME: X-J01058-01-30.dwg

Original Drawing Size: A0

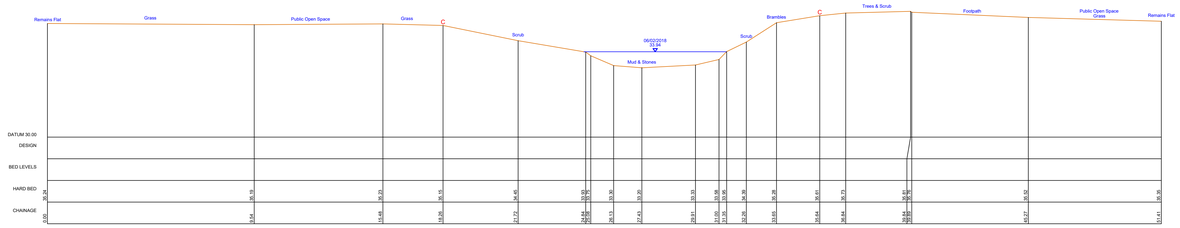
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

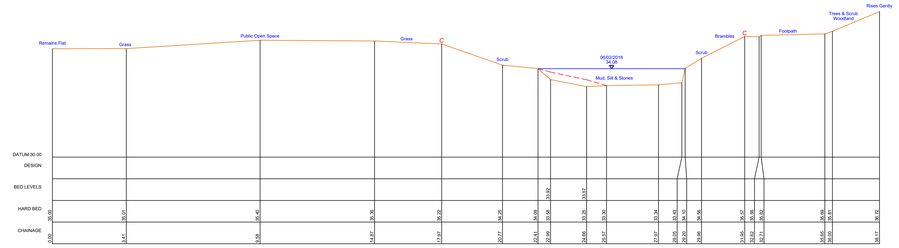
KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

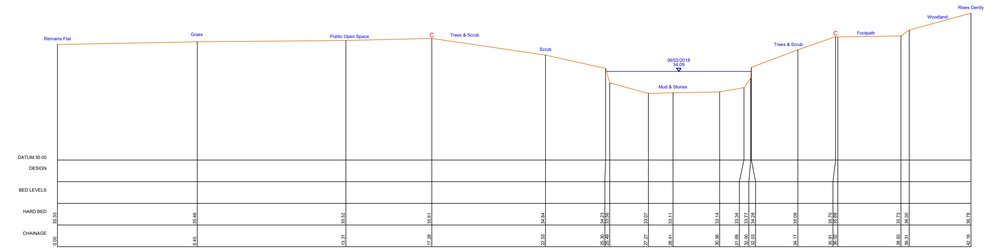
} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS



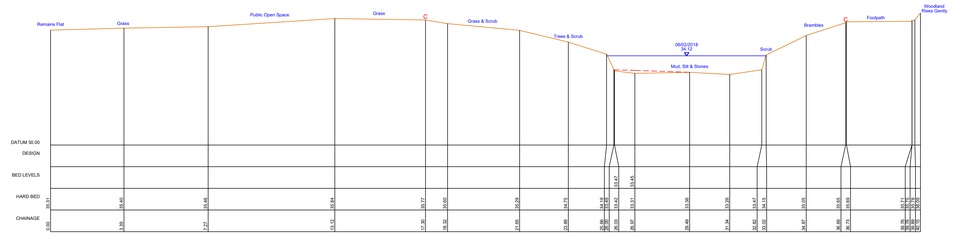
ESTO01_00709
601558.52mE 142250.02mN Brg 127
Open Channel



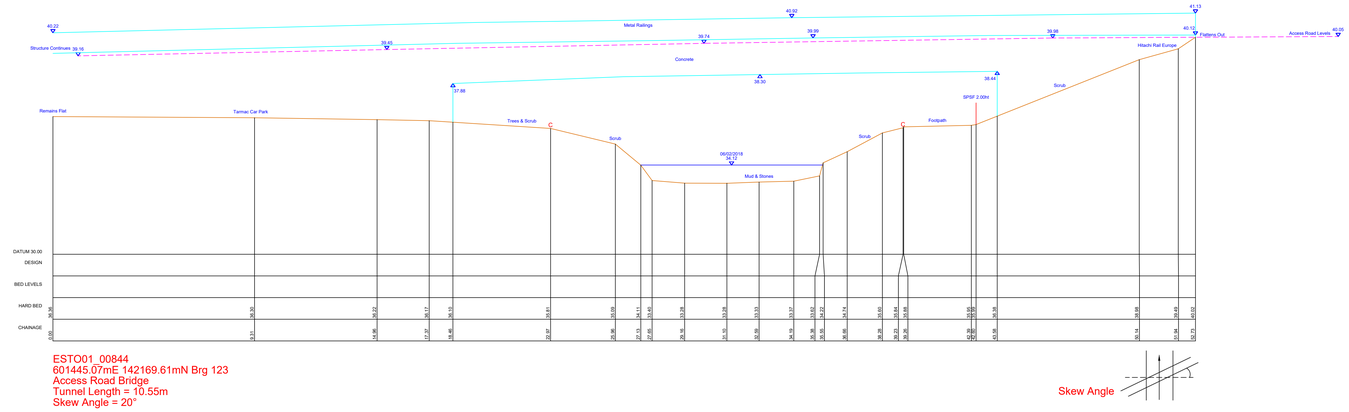
ESTO01_00781
601509.17mE 142209.15mN Brg 144
Open Channel



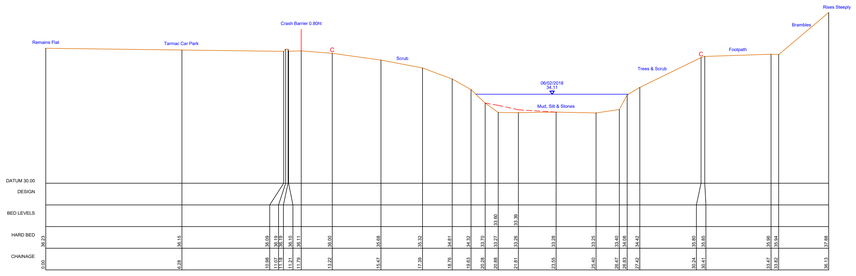
ESTO01_00801
601490.4mE 142200.03mN Brg 143
Open Channel



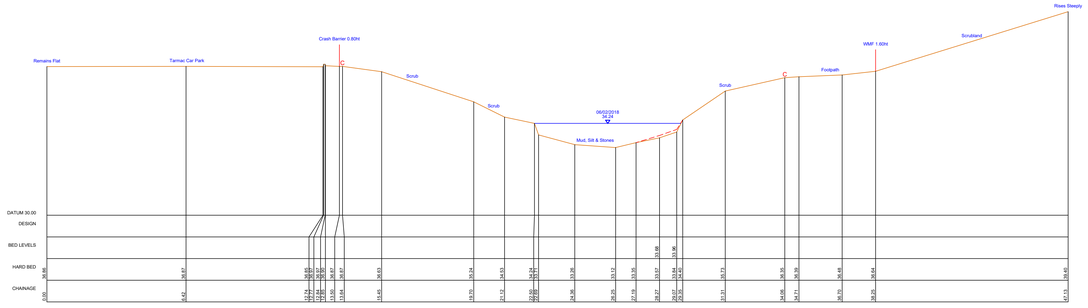
ESTO01_00818
601475.96mE 142190.76mN Brg 143
Open Channel



ESTO01_00844
601445.07mE 142169.61mN Brg 123
Access Road Bridge
Tunnel Length = 10.55m
Skew Angle = 20°



ESTO01_00852
601452.72mE 142168.03mN Brg 147
Open Channel



ESTO01_00934
601383.31mE 142120.35mN Brg 141
Open Channel

NOTES:

1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
B	BOLLARD	FM	FIRE MAIN MARKER	R	RIVER GAUGE
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELGIAN BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BH	BOREHOLE	FRM	FIRE WATER MANHOLE	RM	RAINWATER MH
BH	BOREHOLE	G	GULLY	RMP	RAINWATER PIPE
BL	BED LEVEL	GB	GASBOARD	SC	STOP COCK
BM	BENCH MARK	GC	GAS CONTROL	SC	STOP COCK
BO	BLIG STOP	GP	GATE POST	SK	SOAKWAY
BM	BENCH MARK	GM	GAS MARKER	SL	SERVE LEVEL
BMP	BARBED WIRE	GT	GATE POST	SMH	SHEET METER MANHOLE
BWF	BARBED WIRE FENCE	C	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CBF	CLOSE BOARDED FENCE	H	HEDGE	SP	SIGN POST
CLF	CHAIN LINK FENCE	BF	IRON RAILING FENCE	STN	STATION
CL	COVER LEVEL	BF	IRONWORK FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	MF	MESH FENCE	SW	SOAKWAY PIT
CONC	CONCRETE	EG	KERB INLET GULLY	SWF	SHEER WIRE FENCE
CP	CONCRETE POST	L	LAMP POST	TBM	TEMPORARY BENCH MARK
CP	CONCRETE PALING FENCE	LE	LEFT EDGE	TELEPOL	TELEPHONE (BAL WALPOST)
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CV	CABLE TV MH, MANHOLE	LB	LOCKABLE BOLLARD	TCB	TRAFFIC CONTROL BOX
CUL	CULVERT	MF	MISCELLANEOUS FENCING	TH	THRESHOLD (STAC)
DK	DROP KERB	MK	MARKOUT	TL	TRAFFIC LIGHT
D	DOWNPIPE	MP	MOORING PIPE	TLB	TRAFFIC LIGHT BOX
D	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
EB	ELECTRIC BOX	NB	NOTICE BOARD	TS	TRAFFIC SIGNAL
EMB	EDG WASTE MN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EN	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	UT	UPSTREAM
ET	ELECTRIC TELE	OS	ORDNANCE SURVEY	VP	VENT PIPE, AIR SURVEY
EUF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EOP	ELECTRICITY CABLE PIT	OOR	OPEN STEEL RAILINGS	WM	WATER METER
EP	ELECTRICITY PANEL	P	PIPE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
EX	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
EX	EXTRA HIGH TENSIONSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to EA survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E40730012	TR 0103 4107	35.975
P40730401	TR 0149 4253	35.287
P40730403	TR 0222 4027	35.489
E40731536	TR 0666 3814	51.806
P40730013	TR 0132 4202	36.489
P40730020	TR 0129 4061	36.314
P40730021	TR 0159 4291	36.337
P40730500	TR 0124 4026	36.456
P40731495	TR 0152 4070	37.864
P40731496	TR 0169 4199	37.717
P40731938	TR 0691 3842	52.022
P40731971	TR 0666 3811	50.975
P40733004	TR 0596 3900	53.712
P40733005	TR 0594 3751	52.647
E40731483	TR 0757 4070	56.916
E40731484	TR 0134 4200	37.463
E40731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (ESTO01)
CROSS SECTIONS
ESTO01_00709 TO ESTO01_00934

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332	
SURVEY DATE: DECEMBER 2017 – MARCH 2018			
SCALE: 1:100	DRN: RC	CHKD: ITS	
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18	
GRID: NATIONAL GRID	DRAWING NO.	REV.	
CAD FILENAME: K-J01058-01-32.dwg	X-J01058-02	–	

Original Drawing Size: A0

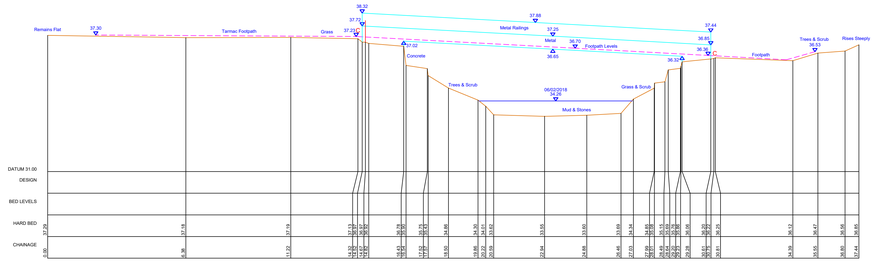
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

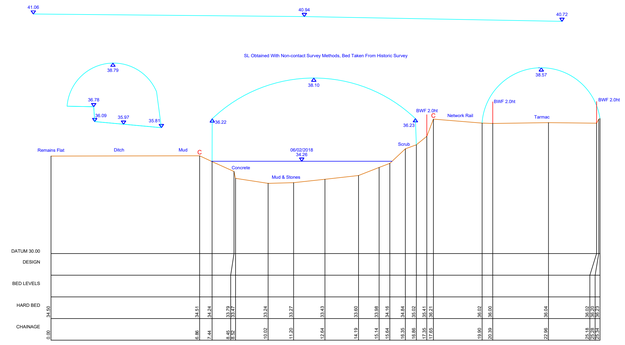
KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

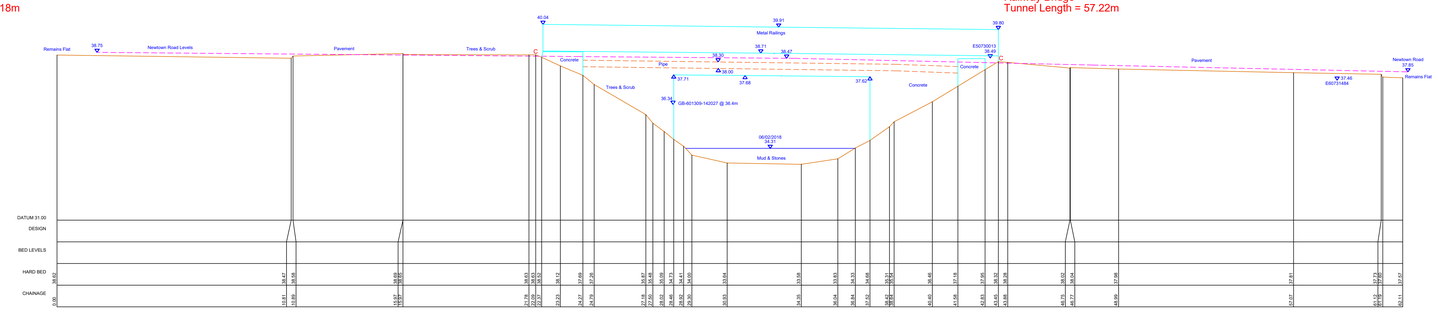
} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS



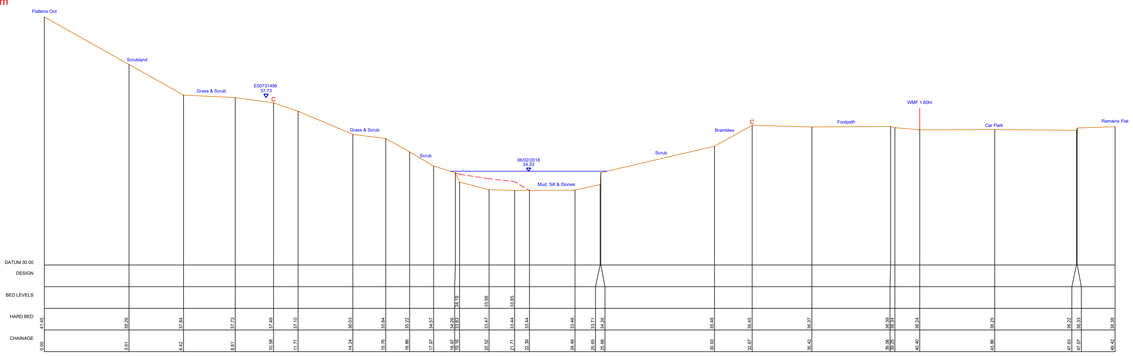
ESTO01_00961
601362.29mE 142104.58mN Brg 143
Footbridge
Tunnel Length = 3.18m



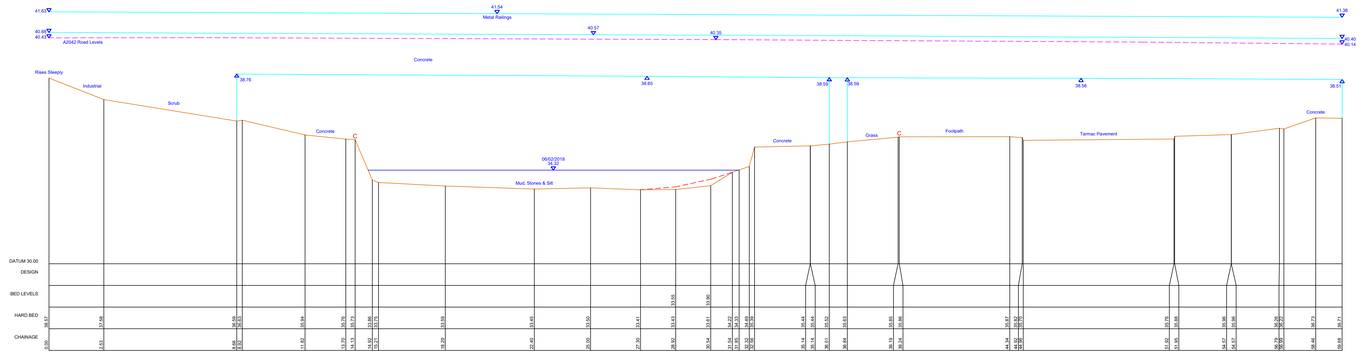
ESTO01_01022
601320.27mE 142054.11mN Brg 129
Railway Bridge
Tunnel Length = 57.22m



ESTO01_01049
601286.13mE 142043.48mN Brg 125
Newtown Road Bridge
Tunnel Length = 9.86m



ESTO01_01089
601278.73mE 141994.52mN Brg 109
Open Channel



ESTO01_01137
601273.69mE 141962.07mN Brg 146
A2042 Road Bridge
Tunnel Length = 39.02m
Skew Angle = 40°

Skew Angle

NOTES:

1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PM	PARKING METER
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RL	REDUCED LEVEL
BA	BUS ARRIVAL BEACON	FS	FLOOR SOCKET	RP	RAILWAY POSTS, JOINT
BDY	BOUNDARY	FWV	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	RW	RAINWATER PIPE
BL	BOLLARD	GB	GRATEBOARD	SC	STOP COCK
BMK	BENCHMARK	GL	GROUND LEVEL	SDP	STAND PIPE
BR	BRIDGE	GM	GAS METER	SE	SOFFIT LEVEL
BW	BLOCK WORK	GV	GAS VARVER	SL	SOFFIT LEVEL
BWK	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
CAB	CONTROL BOX, TRAFFIC	I	INVERT LEVEL, CHAMBER	SP	SIGN POST, PLING
CBF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	GAS VALVE
CF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION
CH	CHAIN LINK FENCE	JB	JUNCTION BOX, BOLLARD	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JE	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KIG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	L	LEVEL, LAMP	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LC	LEFT CREST	TCP	TOP/POP TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELLCOM CABINET
CSW	CATCH SPY WINDOW	LPB	LAMP POST, BOLLARD	TEL	TELEPHONE, TELEGRAPH
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MK	MARKER	TP	TELEPHONE BOX
D	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TR	TIMBER RUBBING STRIP
DRN	DRAINAGE	MS	MILE STONE	TRF	TRELLIS FENCE
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSB	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NC	NATIONAL CYCLING AUTHORITY	UTL	UTILITY
EC	ELECTRICAL CONTROL	OHC	OVERHEAD CABLE	VB	VEHICLE BARRIER
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EGF	ELECTRIC GATE FENCE	PR	PALING RAILINGS	WMF	WIRE MESH FENCE
EMH	ELECTRICITY MANHOLE	PT	PILLAR TOP	WMF	WIRE MESH FENCE
E	ELECTRICITY METER	PW	PALING FENCE	WP	WOOD POST
LT	ELECTRICITY PILLAR	PM	PARKING METER	WPF	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIBRE BOX	PR	POST & RAIL FENCE	YG	YARD GULLY
FBH	FLOWERBED	PTM	PARKING TICKET MACHINE	(Abbreviations apply to ID point only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E60730012	TR 0103 4107	35.975
E60730401	TR 0149 4253	38.757
E60730403	TR 0222 4227	38.489
E60731436	TR 0655 3814	51.808
E60730013	TR 0132 4202	38.489
E60730020	TR 0159 4081	36.114
E60730021	TR 0159 4291	38.337
E60730050	TR 0221 4075	38.486
E60730503	TR 0343 3935	40.259
E60731495	TR 0152 4070	37.864
E60731496	TR 0128 4199	37.732
E60731537	TR 0667 3791	47.711
E60731538	TR 0671 3842	63.022
E60731571	TR 0666 3813	50.978
E60733004	TR 0504 3900	43.712
E60733005	TR 1056 3751	60.587
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

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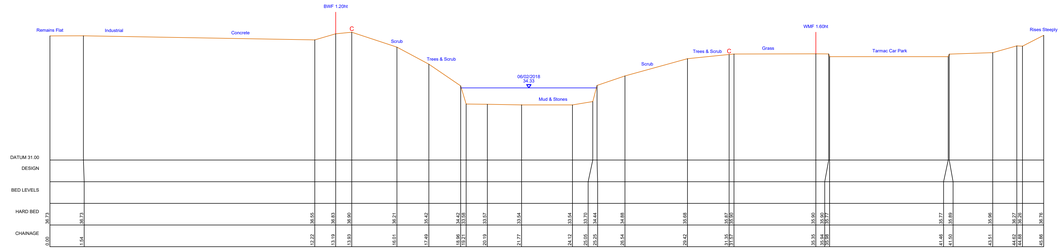
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

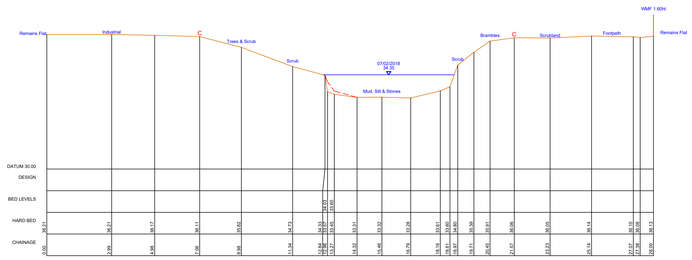
SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_00961 TO EST001_01137

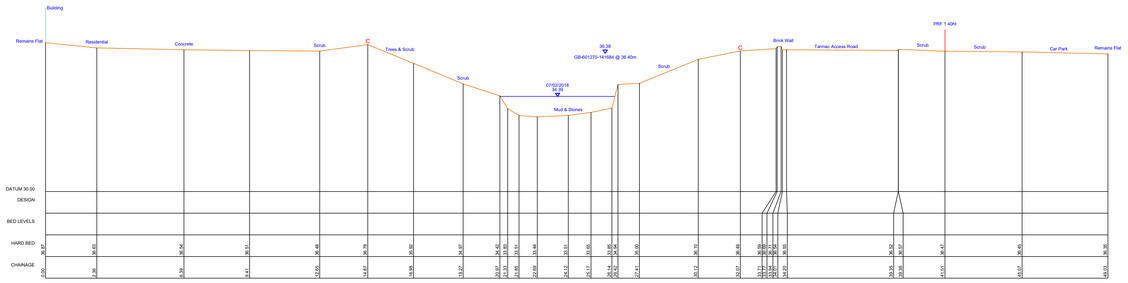
SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_132
SURVEY DATE: DECEMBER 2017 – MARCH 2018		
SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-03	REV. –
CAD FILENAME: X-J01058-01-30.dwg		



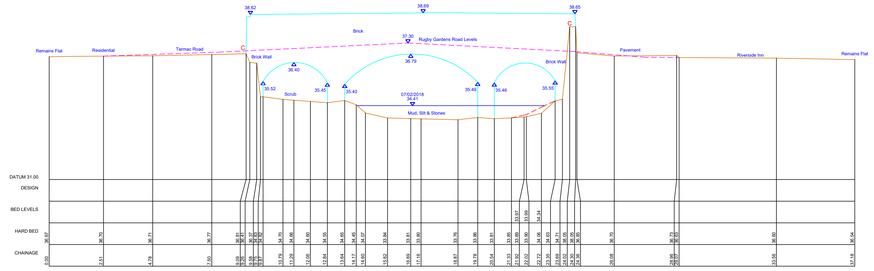
ESTO01_01158
601260.95mE 141924.08mN Brg 98
Open Channel



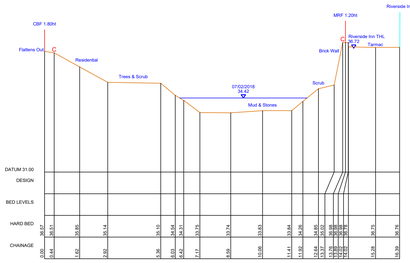
ESTO01_01285
601289.29mE 141796.04mN Brg 88
Open Channel



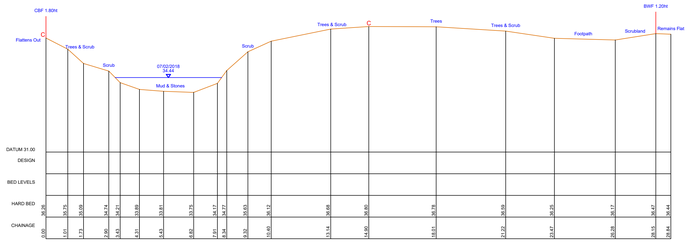
ESTO01_01394
601249.67mE 141702.2mN Brg 111
Open Channel



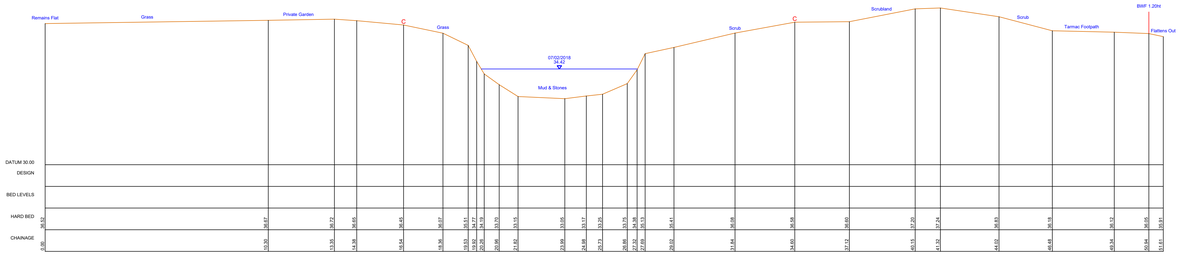
ESTO01_01408
601250.34mE 141688.51mN Brg 115
Rugby Garden Road Bridge
Tunnel Length = 4.33m



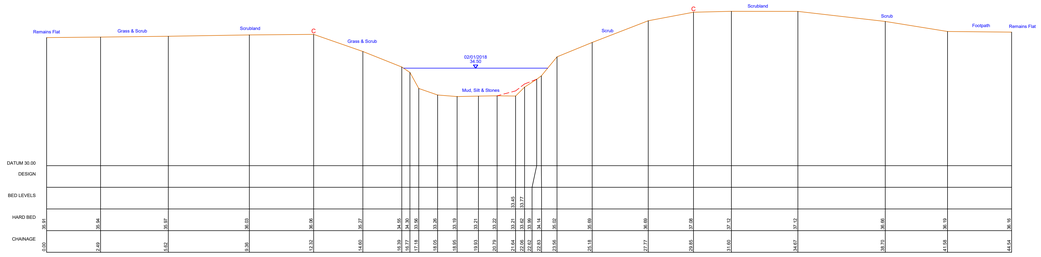
ESTO01_01414
601255.83mE 141679.66mN Brg 115
Open Channel



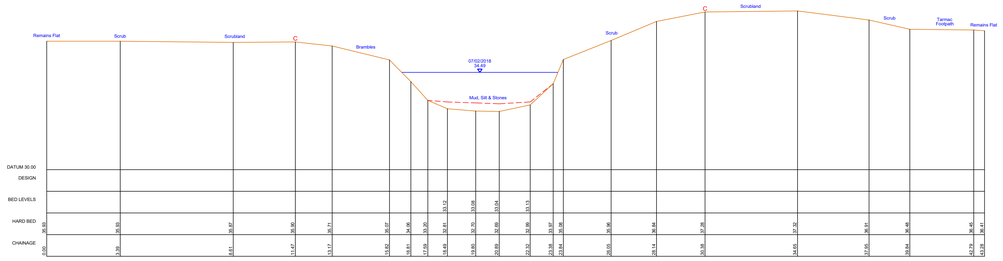
ESTO01_01482
601232.5mE 141615.99mN Brg 121
Open Channel



ESTO01_01590
601166.27mE 141535.55mN Brg 131
Open Channel



ESTO01_01718
601104.58mE 141413.56mN Brg 96
Open Channel



ESTO01_01785
601101.74mE 141345.95mN Brg 92
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRDY	FH	FIRE HYDRANT	PM	PARKING MELL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RM	RIGHT MARK
B	BOLLARD	FL	FLOOR (LVD)	RL	REDUCED LEVEL
BA	BALL HEIGHT MEACION	FS	FLOOD SIGN	RJ	RAILWAY JOINT
BDY	BOUNDARY	FWV	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GATE	RWP	RAIN WATER PIPE
BL	BOLLARD	GB	GRATEBOARD	SC	STOP COCK
BRM	BRICKWORK	GL	GROUND LEVEL	CSF	STAND PIPE
BS	BUS STOP	GM	GAS METER	SIGN	SIGNPOST
BW	BEACH WRPP	GV	GAS WARDER	SL	SUPPT LEVEL
BW	BRICK WALL	HW	HEAD WALL	SMH	SURVICE WATER MANHOLE
CBF	CLOSE BOARDED FENCE	I	INVERT LEVEL	SP	SOIL PIPE / PLUNG
CBF	CLOSE BARRIED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION
CH	CHAIN LINK	JB	JUNCTION BOXES	SV	SOIL VENT PIPE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LC	LEVEL CROSS	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LE	LEFT EDGE	TCP/CP	TELEPHONE CALL BOX/POST
CS	CYCLE SIGN	LV	LAMP POST	TC	TELECOM CABINET
CV	CATS EYE / MANHOLE	LV	LAMP POST BOLLARD	TCB	TELECOM CABINET
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DROP KERB	MK	MARKOUT	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MP	MILE POST	TLB	TELEPHONE BOX
D	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DRN	DRAIN/DRAIN	NP	NOTICE PLATE	TS	TRAFFIC SIGNAL
DWS	DOG WASTE BIN	NS	NOTICE BOARD	TSB	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NW	NATIONAL WATERWAYS AUTHORITY	UTL	UPTERN LIGHT
EB	ELECTRIC BOX	OCC	OCCUPIER CONTACT	VS	VERTICAL SIGN / SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EGF	ELECTRIC GATE FENCE	PR	PALE RAILINGS FENCE	WP	WATER POST
EMH	ELECTRICITY MANHOLE	PT	PILE TEST	WMF	WIRE MESH FENCE
ET	ELECTRICITY TOWER	PV	PIPE VENT	WMP	WIRE MESH POST
LT	ELECTRICITY BLOCK	PM	PARKING METER	WP	WOODEN POST & WAL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIBRE BOX	PR	POST & RAIL FENCE	YL	YARD GULLY
FBH	FLOWERBED	PTM	PARKING TICKET MACHINE		(Abbreviations apply to OS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E60730012	TR 0103 4107	35.975
E60730401	TR 0149 4253	35.757
E60731136	TR 0222 4227	38.489
E60731538	TR 0666 3814	51.016
E60730013	TR 0132 4202	38.489
E60730020	TR 0159 4081	36.114
E60730021	TR 0159 4291	38.337
E60730500	TR 0231 4025	38.486
E60730503	TR 0343 3936	40.259
E60731495	TR 0152 4070	37.864
E60731496	TR 0128 4199	37.732
E60731537	TR 0667 3791	47.711
E60731538	TR 0671 3842	63.022
E60731571	TR 0666 3813	50.976
E60733004	TR 0504 3900	43.712
E60733005	TR 1056 3751	60.587
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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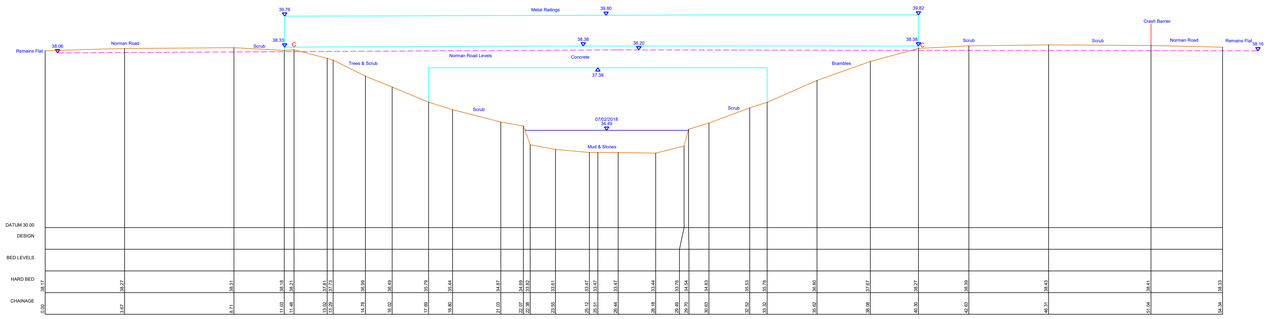
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

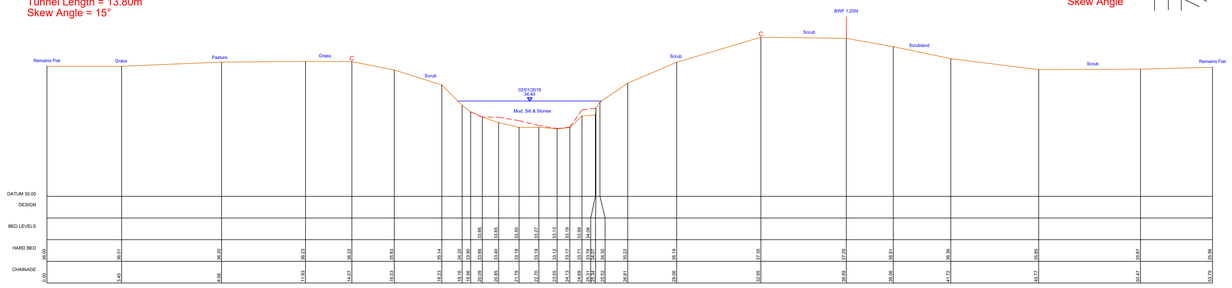
EAST STOUR (EST001)
CROSS SECTIONS
EST001_01158 TO EST001_01785

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_132	
SURVEY DATE: DECEMBER 2017 – MARCH 2018			
SCALE: 1:100	DRN: RC	CHKD: ITS	
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18	
GRID: NATIONAL GRID	DRAWING NO. X-J01058-04		REV. —
CAD FILENAME: X-J01058-01-30.dwg			

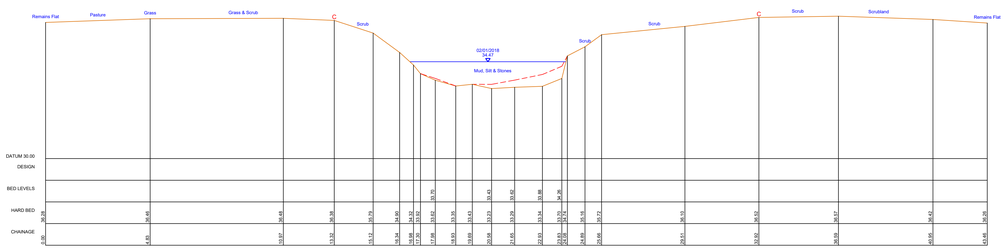


ESTO01_01831
601094.03mE 141309.14mN Brg 113
Norman Road Bridge
Tunnel Length = 13.80m
Skew Angle = 15°

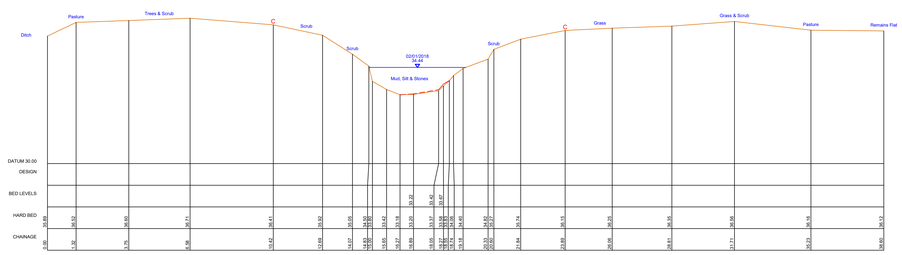
Skew Angle



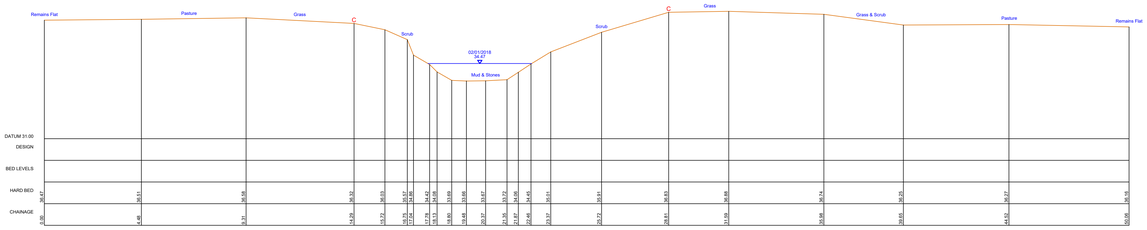
ESTO01_01855
601091.91mE 141278.31mN Brg 99
Open Channel



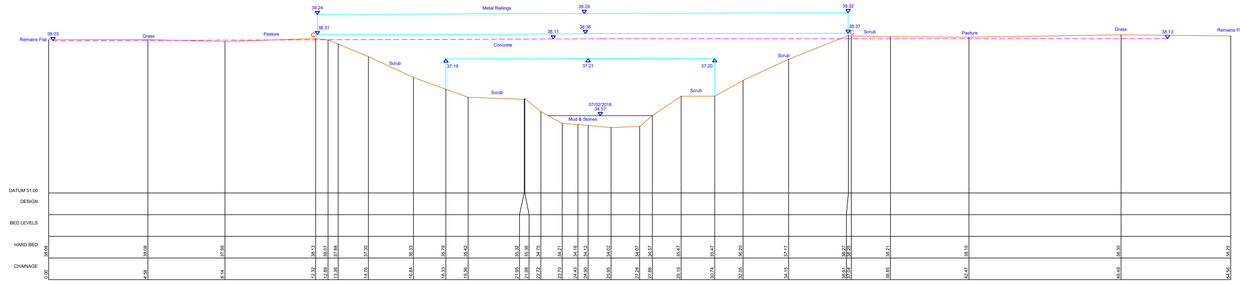
ESTO01_01999
601052.2mE 141145.82mN Brg 111
Open Channel



ESTO01_02043
601050.87mE 141091.15mN Brg 81
Open Channel



ESTO01_02109
601069.74mE 141021.36mN Brg 60
Open Channel



ESTO01_02163
601109.08mE 140968.34mN Brg 31
A2042 Road Bridge
Tunnel Length = 25.53m

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
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2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BE	BENCH MARK BEACON	FP	FENCE PIPE	RJ	RAILWAY SLEEPER JOINT
BGY	BILLBOARD	FWM	FULL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BM	BENCH MARK	GB	GRIT BINS/BOARD	S	SIGN POST
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BUS STOP	GP	GATE POST	SK	SOAKAWAY
BSP	BUSH SAPLING	GR	GRATE/GRILLE	SL	STREET LIGHT
BW	BRICK WALL	HW	HEAD WALL	SMW	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SWP	SHEET METAL PILING
CBF	CONCRETE BLOCK FENCE	IL	INVERT LEVEL	TC	TRAFFIC CONE
CF	CORRUGATED IRON FENCE	IW	IRON RAILING FENCE	TCN	TUCKNIN
CL	CHAIN LINK	JB	JUNCTION BOX/PILLAR	TV	SLUICE VALVE
CLY	CLAY PALING FENCE	JS	JOINTING SLEEVE	TWP	TIMBER PILE
CONC	CONCRETE	KG	KERB INLET GULLY	UWF	UNDER WIRE FENCE
CP	CONCRETE POST	LC	LEVEL CROSSING	VP	VENTILATION PIPE/WARN
CPF	CHESTNUT PALING FENCE	LT	LEFT CREST	TCP/TCP	TELEPHONE CALL BOX/POST
CR	CROSS RAIL FENCE	LV	LOCKING VALVE	TL	TELEGRAPH LINE
CTL	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TOL	TELECOM OUTLET
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DC	DOG COLLAR	MH	MANHOLE	TP	TELEGRAPH POLE
DL	DECK LEVEL	MKP	MARKER	TB	TRAFFIC LIGHT BOX
DP	DAMPER	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MPF	MESH PANEL FENCING	TS	TRAFFIC SIGNALLING STRIP
DR	DOWNSPOUT	MS	MILE STONE	TSL	TREE SUMPS
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSB	TUBULAR STEEL RAILINGS
E	ELECTRICITY MANHOLE	NRA	NATIONAL RIVERS AUTHORITY	TW	TRAFFIC WARDEN
ES	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EF	ELECTRIC FENCE/FENCE	PR	PADDOCK STEEL RAILINGS	WMP	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMP	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ER	ELECTRIC RISER	PM	PARKING METER	WPF	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FLOORBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to OS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E00730012	TR 0103 4107	35.975
E00730401	TR 0149 4127	38.267
E00730403	TR 0227 4037	38.586
E00731436	TR 0666 3814	51.808
E00730013	TR 0132 4207	38.499
E00730020	TR 0159 4081	38.314
E00730021	TR 0159 4291	38.337
E00730000	TR 0223 4029	38.486
E00730001	TR 0243 3935	40.259
E00731495	TR 0152 4070	37.864
E00731496	TR 0128 4199	37.732
E00731537	TR 0687 3791	47.111
E00731538	TR 0671 3842	53.022
E00731671	TR 0666 3813	50.976
E00733004	TR 0504 3900	43.712
E00733005	TR 1056 3751	60.587
E00731483	TR 0151 4070	35.916
E00731484	TR 0133 4200	37.363
E00731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

Orchard House, Endeavour Park, London Road, Addington, West Malling, Kent, ME19 5SH

contact address

PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_01831 TO EST001_02163

SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_332

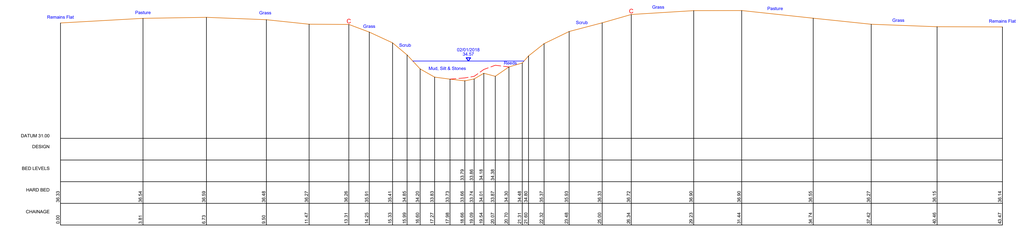
SURVEY DATE: DECEMBER 2017 – MARCH 2018

SCALE: 1:100 | DRN: RC | CHKD: ITS

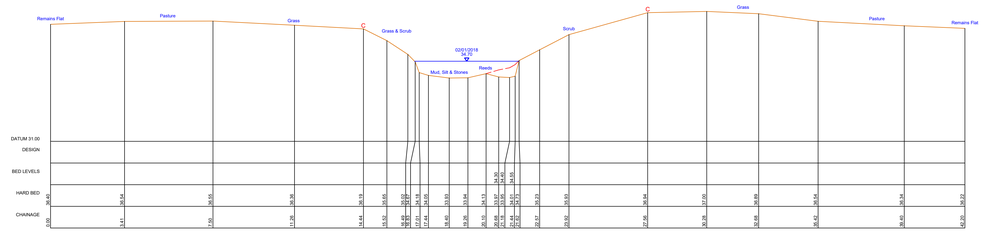
DATUM: OS GPS ACTIVE | DATE: MAR 18 | DATE: MAR 18

GRID: NATIONAL GRID | DRAWING NO. X-J01058-05 | REV. —

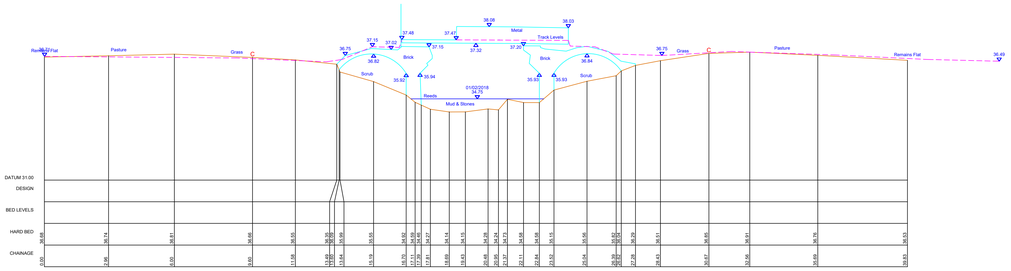
CAD FILENAME: X-J01058-01-30.dwg



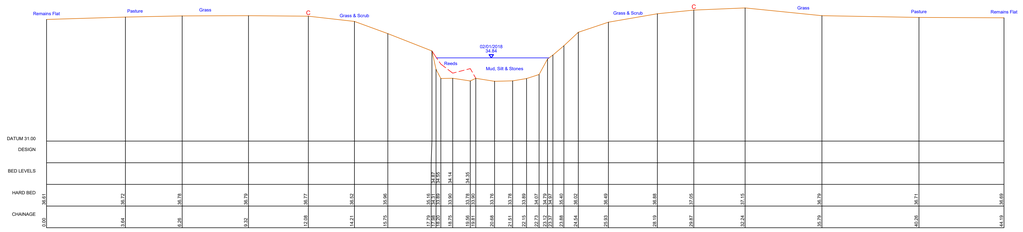
ESTO01_02196
601138.17mE 140955.54mN Brg 34
Open Channel



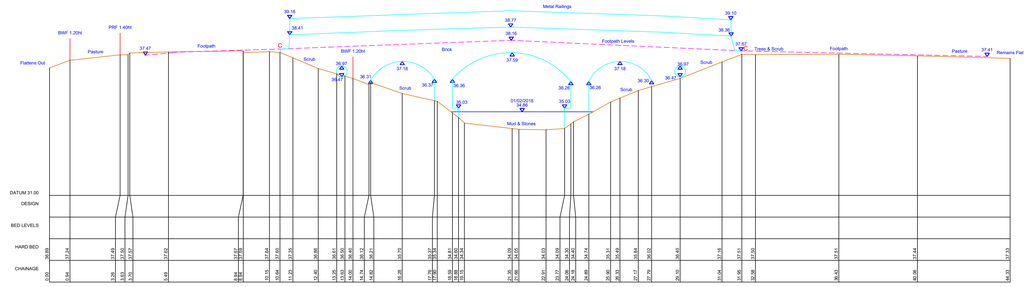
ESTO01_02308
601226.77mE 140889.12mN Brg 36
Open Channel



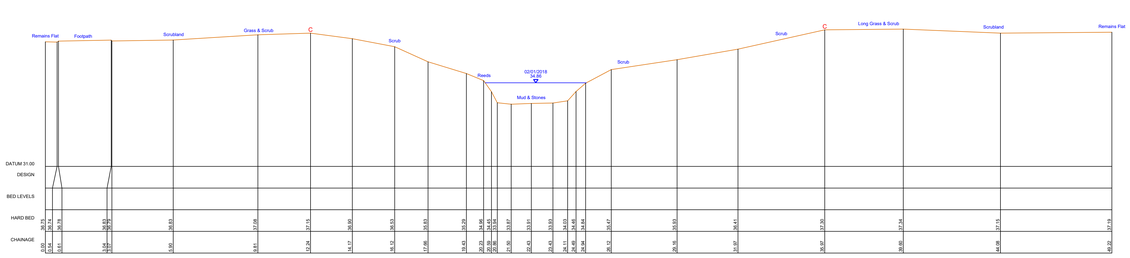
ESTO01_02386
601294.59mE 140845.38mN Brg 30
Footbridge
Tunnel Length = 3.19m



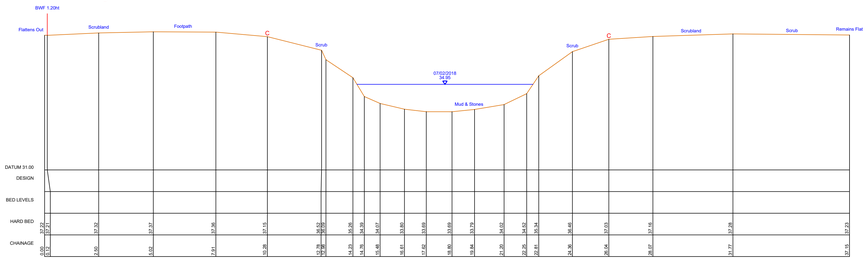
ESTO01_02500
601396.23mE 140793.64mN Brg 28
Open Channel



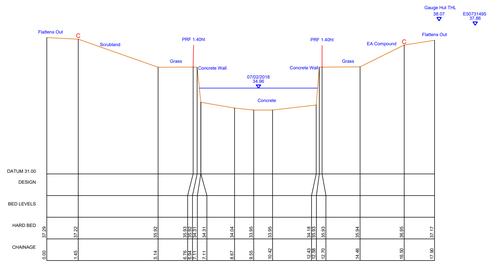
ESTO01_02577
601452.42mE 140750.06mN Brg 45
Footbridge
Tunnel Length = 4.22m



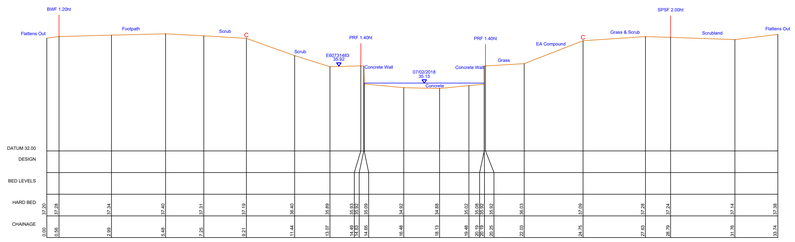
ESTO01_02605
601466.21mE 140732.41mN Brg 59
Open Channel



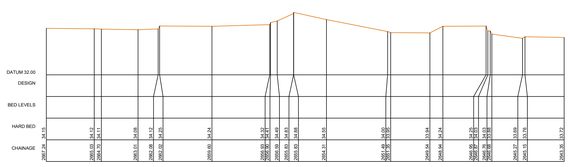
ESTO01_02645
601495.15mE 140699.93mN Brg 50
Open Channel



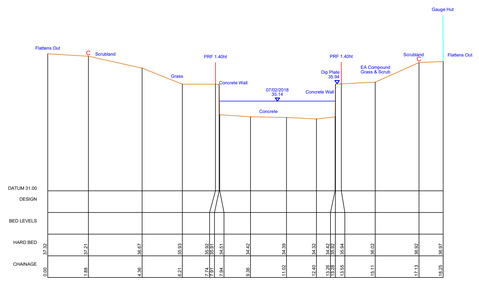
ESTO01_02651
601504.75mE 140701.54mN Brg 56
Weir Toe



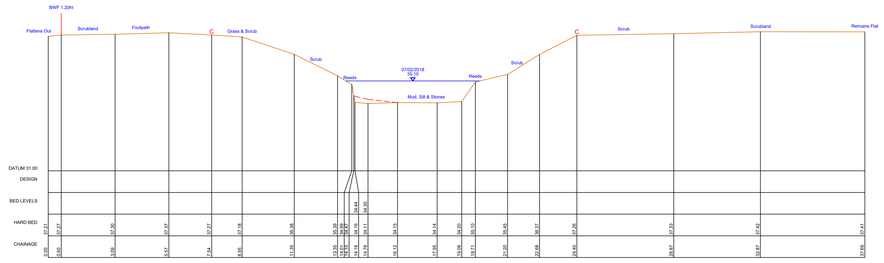
ESTO01_02656
601501.84mE 140692.8mN Brg 52
Weir Crest



Through Section ESTO01_2656
Weir Crest



ESTO01_02657
601507.68mE 140696.48mN Brg 55
Weir Heel



ESTO01_02665
601506.77mE 140686.88mN Brg 56
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:

1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PM	PARAPET WALL
B	BOLLARD	FM	FLOOD MEASURE MARKER	PO	POST OFFICE
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELGIAN BEACON	FO	FENCE POST	RJ	ROLLED STEEL JOIST
BH	BOREHOLE	FMH	FOUL MANHOLE	RM	RAINWATER MH
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GA	GAS MARKER	SA	STAY ANCHOR
BL	BED LEVELS	GL	GROUND LEVEL	SP	STAY POST
BS	BULL STOP	GP	GATE POST	TC	TOP OF CREST
BW	BRICK WALL	GV	GAS VALVE	TK	CHAINAGE
BWM	BRICK WALL	HW	HEAD WALL	TMH	SURFACE WATER MANHOLE
CBF	CLOSE BOARDED FENCE	L	LAMP COLUMN	TP	TELEGRAPH POLE
CBF	CLOSE BOARDED FENCE	L	BASEET LEVEL	UP	DRAIN POST
CF	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	VCN	VISCOUNTS
CH	CHAIN LINK FENCE	RF	WROUGHT IRON FENCE	VP	VENT PIPE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOXES	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LC	LEFT CREST	TBM	TEMPORARY BENCH MARK
CP	CHESTNUT PALING FENCE	LJ	LEFT SHOUT	COLPO	COLLIMATION POLE/ALIGNMENT POST
CS	CYCLE SIGN	LP	LAMP POST	TC	TELECOM CABINET
CS	CYCLE SIGN, MANHOLE	LS	LAMP STANDARD	TCB	TELECOM CABLE BOX
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DH	DEEP HERS	MH	MANHOLE	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MKS	MARKER STONE	TLB	TELEGRAPH LINE BOX
D	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MPF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DS	DOWN STAY	NB	NATIONAL BOARD	TS	TRAFFIC SIGNAL
DWD	DOG WASTE BIN	NG	NOTICE BOARD	TSB	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	UT	UPSTREAM
EC	ELECTRIC CABLE	OS	ORDNANCE SURVEY	UTS	UNCLASSIFIED SURVEY
ECP	ELECTRIC CABLE POST	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EGP	ELECTROPTH CABLE PIT	OGR	OPEN STEEL RAILINGS	WM	WATER METER
EP	ELECTRICITY POLE	P	POST	WF	WOVEN WIRE FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ER	EARTHING ROD	PF	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETB	ELECTRIC TRANSMISSION LINE	PP	POST	WR	WATER ROUTE
FB	FLOWER BED	PR	POST & RAIL FENCE	WS	WHEO GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to DX survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E/07330012	TR 0103 4107	35.975
E/07330401	TR 0149 4229	36.675
E/07331136	TR 0222 4014	38.869
E/07331138	TR 0665 3911	34.806
E/07330020	TR 0133 4007	36.119
E/07330021	TR 0159 4291	38.314
E/07330022	TR 0211 4076	38.286
E/07330503	TR 0341 3935	40.259
E/07331495	TR 0152 4070	37.664
E/07331498	TR 0128 4199	37.732
E/07331537	TR 0687 3791	47.711
E/07331538	TR 0671 3842	53.022
E/07331571	TR 0666 3813	50.076
E/07333004	TR 0504 3900	43.712
E/07333005	TR 1054 3751	60.587
E/07331483	TR 0151 4070	35.916
E/07331484	TR 0133 4200	37.463
E/07331539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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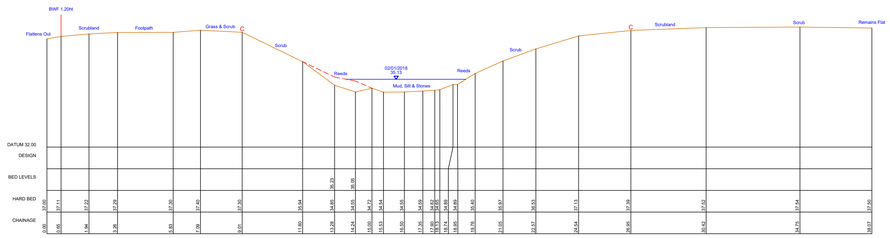
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

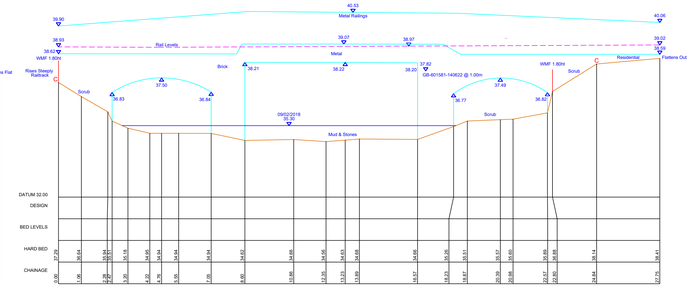
SITE/LIMITS

EAST STOUR (ESTO01)
CROSS SECTIONS
ESTO01_02196 TO ESTO01_02665

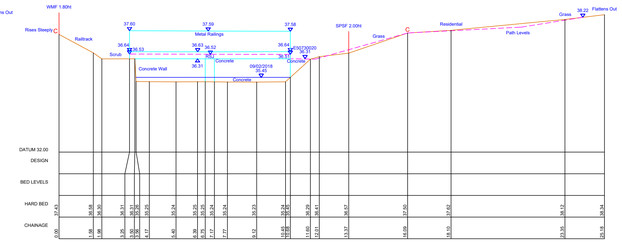
SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_032
SURVEY DATE: DECEMBER 2017 – MARCH 2018		
SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-06	REV. —
CAD FILENAME: X-J01058-01-30.dwg		



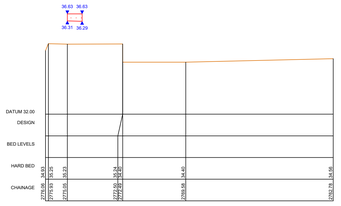
ESTO01_02705
601528.85mE 140653.07mN Brg 56
Open Channel



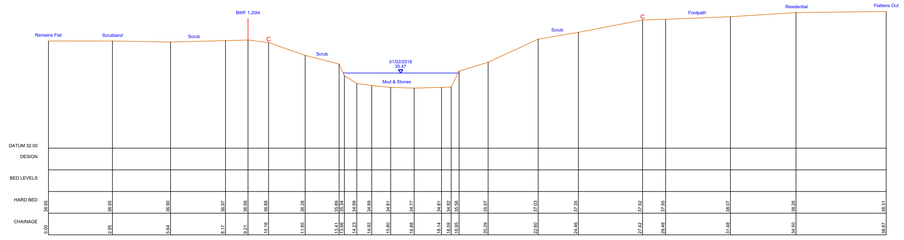
ESTO01_02763
601582.32mE 140606.02mN Brg 356
Rail Bridge
Tunnel Length = 10.55m
Skew Angle = 40°



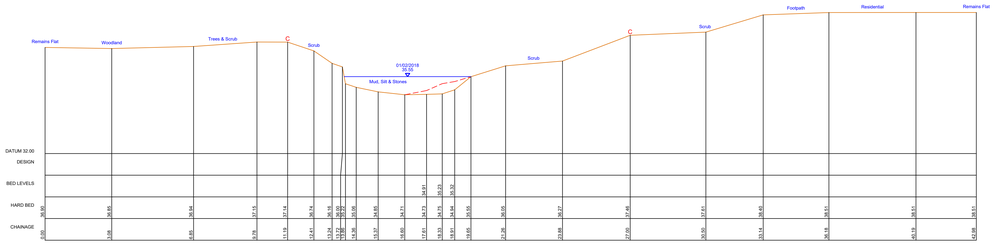
ESTO01_02775
601584.87mE 140605.71mN Brg 43
Footbridge
Tunnel Length = 0.68m



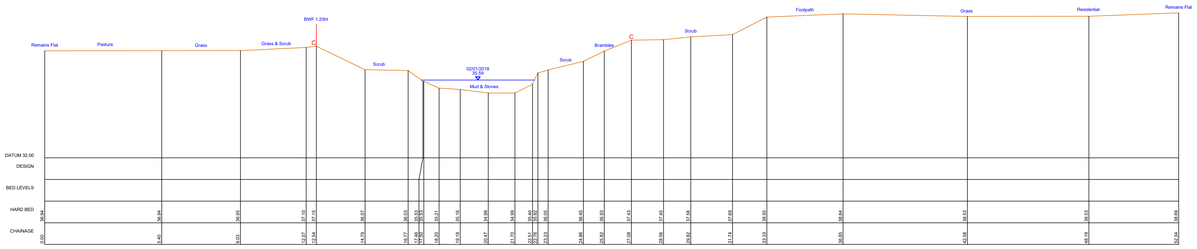
Through Section ESTO01_2775
Footbridge



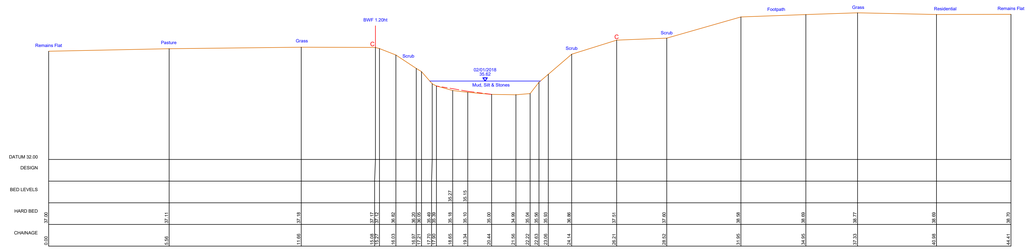
ESTO01_02821
601619.02mE 140564.32mN Brg 16
Open Channel



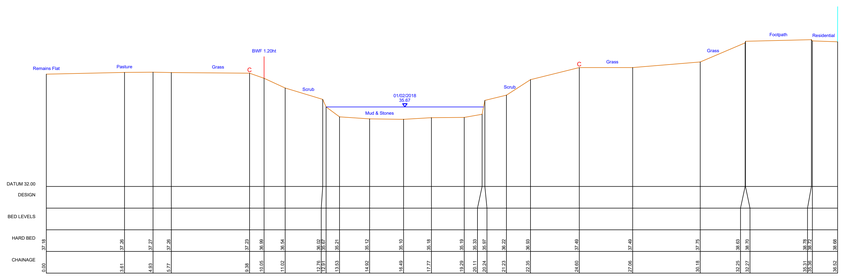
ESTO01_02904
601699.17mE 140542.41mN Brg 13
Open Channel



ESTO01_03003
601794.83mE 140522.01mN Brg 14
Open Channel



ESTO01_03096
601886.59mE 140503.89mN Brg 10
Open Channel



ESTO01_03202
601977.99mE 140476.34mN Brg 43
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:

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SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
B	BOLLARD	FM	FIRE MAIN MARKER	R	RAIL LEVEL
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELGIAN BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BM	BENCH MARK	FWM	FOOT WATER MANHOLE	RWP	RAINWATER PIPE
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BS	BUS STOP	GI	GRATED INLET	SC	STOP COCK
BS	BUS STOP	GP	GATE POST	SA	GANGWAY
BW	BEACH MARK	GM	GAS MARKER	SL	SLIPPY LEVEL
CB	CATCH BOX	GV	GAS VALVE	SMH	SHEET METAL MANHOLE
BWF	BARBED WIRE FENCE	C	INSPECTION CHAMBER	SWP	SHEET METAL PILING
CSF	CLOSE BOARDED FENCE	H	HEDGE LEVEL	SP	SIGN POST
CWF	CHAIN LINK WIRE FENCE	IW	IRON RAILING FENCE	STN	STATION
CL	COVER LEVEL	JF	JOINERS FENCE	SL	SLUICE LEVEL
CL	COVER LEVEL	MF	MESH FENCE	SW	SHEET WIRE FENCE
CONC	CONCRETE	KG	KERB GULLY GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	L	LEVEL	TM	TRIANGULATION MARK
CP	CONCRETE PALING FENCE	LC	LEFT CREST	TOLPOST	TELEPHONE (BSL) WALPOST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CV	CATCH VALVE, MANHOLE	LB	LOCKABLE BOLLARD	TP	TELEGRAPH POLE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	TW	THRESHOLD (STAC)
DK	DROP KERB	MK	MARKOUT	TL	TRAFFIC LIGHT
D	DOWN PIPE	MP	MOORING POST	TLB	TRAFFIC LIGHT BOX
D	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DW	DOG WASTE BIN	NB	NOTICE BOARD	TS	TRAFFIC SIGNAL
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRIC BOX	OB	OBSERVATION BOX	VS	VERTICAL SIGN, SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EOP	ELECTRICITY CABLE PIT	OOR	OPEN STEEL RAILINGS	WM	WATER METER
EP	ELECTRICITY PYLON	P	POST	WMF	WIRE MESH FENCE
LP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
EN	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PP	PIPE	WS	WOODEN STILE
FG	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to DI survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E40730012	TR 0103 4107	35.975
E40730401	TR 0149 4253	35.787
E40730403	TR 0222 4027	35.489
E40731536	TR 0666 3814	51.806
E40730013	TR 0132 4202	38.489
E40730020	TR 0129 4061	36.314
E40730021	TR 0159 4291	36.337
E40730500	TR 0323 4026	38.456
E40731495	TR 0152 4070	37.864
E40731496	TR 0128 4199	37.717
E40731938	TR 0691 3242	62.022
E40731971	TR 0666 3811	52.072
E40733004	TR 0594 3900	53.715
E40733005	TR 1054 3751	42.647
E40731483	TR 0757 4070	32.916
E40731484	TR 0133 4200	37.463
E40731539	TR 0671 3828	52.251

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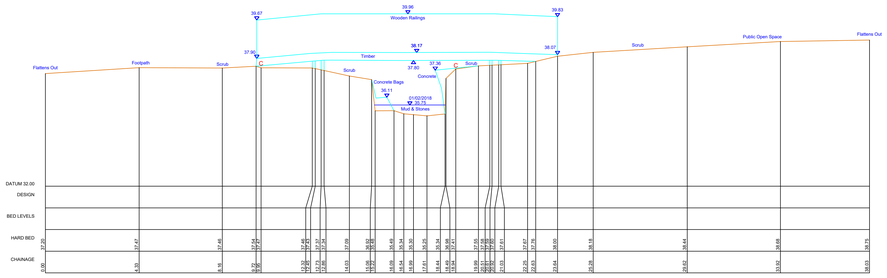
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

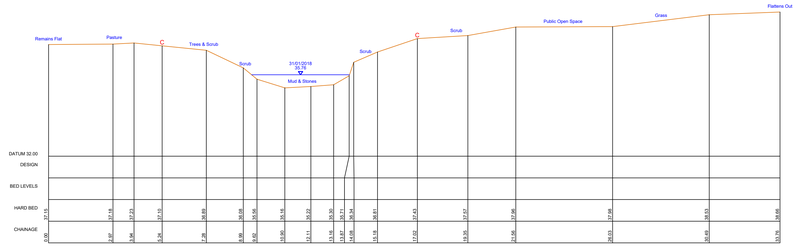
SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_02705 TO EST001_03202

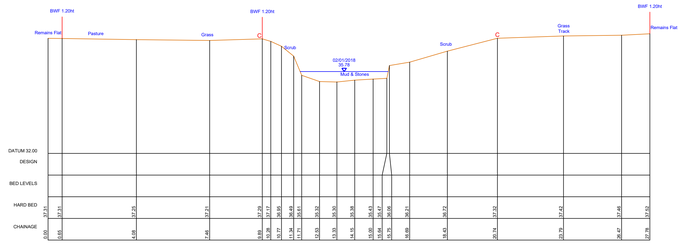
SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_132	
SURVEY DATE: DECEMBER 2017 - MARCH 2018			
SCALE: 1:100	DRN: RC	CHKD: ITS	
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18	
GRID: NATIONAL GRID	DRAWING NO.	REV.	
CAD FILENAME: X-J01058-07-X.dwg	X-J01058-07	—	



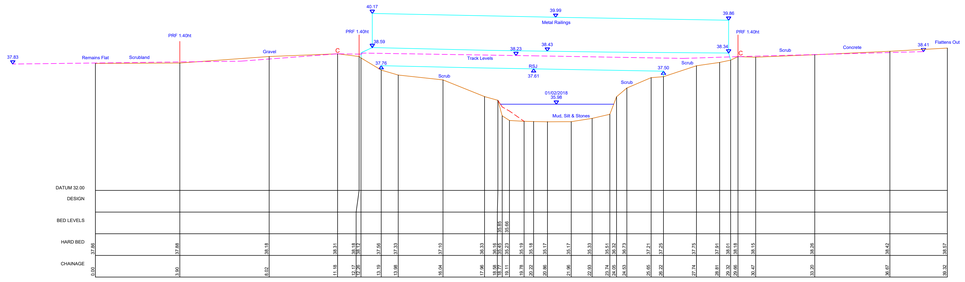
ESTO01_03213
601986.99mE 140467.56mN Brg 39
Footbridge
Tunnel Length = 2.89m



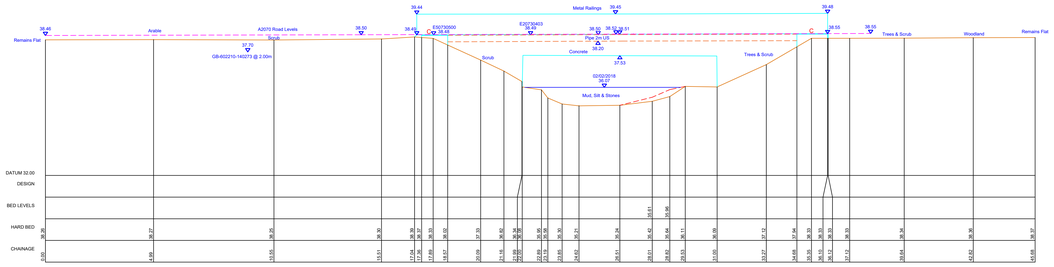
ESTO01_03219
601995.56mE 140468mN Brg 36
Open Channel



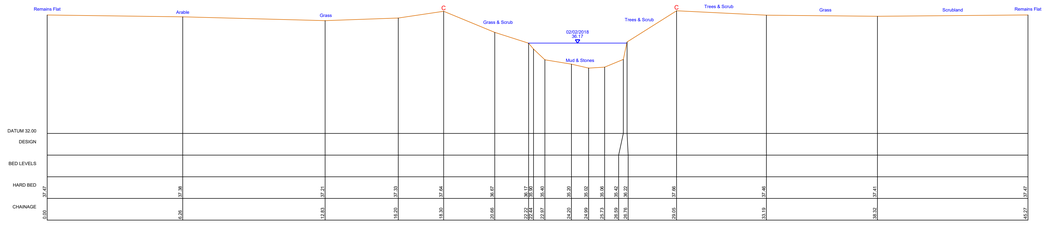
ESTO01_03373
602107.65mE 140373.92mN Brg 54
Open Channel



ESTO01_03495
602185.42mE 140283.38mN Brg 45
Access Bridge
Tunnel Length = 3.24m

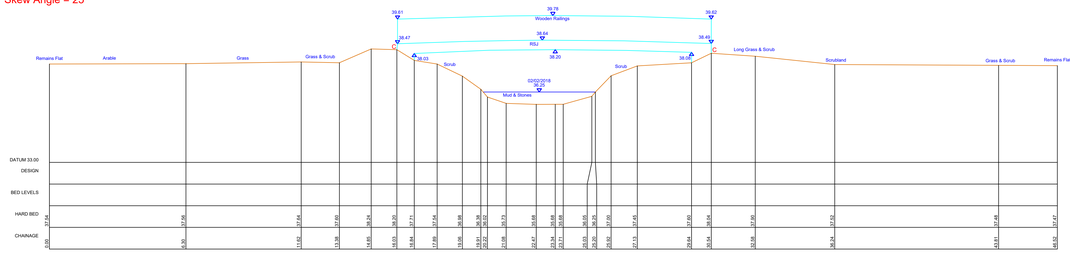


ESTO01_03551
602203.75mE 140247.99mN Brg 83
A2070 Road Bridge
Tunnel Length = 28.36m
Skew Angle = 25°

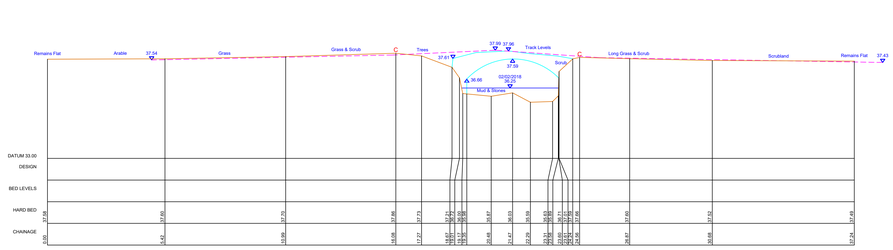


ESTO01_03579
602227.18mE 140215.04mN Brg 56
Open Channel

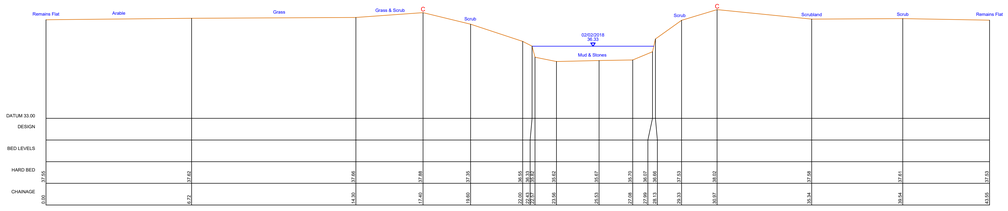
Skew Angle



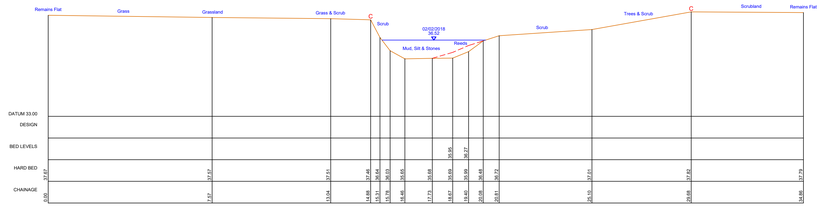
ESTO01_03640
602239.66mE 140162.17mN Brg 66
Footbridge
Tunnel Length = 1.12m



ESTO01_03645
602243.2mE 140158.26mN Brg 67
Access Bridge
Tunnel Length = 3.79m



ESTO01_03704
602276.15mE 140099.23mN Brg 41
Open Channel



ESTO01_03809
602337.75mE 140043.63mN Brg 82
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PM	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
BH	BOREHOLE	FL	FLOOD LEVEL	RC	RECTANGULAR
BL	BOLLARD, BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BM	BENCH MARK	G	GATE	SAP	SANITARY APPL.
BL	BED LEVEL	GB	GRATEBOARD	SP	STOP VIEW
BRK	BRICKWORK	GL	GROUND LEVEL	STOP	STAND PIPE
BS	BOX SPAN	GM	GAS METER	SL	SOFFIT LEVEL
BW	BEACH WARP	GV	GAS VARVER	SL	SOFFIT LEVEL
BW	BRICK WALL	HB	HEAD BALL	SMH	SURFACE WATER MANHOLE
CHF	CHESTNUT PALING FENCE	HC	HEAD CHAMBER	SP	SOCKET FOR PALING
CHP	CLOSE BOARDED FENCE	L	INVERT LEVEL	SP	SIGN POST
CI	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	STN	STATION VALVE
CL	CHAIN LINK FENCE	JB	JUNCTION BOX FENCE	SV	SOIL VENT PIPE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LC	LEFT CREST	TBM	TEMPORARY BENCH MARK
CHF	CHESTNUT PALING FENCE	LC	LEFT CREST	TELPOL	TELEPHONE CALL BOX/POST
CS	CYCLE SIGN	LV	LAMP MAST	TC	TELECOM CABINET
CVL	CABLE TV MANHOLE	LB	LAMP MAST BOLLARD	TCB	TELEPHONE CABINET
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DECK VIEW	MP	MARKER POST	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MVB	MAGNETIC VALVE BOX	TLB	TRAFFIC LIGHT BOX
DP	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DOWNPIPE COURSE	MR	METAL RAILING FENCE	TR	TRAFFIC LIGHT STAMP
DPR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DR	DOOR VIEW	NB	NATIONAL BOUNDARY	TSF	TRIPLE STEEL RAILINGS
DN	DOWNNGLE BUOACY	NRA	NATIONAL RIVERS AUTHORITY	UB	UPSIDE BOX
ES	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTL	UNABLE TO SURVEY
ESF	ELECTRICITY BOX FENCE	OP	OPEN PIPE (DIAMETER)	VL	VERTICAL LIGHT/WATER LINE
ELF	ELECTRICITY CABLE RT	OSF	OPEN STEEL RAILINGS	WA	WATER ANTENA
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POST	PB	PARKING BOX	WP	WOODEN POST
E	EARTHING BOX	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIRE BELL	PR	PALING & RAIL FENCE	WM	WELL MARKER
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to GI survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	32.757
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	38.337
E20730500	TR 0223 4525	38.486
E20730503	TR 0343 3935	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731571	TR 0666 3813	50.975
E20733004	TR 0504 3900	43.712
E20733005	TR 1056 3751	60.987
E20731483	TR 0151 4070	35.916
E20731484	TR 0133 4200	37.463
E20731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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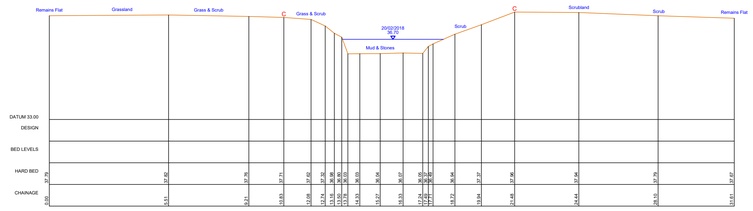
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

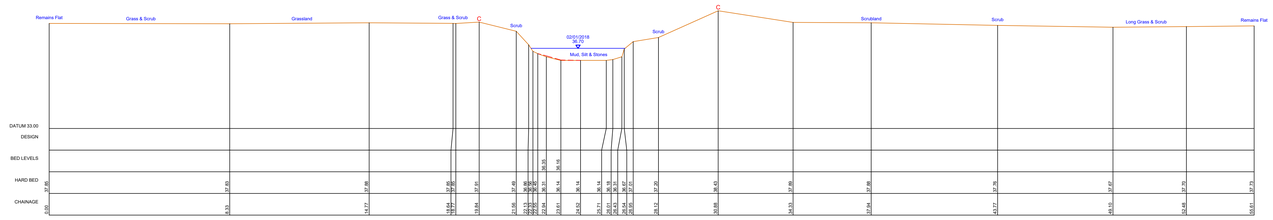
SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_03213 TO EST001_03809

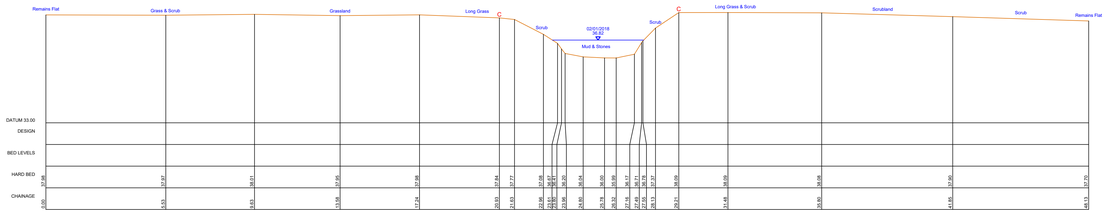
SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_152	
SURVEY DATE: DECEMBER 2017 - MARCH 2018			
SCALE: 1:100	DRN: RC	CHKD: ITS	
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18	
GRID: NATIONAL GRID	DRAWING NO. X-J01058-08		REV. --
CAD FILENAME: X-J01058-01-30.dwg			



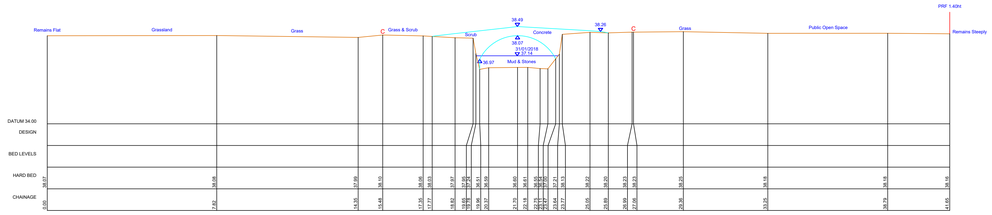
ESTO01_03880
602424.73mE 140010.01mN Brg 316
Open Channel



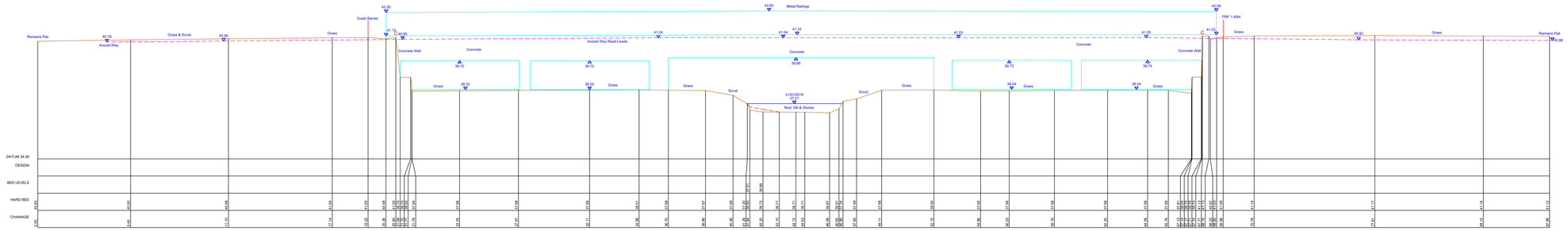
ESTO01_03989
602516.71mE 140028.58mN Brg 318
Open Channel



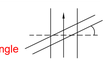
ESTO01_04093
602568.44mE 140082.82mN Brg 353
Open Channel

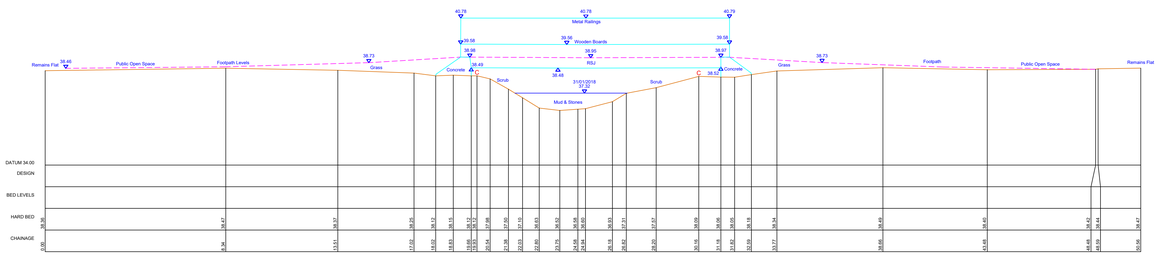


ESTO01_04220
602626.1mE 140024.93mN Brg 64
Access Bridge
Tunnel Length = 3.69m

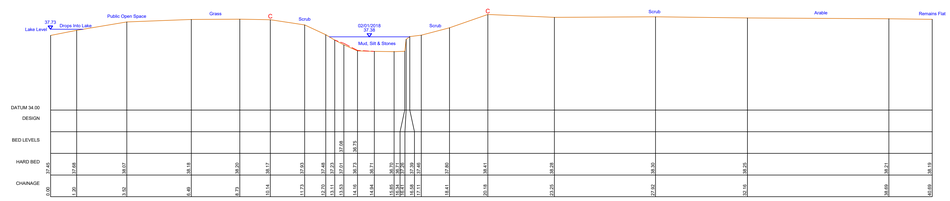


ESTO01_04269
602644.73mE 139952.42mN Brg 30
Avocet Way Road Bridge
Tunnel Length = 17.42m
Skew Angle = 35°

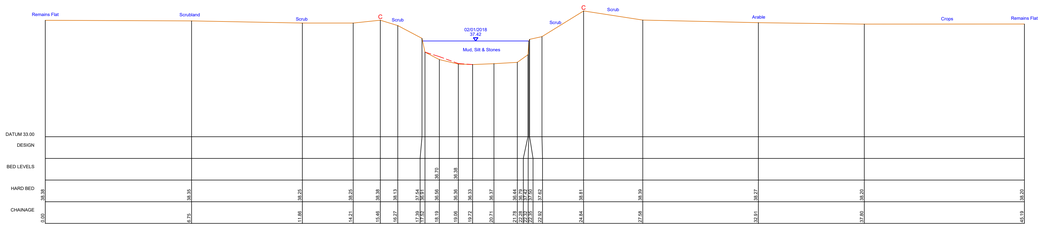




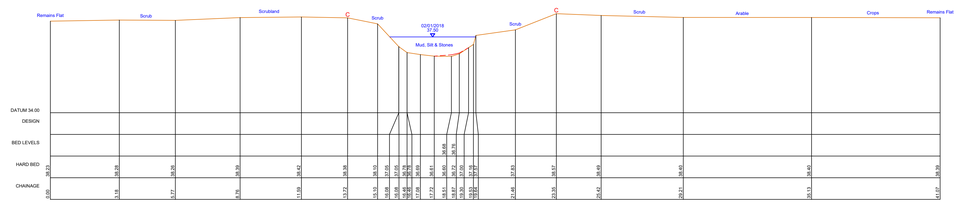
ESTO01_04316
602665mE 139929.58mN Brg 45
Footbridge
Tunnel Length = 3.00m



ESTO01_04407
602692.45mE 139891.45mN Brg 46
Open Channel



ESTO01_04480
602751.53mE 139834.82mN Brg 18
Open Channel



ESTO01_04624
602793.84mE 139758.08mN Brg 16
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE. © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
B	BOLLARD	FM	FLOW METER / MARKER	R	RIVER GAUGE
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELGIAN BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BH	BOREHOLE	FRM	FIRE REMOTE MANHOLE	RM	RAINWATER MH
BH	BOREHOLE	G	GULLY	RMP	RAINWATER PIPE
BL	BED LEVEL	GD	GAUGEBOARD	SC	STOP COCK
BM	BENCHMARK	GI	GRATED INLET	SC	SERVICE COCK
BS	BLIC STOP	GP	GATE POST	SK	SOAKAWAY
BW	BEACH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
CB	CATCH BASIN	GV	GAS VALVE	SMH	SHEET METAL MANHOLE
BWF	BARBED WIRE FENCE	C	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CBF	CLOSE BOARDED FENCE	I	INVERT LEVEL	SP	SIGN POST
CLF	CHAIN LINK/WIRE FENCE	INF	IRON RAILING FENCE	STN	STATION MARK
CL	COVER LEVEL	IF	JOINERS FENCE	SL	SLUICE LEVER
CONC	CONCRETE FENCE	KF	KICKING FENCE	SW	SHEET WIRE FENCE
CP	CONCRETE PIPE	KG	KERB GULLY GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE PALING FENCE	LE	LEFT EDGE	TM	TRIANGULATION MARK
CR	CYCLE RACK	LP	LAMP POST	TELPOL	TELEPHONE BOX / WALPOST
CV	CATCH PIT / MANHOLE	LV	LEVER / BOLLARD	TC	TELECOM CABINET
CUL	CULVERT	MF	MISCELLANEOUS FENCING	TH	THROSHOLD (DOR)
DK	DROP KERB	MK	MARKOUT	TH	THRESHOLD (STAIR)
D	DOWN PIPE	MP	MOORING PILE	TL	TRAFFIC LIGHT
D	DOMESTIC	MP	MOORING PILE	TB	TELEPHONE BOX
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TP	TELEGRAPH POLE
EB	ELECTRIC BOX	NB	NOTICE BOARD	TRS	TIMBER RUBBING STRIP
EMB	DOG WASTE BIN	NS	NOTICE SIGNS	TS	TRAFFIC SIGNS
EN	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	TSR	TUBULAR STEEL RAILINGS
ESP	ELECTRIC SPUR	OB	OBSERVATION BOREHOLE	US	UPSTREAM
ESP	ELECTRIC CABLE PIPE	OS	ORDNANCE SURVEY	VT	VERIFICATION TO SURVEY
ESP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WL	WATER LEVEL/WATER LINE
EP	ELECTRICITY POLE	P	PIPE	WM	WATER METER
EP	ELECTRICITY POLE	PB	PILLAR BOX	WF	WIRE MESH FENCE
EN	EARTHING ROD	PM	PARKING METER	WPB	WOODEN POST
EN	EARTHING ROD / TRANSMISSION LINE	PP	PIPE	WPR	WOODEN POST & RAIL FENCE
FB	FLOWER BED	POST & RAIL FENCE	PRF	WS	WIND SOCK
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	YG	YARD GULLY
					(Abbreviations apply to DI survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E40730012	TR 0103 4107	35.975
E40730401	TR 0149 4253	35.287
E40730433	TR 0222 4027	35.489
E40731536	TR 0666 3814	51.806
E40730013	TR 0132 4202	38.489
E40730020	TR 0139 4061	36.314
E40730021	TR 0139 4239	36.332
E40730500	TR 0323 4025	38.456
E40731495	TR 0142 4070	37.864
E40731496	TR 0126 4189	37.717
E40731938	TR 0691 3242	62.022
E40731071	TR 0566 3813	60.075
E40733004	TR 0594 3900	53.712
E40733005	TR 1054 3751	42.647
E40731483	TR 0151 4070	38.916
E40731484	TR 0133 4200	37.463
E40731539	TR 0671 3828	52.251

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KENT & SOUTH LONDON REGION

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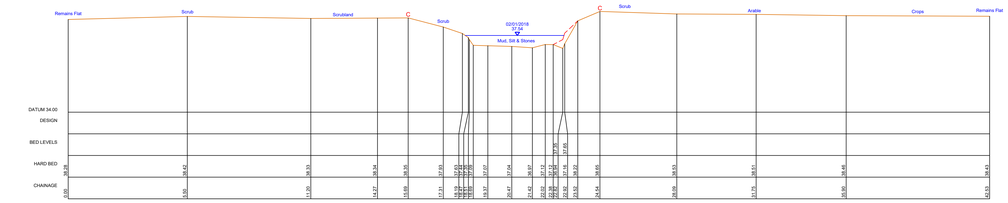
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

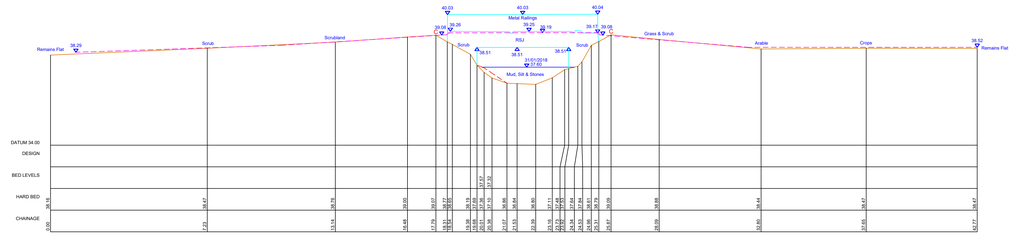
SITE/LIMITS

EAST STOUR (ESTO01)
CROSS SECTIONS
ESTO01_03880 TO ESTO01_04624

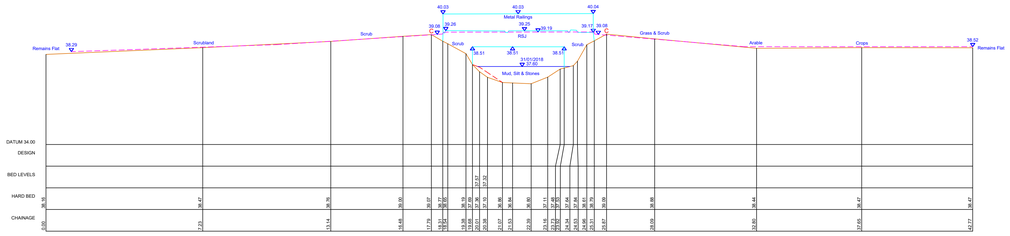
SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332
SURVEY DATE: DECEMBER 2017 – MARCH 2018		
SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO.	REV.
CAD FILENAME: X-J01058-01-30.dwg	X-J01058-09	–



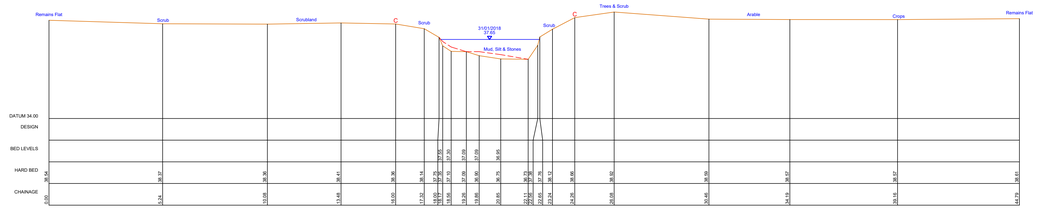
ESTO01_04717
602826.33mE 139713.92mN Brg 31
Open Channel



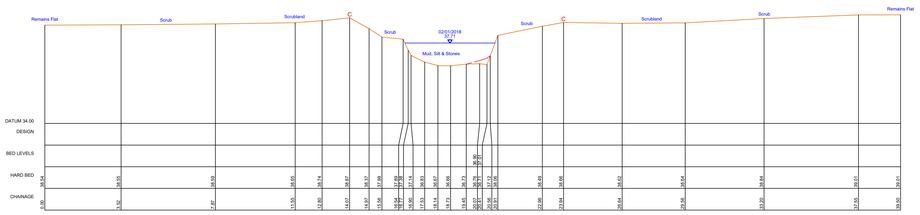
ESTO01_04735
602843.61mE 139702.98mN Brg 24
Footbridge
Tunnel Length = 4.02m



ESTO01_04738
602847.64mE 139703mN Brg 23
Footbridge
Tunnel Length = 0.88m



ESTO01_04804
602916.24mE 139682.68mN Brg 360
Open Channel



ESTO01_04907
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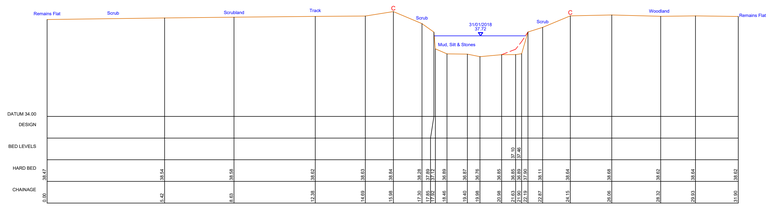
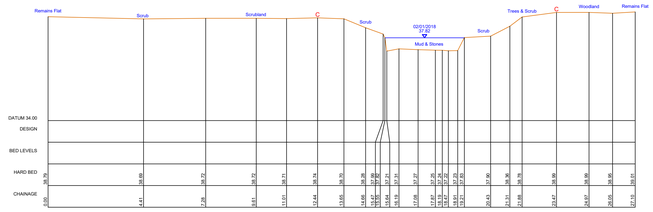
Open Channel



ESTO01_05008
603077.68mE 139597.7mN Brg 39
Open Channel



ESTO01_05114
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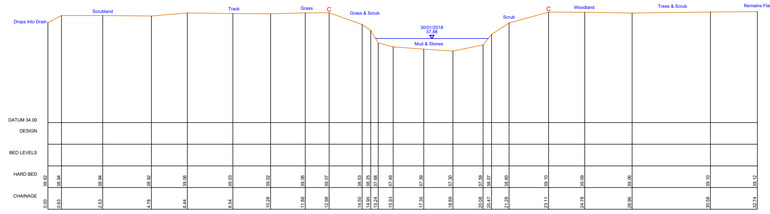
Open Channel



ESTO01_05214
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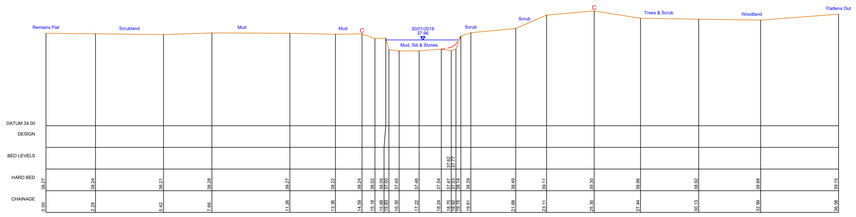
Open Channel



ESTO01_05304
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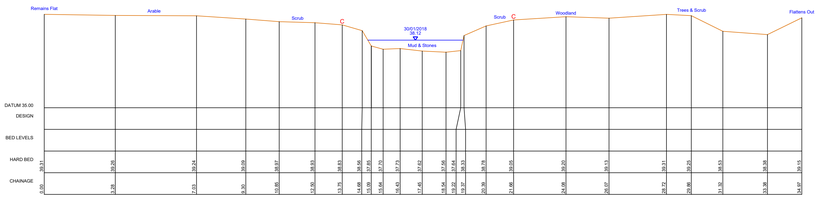
Open Channel



ESTO01_05397
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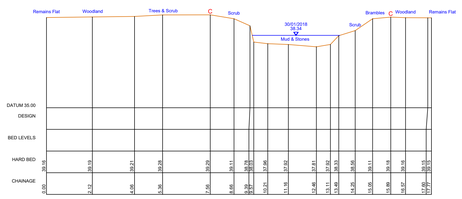
Open Channel



ESTO01_05496
603408.01mE 139371.32mN Brg 41
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHW	FIRE HYDRANT MARKER	RB	RIGHT BANK
BH	BOREHOLE	FL	FLAG POLE	RC	RECTANGULAR CULVERT
BS	BULLISH BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BLD	BUILDING	G	GATE	SBP	SINGLE BARRIER POST
BL	BED LEVEL	GB	GRASSBANK	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SCP	STAND PIPE
BM	BENCH MARK	GO	GAS OUTLET	SP	SIGNPOST
TM	BEACH MARK	GM	GAS MARKER	SL	SUPPLY LEVEL
BMP	BARRIER POST	H	HYDRANT	SMH	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SMP	SLATE METAL PILING
CHF	CLOSE BOARDED FENCE	L	MARKER LEVEL	SP	SIGN POST
CI	CAST IRON PIPE / IRON FENCE	LF	LOW FENCE / FENCE	SV	SLUICE VALVE
CY	COVER LEVEL	MF	INTERMEDIATE FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	MH	MANHOLE COVER	TBM	TEMPORARY BENCH MARK
CP	CONCRETE POST	OG	KERB OR GULLY GULLY	VMF	VARIOUS METAL FENCE
CP	CONCRETE POST	LE	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CONCRETE PALISADE FENCE	LP	LAMP POST	TELP	TELEGRAPH POLE/POST
CY	CYCLE RACK	LV	LAMP POST	TF	TELECOM FIBRES
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
DA	DRAIN ARROW	MF	MESH OR UNCLASSIFIED FENCING	TL	TELEGRAPH LEVEL
DR	DROP KERB	MT	MARKER	TP	TRAFFIC LIGHT
D	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DP	DRAIN POINT	MP	METAL PARTITION FILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TSS	TIMBER RUBBERS STOP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
EB	ELECTRIC BOX	NG	NATIONAL GRID	TSR	TIMBER STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	LS	LIFTSHAFT
ES	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
ECP	ELECTRICITY CONCRETE POST	OHL	OVERHEAD TELEPHONE LINE	WL	WATER LEVEL/WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WB	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMP	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
EX	EARTHING AUDIT	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	POST	POST	WV	WATER VALVE
FB	FIBRE BOX	PR	POST & RAIL FENCE	WV	WATER VALVE
FBB	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations equals to OS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0661 3814	51.606
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	36.337
E20730000	TR 0223 4020	38.486
E20730503	TR 0343 3936	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0667 3791	47.711
E20731538	TR 0671 3842	63.022
E20731971	TR 0666 3813	50.978
E20733004	TR 0504 3900	43.347
E20733005	TR 1096 3791	60.667
E20731483	TR 0151 4070	35.916
E20731494	TR 0133 4200	37.863
E60731539	TR 0671 3828	52.251

Environment Agency
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PROJECT/WATERCOURSE
EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS
EAST STOUR (ESTO01)
CROSS SECTIONS
ESTO01_04717 TO ESTO01_05496

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332
SURVEY DATE: DECEMBER 2017 – MARCH 2018		
SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-10	REV. —
CAD FILENAME: X-J01058-01-30.dwg		

Original Drawing Size: A0

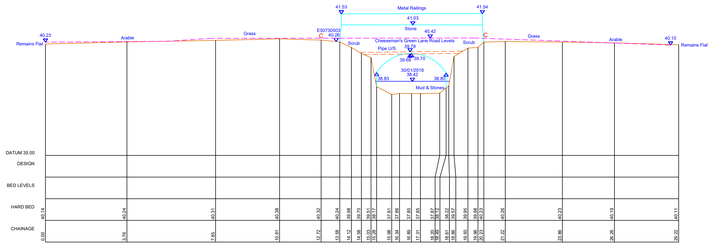
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

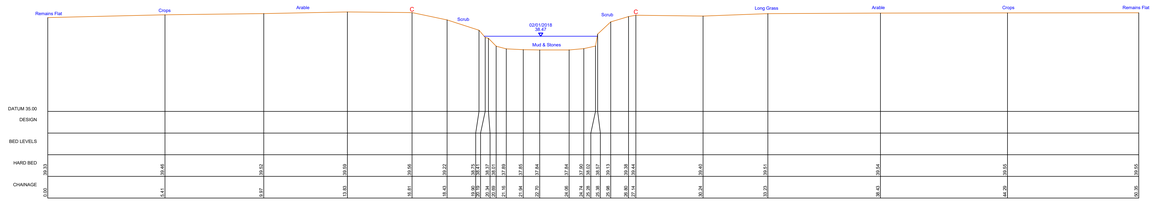
KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

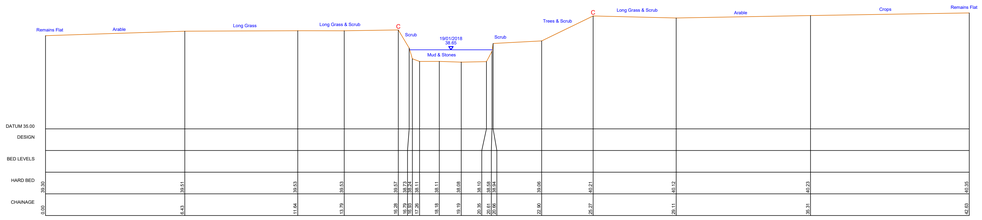
} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS



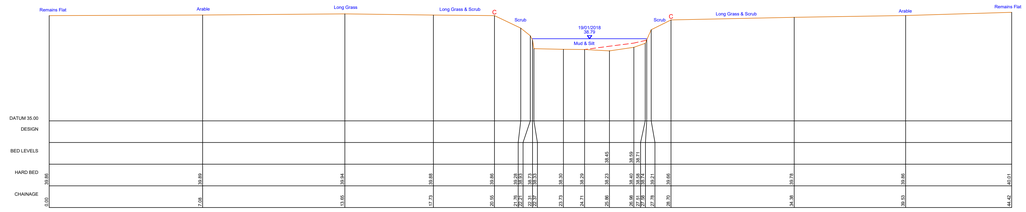
ESTO01_05532
603433.35mE 139344.64mN Brg 37
Cheeseman's Green Lane Road Bridge
Tunnel Length = 6.66m



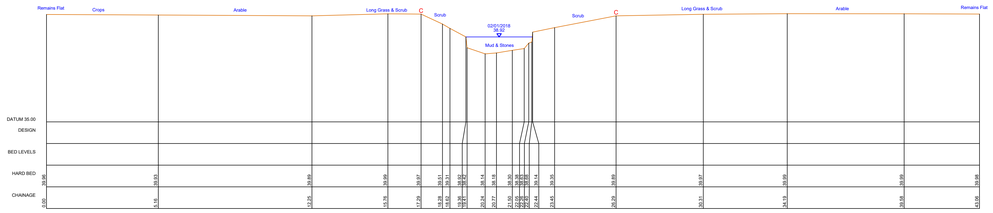
ESTO01_05545
603447.16mE 139337.31mN Brg 21
Open Channel



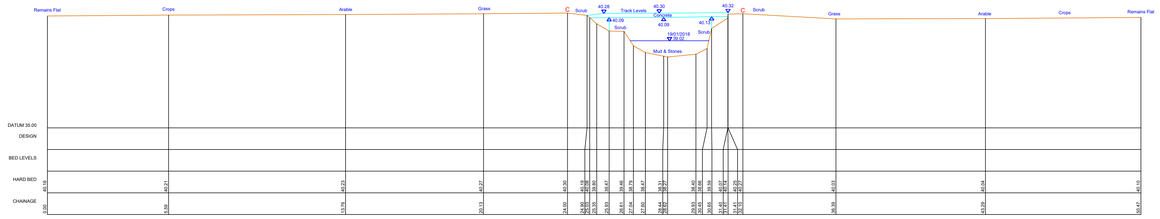
ESTO01_05701
603565.78mE 139302.6mN Brg 29
Open Channel



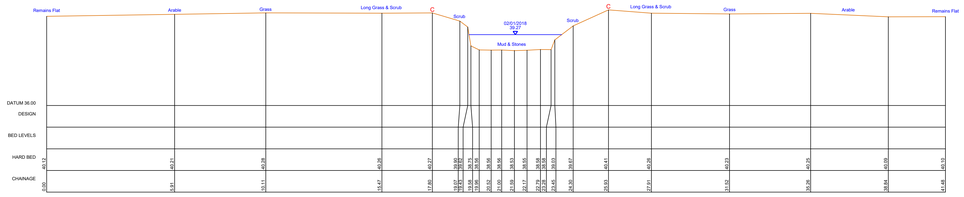
ESTO01_05810
603650.6mE 139248.34mN Brg 10
Open Channel



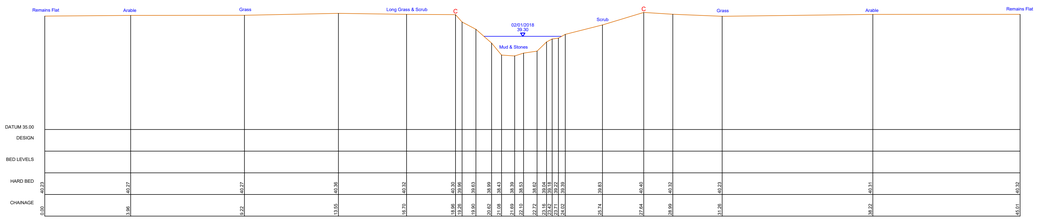
ESTO01_05900
603693.52mE 139266.37mN Brg 100
Open Channel



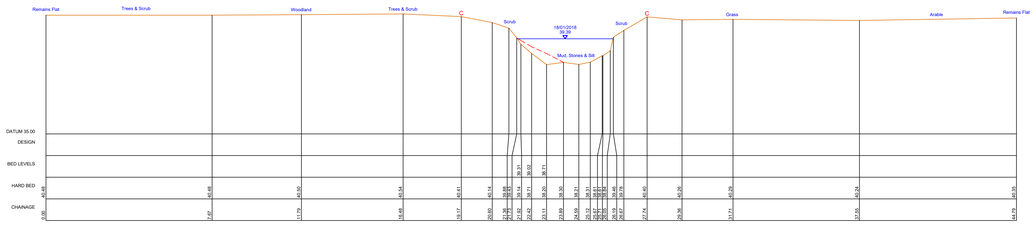
ESTO01_06009
603774.16mE 139210.72mN Brg 32
Access Bridge
Tunnel Length = 3.84m



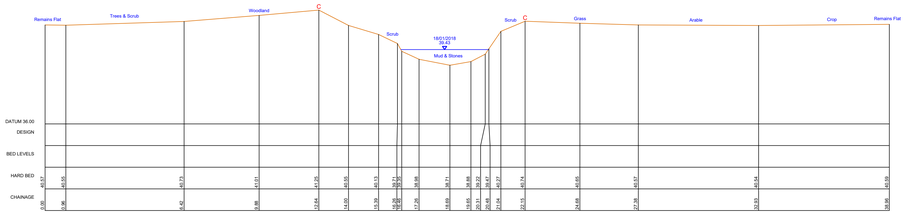
ESTO01_06092
603752.67mE 139168.23mN Brg 100
Open Channel



ESTO01_06177
603732.16mE 139080.8mN Brg 77
Open Channel



ESTO01_06303
603793.36mE 138981.13mN Brg 27
Open Channel



ESTO01_06393
603867.82mE 138960.82mN Brg 50
Open Channel

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PM	PARAPET WALL
AV	AIR VALVE	FM	FIRE MAINS MARKER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BE	BOTTOM OF BEACON	FP	FENCE POST	RJ	RIGHT SIDE OF JOIST
BH	BOUGHROW	FWM	FECAL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BM	BENCH MARK	GB	GRAVEL BOARD	SA	SOAKAWAY
BRK	BRICKWORK	GL	GROUND LEVEL	SCP	STAND PIPE
BS	BLIX STOP	GP	GATE POST	SK	SOAKWAY
BS	BUTTERFLY SPARK	GR	GRATED DRAIN	SP	SIGN POST
BW	BRICK WALL	HM	HUGE MAUL	SW	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SWP	SHEET METAL PILING
CF	CHAIN LINK FENCE	IL	INVERT LEVEL	TC	TOP OF CREST
CF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	CVR	COVERS
CL	COVER LEVEL	INF	INTERMEDIN FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	K	KERB STONE	TBM	TEMPORARY BENCH MARK
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LB	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CONCRETE PANEL FENCE	LC	LEFT CREST	TEL	TELEPHONE / TELEGRAPH POST
CR	CYCLE RACK	LJ	LAMP POST	TF	TELEGRAM CABINET
CTV	CABLE TV MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
DF	DRAIN FOOT	MF	MESH PALISADED FENCING	TP	TELEGRAPH POLE
DK	DROP KERB	MJ	MARKED JOINT	TL	TRAFFIC LIGHT
DL	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DP	DOWN PIPE	MP	MILEPOST PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DS	DOWN SPOUT	MS	MOORING STAKE	TS	TIMBER STAKE
DWB	DOG WASTE BIN	N	NOSE DAMP	TSR	TIMBER STEEL RAILINGS
E	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	UL	UPSTREAM LEVEL
EB	ELECTRIC BOX	OA	ORDNANCE DATUM	US	UNDERSIDE SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EGF	ELECTRICAL GUARD FF	PSR	PRESS STEEL RAILINGS	WM	WATER METER
ELC	ELECTRICAL CABLE	P	POST	WMB	WATER MAIN BUTTERFLY
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ET	ELECTRIC TOWER	PM	PARKING METER	WR	WOODEN RAIL & RAIL FENCE
EL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBI	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to 3d survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	38.567
E20730403	TR 0222 4027	38.459
E20731036	TR 0666 3814	41.805
E20730013	TR 0139 4202	38.489
E20730201	TR 0129 4081	38.414
E20730002	TR 0129 4291	38.337
E20730003	TR 0224 4040	38.956
E20731495	TR 0152 4070	37.884
E20731496	TR 0128 4199	37.737
E20731236	TR 0091 3941	41.717
E20731239	TR 0666 3814	50.976
E20731204	TR 0504 3920	43.919
E20730005	TR 1056 3751	60.587
E20731483	TR 0151 4070	36.916
E20731484	TR 0133 4200	37.463
E20731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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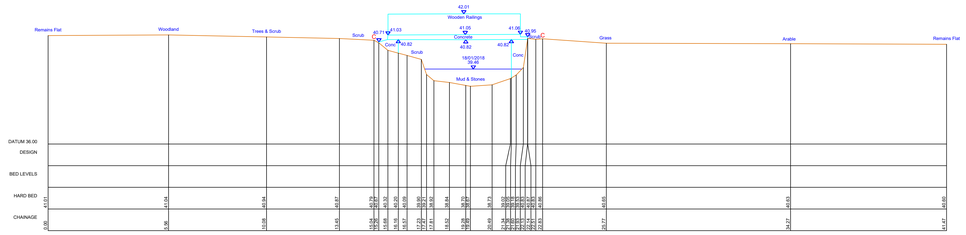
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

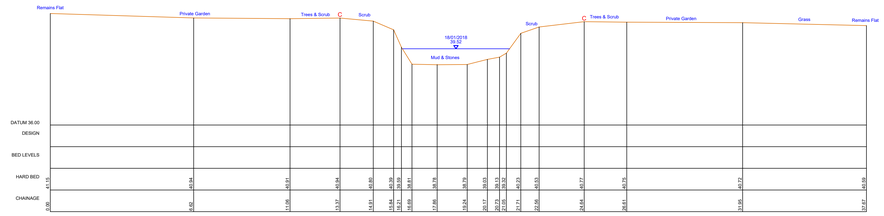
SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_05532 TO EST001_06393

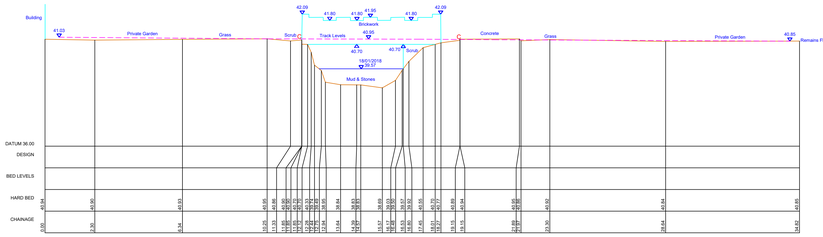
SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332	
SURVEY DATE: DECEMBER 2017 – MARCH 2018			
SCALE: 1:100	DRN: RC	CHKD: ITS	
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18	
GRID: NATIONAL GRID	DRAWING NO. X-J01058-11		REV. –
CAD FILENAME: X-J01058-01-30.dwg			



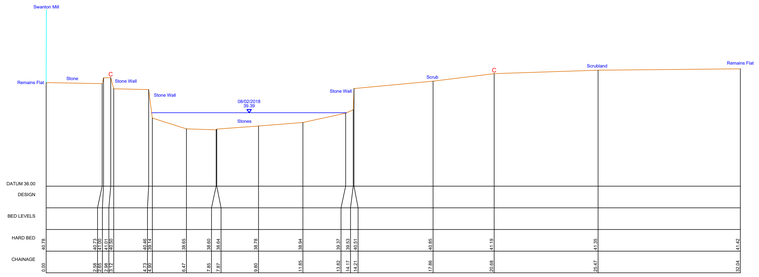
ESTO01_06443
603896.67mE 138929.83mN Brg 54
Footbridge
Tunnel Length = 0.46m



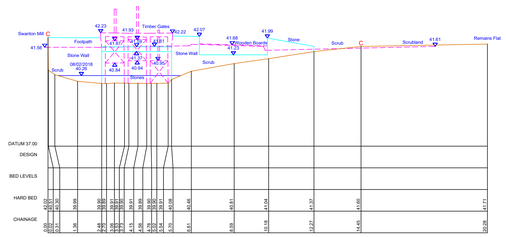
ESTO01_06489
603881.83mE 138903.75mN Brg 95
Open Channel



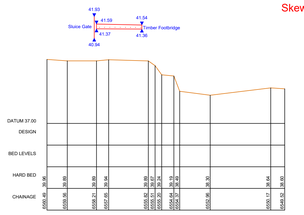
ESTO01_06503
603886.5mE 138893.88mN Brg 113
Footbridge
Tunnel Length = 2.83m
Skew Angle = 20°



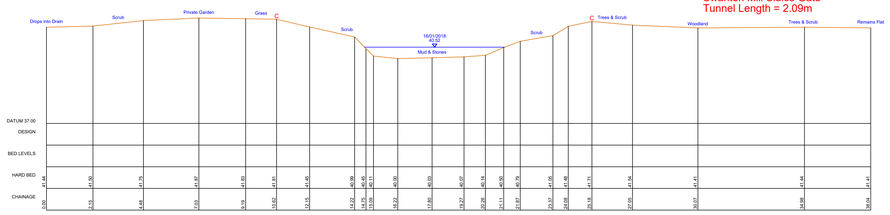
ESTO01_06550
603889.69mE 138850.16mN Brg 132
Open Channel



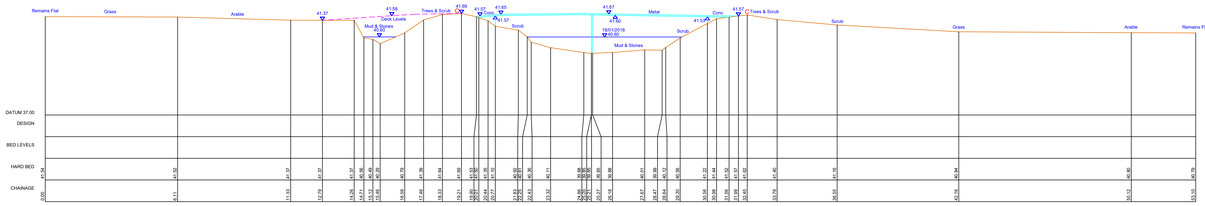
ESTO01_06558
603886.62mE 138841.11mN Brg 131
Swanton Mill Sluice Gate
Tunnel Length = 2.09m



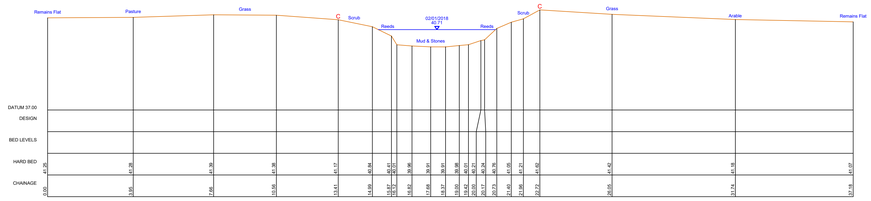
Through Section ESTO01_06558
Swanton Mill Sluice Gate



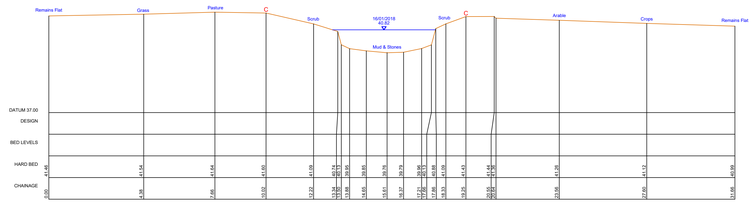
ESTO01_06591
603896.12mE 138796.5mN Brg 31
Open Channel



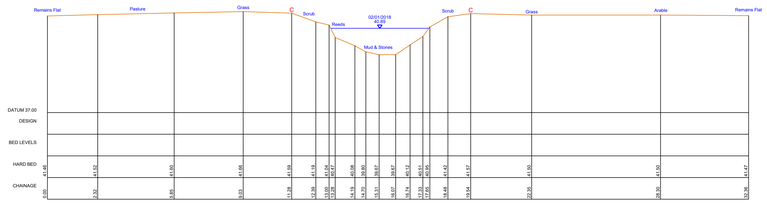
ESTO01_06670
603983.29mE 138774.17mN Brg 359
Dilapidated Access Bridge
Tunnel Length = 2.27m



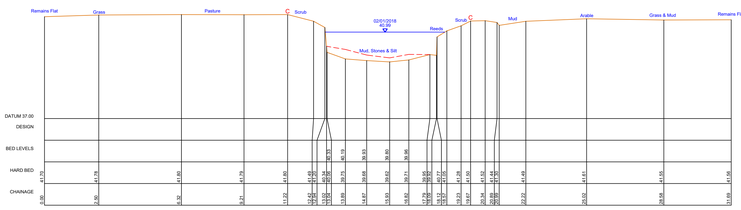
ESTO01_06810
604116.42mE 138833.12mN Brg 324
Open Channel



ESTO01_06916
604195.62mE 138872.97mN Brg 342
Open Channel



ESTO01_07016
604291.07mE 138910.06mN Brg 333
Open Channel



ESTO01_07119
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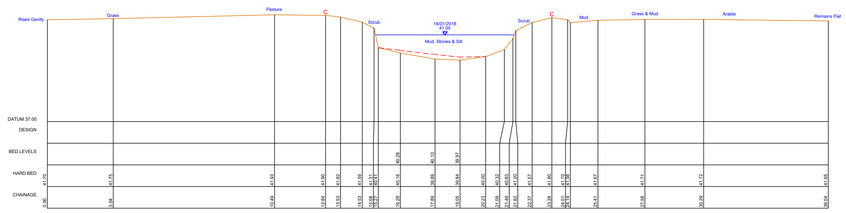
Open Channel



ESTO01_07212
604467.12mE 138969.56mN Brg 328
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PM	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
BA	BUS ARRIVAL	FL	FENCE LINK	RC	RIGHT CROSS
BB	BULLISH BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GATE	RW	RAINWATER PIPE
BL	BILL LEVEL	GB	GRATEBOARD	SA	STAY ANCHOR
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BUS STOP	GM	GAS METER	SE	SOFFIT LEVEL
BW	BEACH WARP	GM	GAS MARKER	SL	SOFFIT LEVEL
BM	BRICK WALL	HB	HEAD WALL	SMH	SURFACE WATER MANHOLE
CBM	CONCRETE BRIDGE	HC	HOT WATER CHAMBER	SP	SIGN POST / PLINC
CHF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CF	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	STN	STATION
CH	CHAINAGE	JB	JUNCTION BOX	SV	SOIL VENT PIPE
CLF	CHAIN LINK FENCE	JE	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LC	LEFT CROSS	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LJ	LEFT SKEW	TELP/OP	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CV	CABLE TV MANHOLE	LV	LOCKABLE BOLLARD	TCB	TRAFFIC CONTROL BOX
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DECK LEVEL	MH	MANHOLE	TL	TRAFFIC LIGHT
DP	DROP KERB	MKB	MARKER BOLLARD	TLB	TRAFFIC LIGHT BOX
DP	DOWNPIPE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPF	DOUBLE STRUT COURSE	MPF	MOORING PALING FENCE	TR	TRAFFIC ROAD SIGNP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
EB	ELECTRIC BOX	NB	NATIONAL BOUNDARY	TSR	TUBULAR STEEL RAILINGS
EHW	EXCHEQUER MUSCH	NRA	NATIONAL RIVERS AUTHORITY	UB	UTILITIES BOX
ES	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTL	UNABLE TO SURVEY
ESF	ELECTRICITY BARBED FENCE	OP	OPEN STEEL RAILING	WL	WATER LEVEL / WATER LINE
ESF	ELECTRICITY CABLE RT	OSR	OPEN STEEL RAILING	WM	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRIC POLE / POST	PB	PILLAR BOX	WP	WOODEN POST
E	EARTHING BOLT	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIBRE BOX	PR	PARKING & RAIL FENCE	WR	WIRE & RAIL FENCE
FBB	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to OS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.757
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	36.337
E20730500	TR 0223 4025	38.486
E20730503	TR 0343 3936	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731571	TR 0666 3813	50.975
E20733004	TR 0504 3900	43.712
E20733005	TR 1056 3721	60.587
E20731483	TR 0151 4070	35.916
E20731484	TR 0133 4200	37.463
E20731539	TR 0671 3828	52.251

Environment Agency
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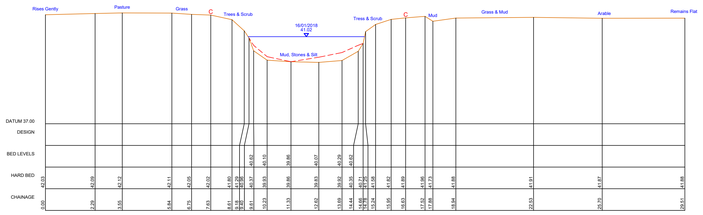
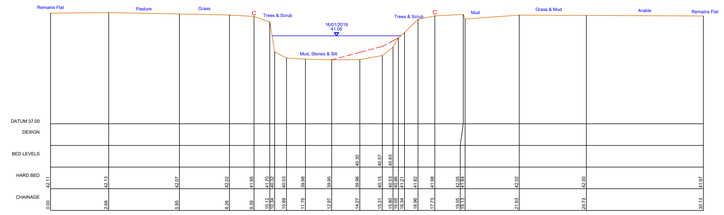
PROJECT/WATERCOURSE
EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS
EAST STOUR (EST001)
CROSS SECTIONS
EST001_06443 TO EST001_07212

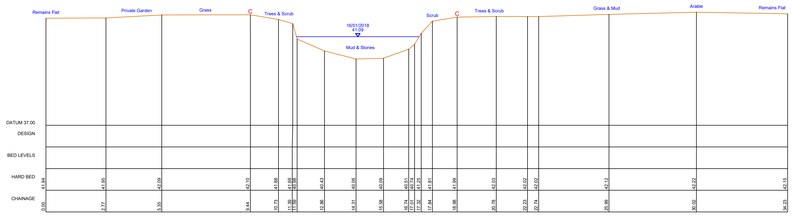
SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_152
SURVEY DATE: DECEMBER 2017 - MARCH 2018		
SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-12	REV. --
CAD FILENAME: X-J01058-01-30.dwg		



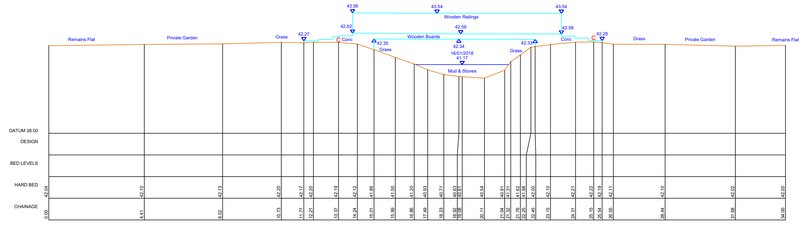
ESTO01_07310
604534.44mE 138979.21mN Brg 15
Open Channel



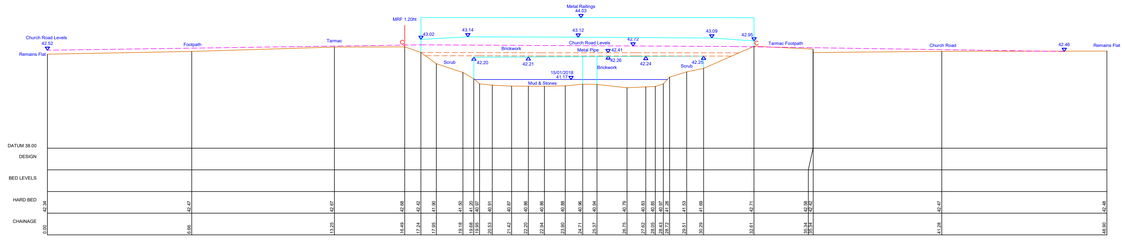
ESTO01_07416
604633.97mE 138983.07mN Brg 29
Open Channel



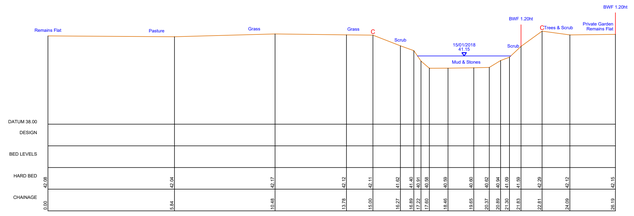
ESTO01_07513
604716.71mE 138972.35mN Brg 306
Open Channel



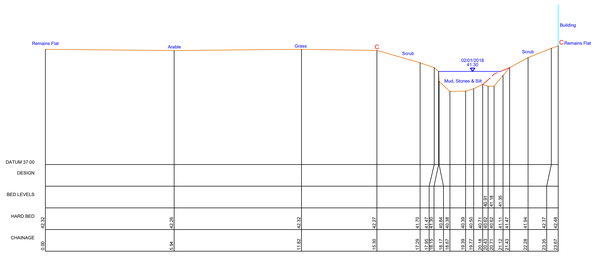
ESTO01_07572
604739.82mE 139016.46mN Brg 330
Footbridge
Tunnel Length = 0.86m



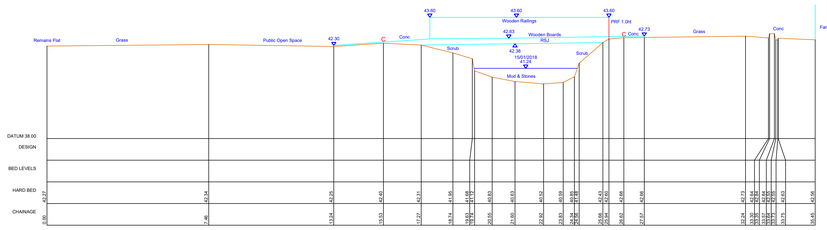
ESTO01_07600
604751.12mE 139016.01mN Brg 13
Church Road Bridge
Tunnel Length = 6.06m



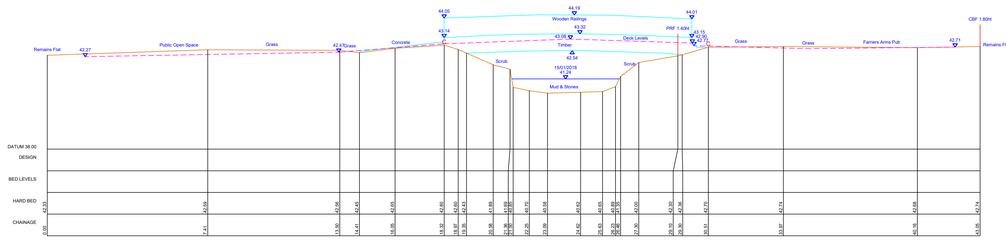
ESTO01_07611
604775.54mE 139029.42mN Brg 329
Open Channel



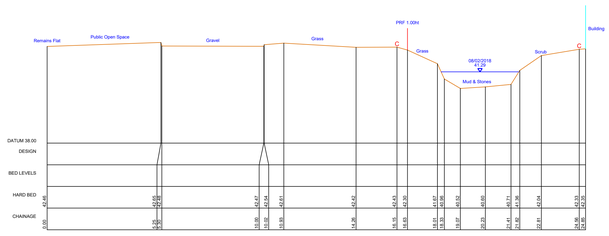
ESTO01_07716
604859.11mE 139059.32mN Brg 4
Open Channel



ESTO01_07765
604916.22mE 139070.08mN Brg 324
Footbridge
Tunnel Length = 1.09m



ESTO01_07779
604915.42mE 139067.22mN Brg 4
Footbridge
Tunnel Length = 2.10m



ESTO01_07792
604927.17mE 139070.26mN Brg 8
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE. © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
BH	BOREHOLE	FL	FLAG POLE	RC	RAILWAY CROSS
BR	BOLLARD BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BSY	BOUNGANY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BT	BUSH TRUNK	G	GATE	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GRASSBANK	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SOP	STAND PIPE
BS	BOREHOLE SITE	GO	GAS VALVE	SP	SIGN POST
BM	BENCH MARK	GM	GAS MARKER	SL	SUPPLY LEVEL
BWP	BARBED WIRE	GR	GRATING	SMH	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	H	HEADWALL CHAMBER	SMP	SLATED METAL PILING
CBF	CLOSE BOARDED FENCE	HP	HAND PUMP	SP	SIGN POST
CLF	CHAIN LINK FENCE	IL	INVERT LEVEL	SV	SLUICE VALVE
CT	CHAIR LIFT	INF	INTERCEPTOR FENCE	SV	SLICE VALVE
CWF	CONCRETE FENCE	JB	JUNCTION BOX	TBF	TIMBER BARRIER
CP	CONCRETE POST	KG	KERB GULLY GULLY	THF	THICK WIRE FENCE
CPF	CONCRETE PANEL FENCE	LE	LEFT BANK	TBM	TEMPORARY BENCH MARK
CY	CYCLE RACK	LP	LAMP POST	TCP	TELEPHONE CABLE PILLPOST
CTV	CABLE TV. MANHOLE	LT	LAMP POST	TF	TELECOM CABINET
DA	DRAIN	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
DK	DROP KERB	MF	MOORING FENCING	TP	TELEPHONE POLE
DL	DECK LEVEL	MKR	MARKER	TR	TRAPPED GULLY
DP	DOWNPIPE	MKS	MARKER PILE	TLB	TRAPPED LIGHT BOX
DPC	DAMP PROOF COURSE	MP	METAL RAILING FENCE	TP	TELEPHONE POLE
DR	DORMETERM	MS	MILE STONE	TS	TIMBER RUBBING STRIP
EA	ENVIRONMENT AGENCY	NB	NATIONAL BOUNDARY	TS	TREE STUMP
EN	ENVIRONMENT AGENCY	NWA	NATIONAL RIVERS AUTHORITY	TSR	TUBE STEEL RAILINGS
ES	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UL	UPSTREAM
ESP	ELECTRICITY SUPPLY FENCE	OP	OPEN STEEL RAILING	UTS	UNABLE TO SURVEY
EUP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILING	WL	WATER LEVEL/WATER LINE
EMH	ELECTRICITY MANHOLE	P	PILE	WM	WATER METER
ET	ELECTRICITY TOWER	PB	PARKING BOX	WMF	WIRE MESH FENCE
EV	EARTHING ROD	PM	PARKING METER	WP	WOODEN POST
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WR	WOODEN POST & RAIL FENCE
FB	FIBRE BOX	PRF	PARKING & RAIL FENCE	WV	WATER VALVE
FBB	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	X	(Abbreviations apply to CS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0665 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	36.137
E20730000	TR 0223 4020	38.486
E20730503	TR 0343 3936	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731521	TR 0666 3813	50.978
E20733004	TR 0504 3900	43.175
E20733005	TR 1099 3731	60.047
E20731483	TR 0151 4070	35.916
E20731484	TR 0133 4200	37.463
E20731539	TR 0671 3828	52.251

Environment Agency

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_07310 TO EST001_07792

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332
SURVEY DATE: DECEMBER 2017 – MARCH 2018		
SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-13	REV. —
CAD FILENAME: X-J01058-01-3D.dwg		

Original Drawing Size: A0

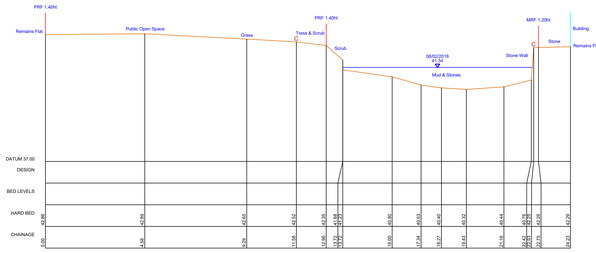
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

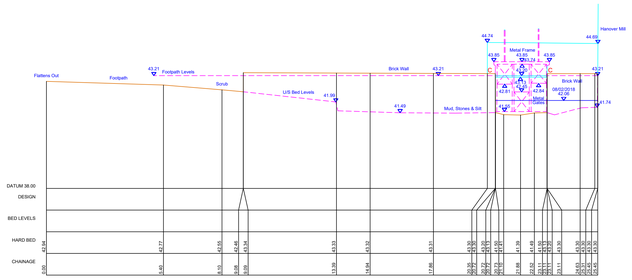
KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

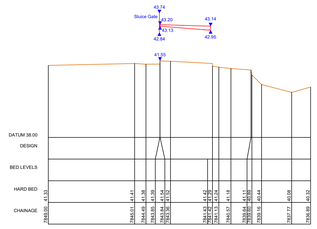
} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS



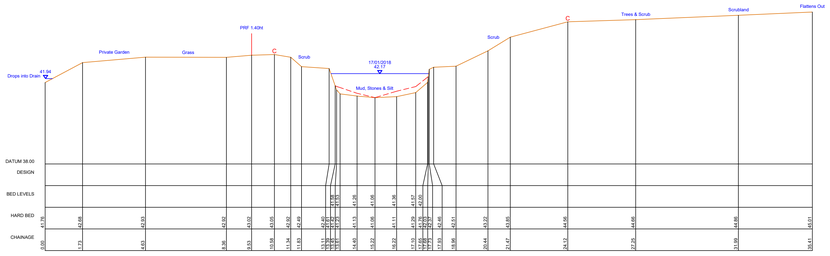
ESTO01_07837
604976.6mE 139066.07mN Brg 321
Open Channel



ESTO01_07844
604984.47mE 139069.87mN Brg 317
Hanover Mill Sluice
Tunnel Length = 2.33m



Through Section ESTO01_07844
Hanover Mill Sluice



ESTO01_07863
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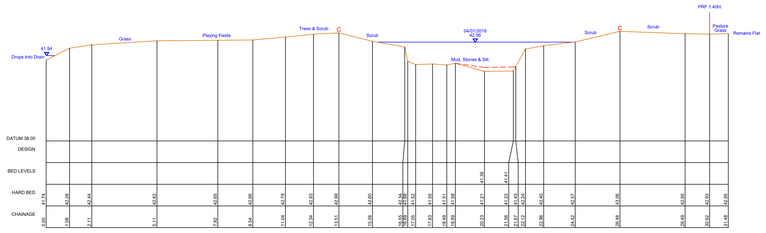
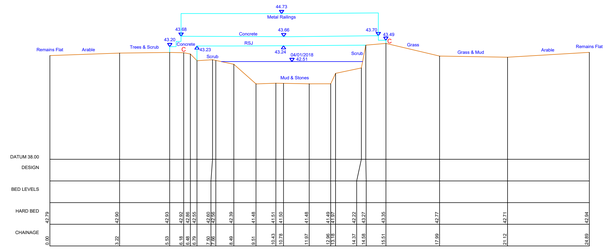
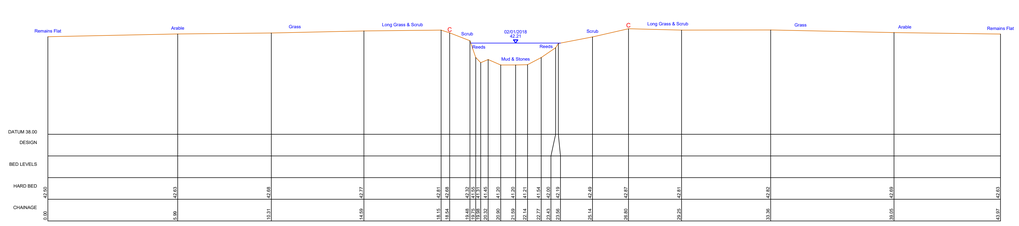
Open Channel



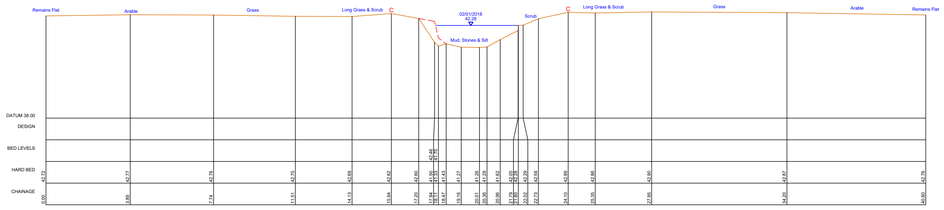
ESTO01_07923
605007.05mE 139020.32mN Brg 54
Open Channel



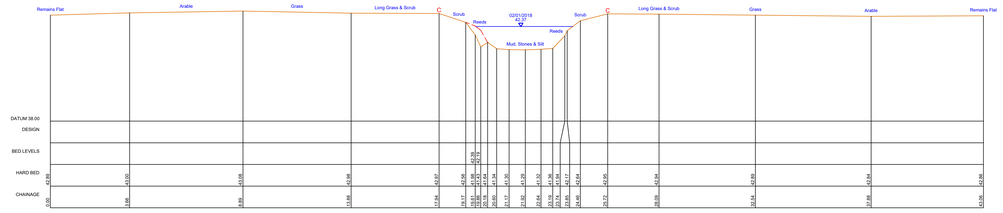
ESTO01_07960
605038.27mE 138995.2mN Brg 40
Footbridge
Tunnel Length = 0.80m



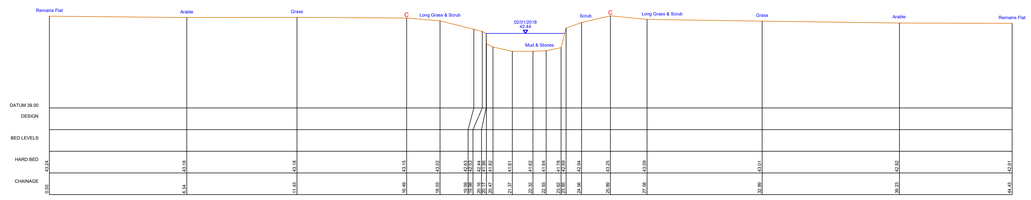
ESTO01_08023
605058.75mE 138938.48mN Brg 61
Open Channel



ESTO01_08116
605103.76mE 138892.19mN Brg 147
Open Channel



ESTO01_08233
605132.61mE 138787.35mN Brg 45
Open Channel



ESTO01_08351
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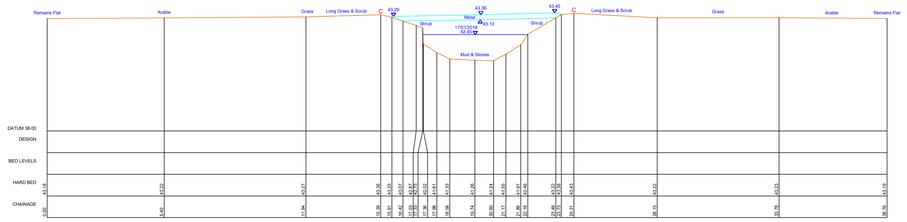
Open Channel



ESTO01_08425
605230.82mE 138649.98mN Brg 51
Dilapidated Footbridge
Tunnel Length = 0.91m

NOTES:

1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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SURVEY LEGEND

AB	AIR BRDG	FH	FIRE HYDRANT	PM	PARKING MELL
AV	AIR VALVE	FM	FIRE HYDRANT MARKER	RM	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RL	REDUCED LEVEL
BA	BALLAST BEACON	FS	FLOOD SIGN	RJ	RIVET/JOISTS JOIST
BDY	BOUNDARY	FMW	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GATE	RP	RAINWATER PIPE
BL	BOLLARD	GR	GRATEBOARD	SC	STOP COCK
BRM	BRICKWORK	GL	GROUND LEVEL	COP	STAND PIPE
BS	BUS STOP	GP	GUIDE POST	SP	SIGNPOST
BW	BLOCK WORK	GM	GAS MARKER	SL	SLOPE LEVEL
BW	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
CBF	CLOSE BOARDED FENCE	I	INVERT LEVEL	SP	SOIL PIPE / PLUMC
CBF	CLOSE BARBED FENCE	L	SHORT LEVEL	SP	GAS VALVE
CF	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	STN	STATION NUB
CH	CHAIN LINK FENCE	WF	WOODEN RAILS FENCE	SVP	SOIL VENT PIPE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	TSP	TOP OF SLOPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LC	LEVEL CROSS	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LE	LEFT BREST	TP/TW	TELEPHONE CALL BOX/POST
CS	CYCLE SIGN	LV	LAMP POST	TC	TELLCOM CABINET
CSM	CABLE TV MANHOLE	LB	LAMP BOLLARD	TCB	TELEPHONE CABINET
CUL	CULVERT	MF	MISCELLANEOUS FENCING	TRL	THRESHOLD LEVEL
DK	DEEP KERB	MK	MARKOUT	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MP	MILE POST	TB	TELEPHONE BOX
D	DOMESTIC	MP	ACORNS PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DW	DOWNWARD	NP	NOTICE PLATE	TW	TIMBER WALL
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NAT	NATIONAL TRUST AUTHORITY	UPS	UPSTREAM
EB	ELECTRICAL BOX	OSC	OPERATIONAL CONTROL	UTL	UTILITIES SURVEY
ELP	ELECTRIC CABLE POINT	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
ERB	ELECTRIC RAILWAY BOX	PR	PALISADE RAILINGS	WF	WIRE FENCE
EMH	ELECTRICITY MANHOLE	PT	PILE TRIG	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PP	PILE POST	WPF	WOODEN PALE
E	ELECTRICITY SUBSTATION	PF	PARKING METER	WPP	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FOOT BRIDGE	PR	POST & RAIL FENCE	WG	WIRE GUARD
FBH	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to OS survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E00730012	TR 0103 4107	35.975
E00730401	TR 0149 4153	36.757
E00730403	TR 0222 4227	38.489
E00731536	TR 0665 3814	51.806
E00730013	TR 0132 4202	38.489
E00730020	TR 0159 4081	36.114
E00730021	TR 0159 4291	38.337
E00730500	TR 0243 4025	38.486
E00730503	TR 0343 3936	40.259
E00731495	TR 0152 4070	37.864
E00731496	TR 0128 4199	37.732
E00731537	TR 0667 3791	47.711
E00731538	TR 0671 3842	63.022
E00731571	TR 0666 3813	50.976
E00733004	TR 0504 3900	43.712
E00733005	TR 1056 3751	60.587
E00731483	TR 0151 4070	35.916
E00731484	TR 0133 4200	37.463
E00731539	TR 0671 3828	52.251

Environment Agency

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_07837 TO EST001_08425

SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_132

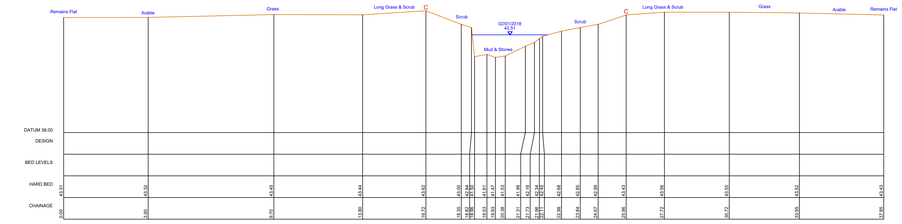
SURVEY DATE: DECEMBER 2017 – MARCH 2018

SCALE: 1:100 — DRN: RC — CHKD: ITS

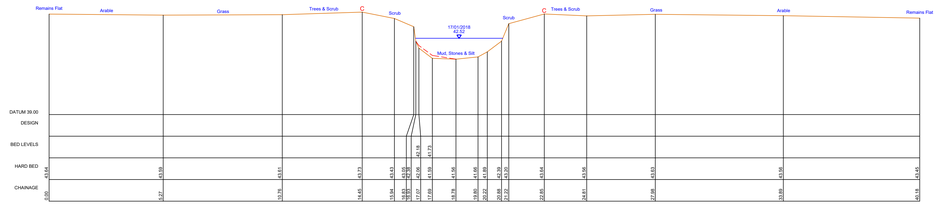
DATUM: OS GPS ACTIVE — DATE: MAR 18 — DATE: MAR 18

GRID: NATIONAL GRID — DRAWING NO. X-J01058-14 — REV. —

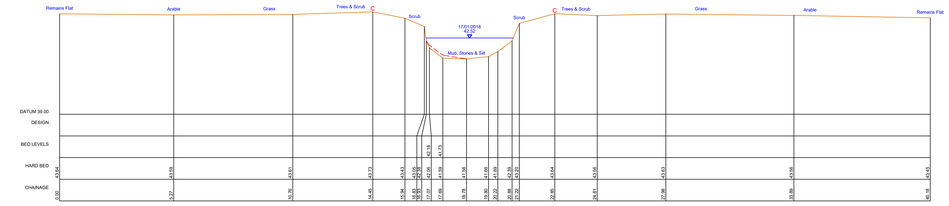
CAD FILENAME: X-J01058-01-30.dwg



ESTO01_08523
605268.65mE 138600.04mN Brg 90
Open Channel



ESTO01_08616
605247.32mE 138535.28mN Brg 118
Open Channel



ESTO01_08616
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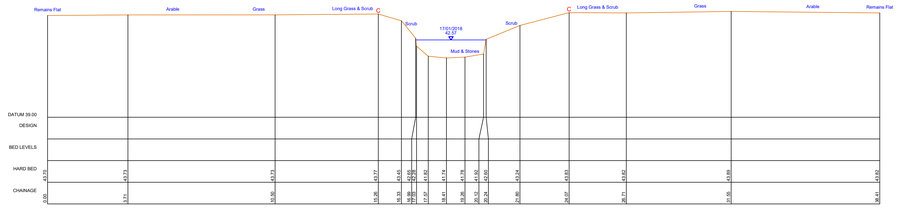

ESTO01_08720
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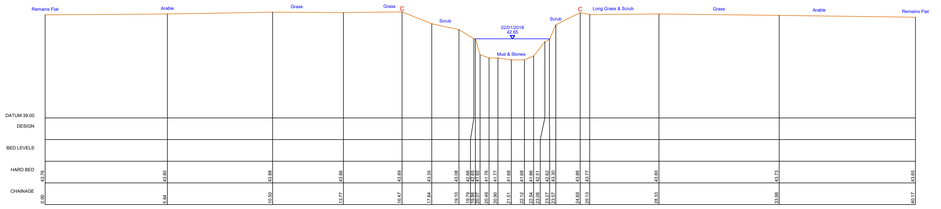
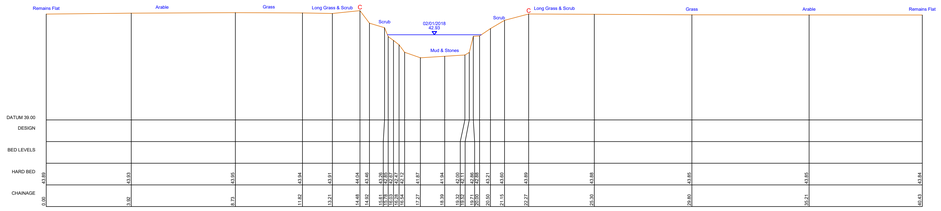


ESTO01_08836
605324.09mE 138337.94mN Brg 24
Open Channel



ESTO01_08920
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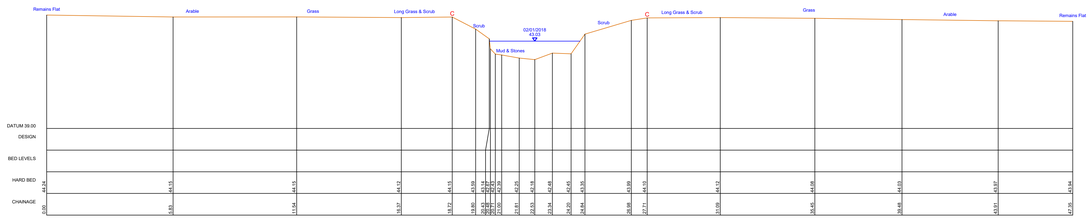
Open Channel



ESTO01_09022
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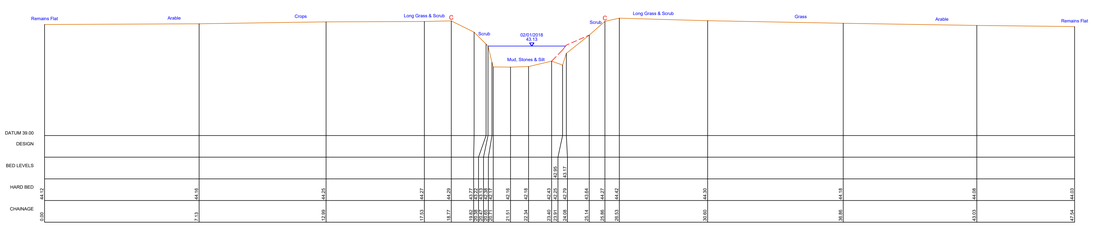
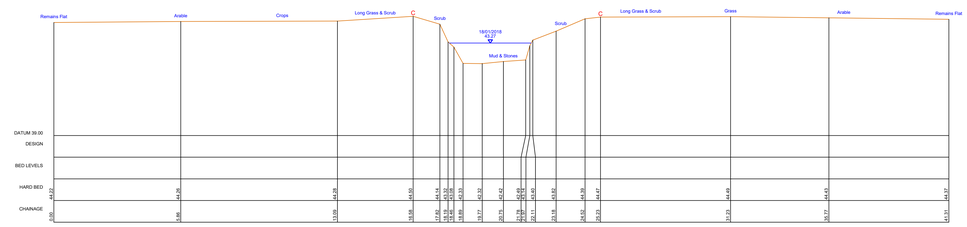
Open Channel



ESTO01_09119
605553.15mE 138237.24mN Brg 312
Open Channel



ESTO01_09226
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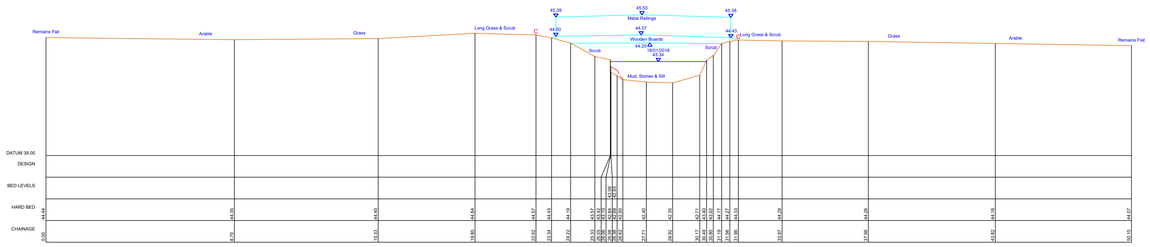
Open Channel



ESTO01_09305
605666.94mE 138248.56mN Brg 7
Footbridge
Tunnel Length = 1.33m

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:

1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
B	BOLLARD	FM	FLOW METER MARKER	R	RIVER GAUGE
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELGIAN BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BH	BOREHOLE	FRM	FLOW METER MANHOLE	RM	RAINWATER MANHOLE
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	Gn	GNOME	SP	STOP POST
BL	BED LEVEL	GL	GROUND LEVEL	TSP	TEMPORARY STOP
BS	BULK SIGN	GP	GATE POST	CK	CHAINAGE
BS	BULK SIGN	GR	GARAGE	CL	CENTRE LINE
BW	BRICK WALL	HW	HEAD WALL	DMH	SURFACE WATER MANHOLE
CBF	CLOSE BOARD FENCE	L	LAMP COLUMN	DP	DRAIN PIPE
CBF	CLOSE BOARDED FENCE	L	WASTE LEVEL	DP	DRAIN POINT
CF	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	STN	STATION
CH	CHAIN LINK FENCE	SF	SHEEP WIRE FENCE	SP	SOIL PIPE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LC	LEFT CREST	TBM	TEMPORARY BENCH MARK
CP	CONCRETE PALING FENCE	LJ	LEFT JOIST	CO/TP	TELEPHONE CALL MULTIPOST
CR	CYCLE RACK	LP	LAMP POST	TC	TELCOM CABINET
CUL	CULVERT MANHOLE	LB	LAMP COLUMN BOLLARD	TC	TELEPHONE CABINET
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DECK KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DP	DRAIN PIPE	MK	MARKER POST	TL	TRAFFIC LIGHT
D	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH BOX
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TPS	TIMBER RUBBING STRIP
EM	ELECTRIC METER	NG	NATURAL GAS	TR	TRAFFIC SIGNAL
EMB	DOG WASTE BIN	NG	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EN	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
ER	ELECTRIC RISER	OS	ORDNANCE SURVEY	UT	UNKNOWN TELE SURVEY
ESF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
ESP	ELECTROPT CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EW	ELECTRIC WARNING TAPE	P	PIPE	WMF	WIRE MESH FENCE
EP	ELECTROPT POLE	PB	PILLAR BOX	WP	WOODEN POST
ER	EARTHING REID	PF	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRIC TRANSMISSION LINE	PM	PIPE	WS	WATER STOP
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to OS survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E60730012	TR 0103 4107	35.975
E60730401	TR 0149 4229	36.401
E60731434	TR 0622 4014	38.289
E60731536	TR 0666 3914	31.806
E60730023	TR 0133 4207	36.419
E60730020	TR 0159 4291	38.314
E60730501	TR 0021 4076	38.286
E60730503	TR 0343 3935	40.259
E60731495	TR 0152 4070	37.864
E60731498	TR 0128 4199	37.732
E60731537	TR 0687 3791	47.711
E60731538	TR 0671 3842	53.022
E60731671	TR 0666 3813	52.076
E60733004	TR 0504 3900	43.712
E60733005	TR 1056 3751	60.587
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_08532 TO EST001_09305

SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_552

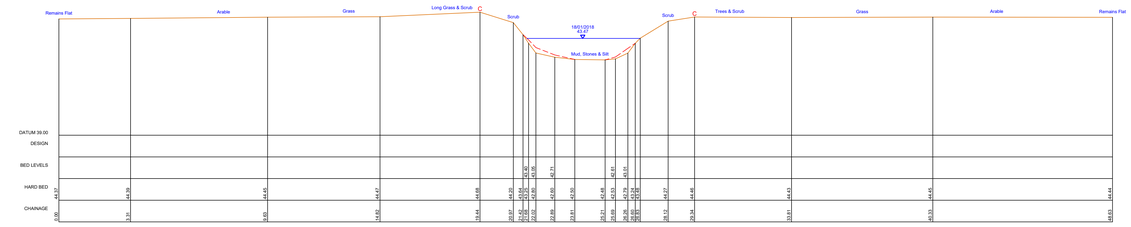
SURVEY DATE: DECEMBER 2017 - MARCH 2018

SCALE: 1:100 | DRN: RC | CHKD: ITS

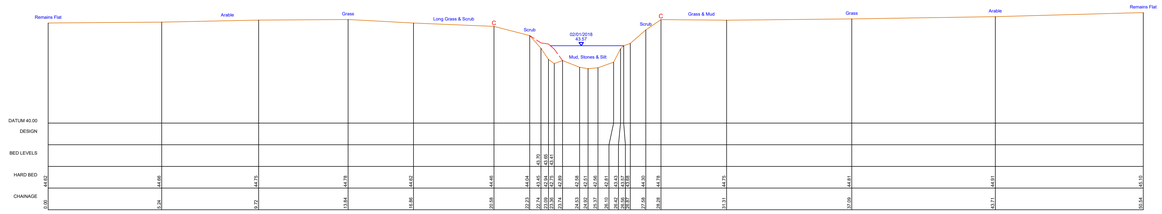
DATUM: OS GPS ACTIVE | DATE: MAR 18 | DATE: MAR 18

GRID: NATIONAL GRID | DRAWING NO. X-J01058-15 | REV. —

CAD FILENAME: X-J01058-01-30.dwg



ESTO01_09412
605721.04mE 138206.05mN Brg 39
Open Channel



ESTO01_09525
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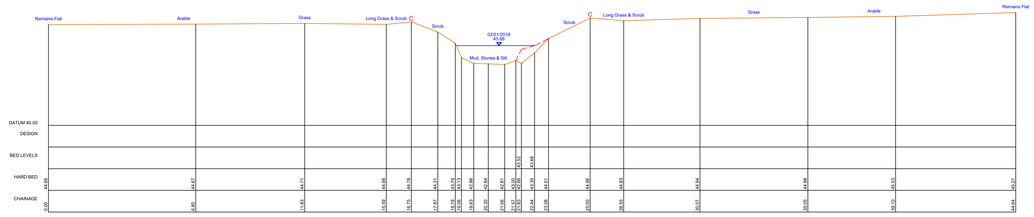
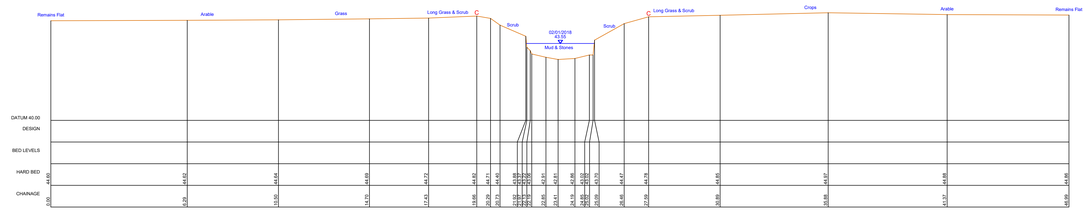
Open Channel



ESTO01_09624
605879.99mE 138201.69mN Brg 23
Open Channel



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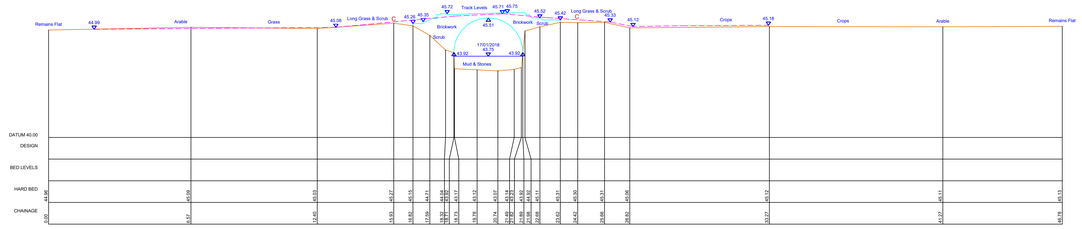
Open Channel



ESTO01_09835
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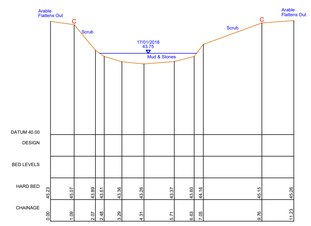
Access Bridge
Tunnel Length = 3.60m



ESTO01_09838
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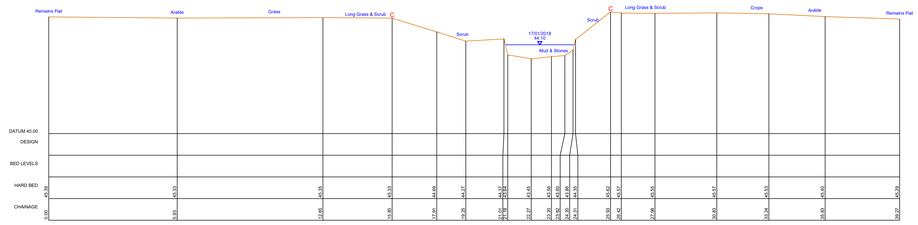
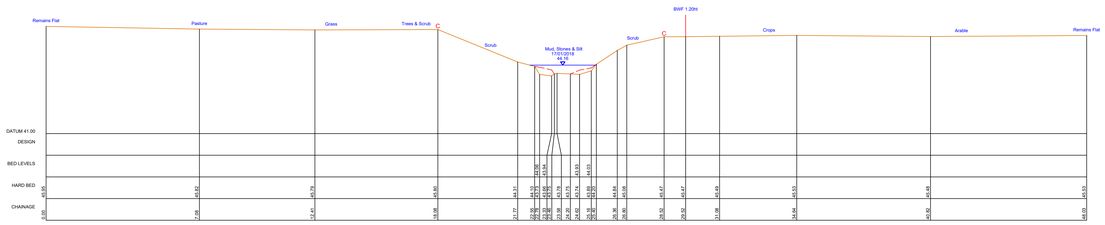
Open Channel



ESTO01_09934
606156.99mE 138070.58mN Brg 21
Open Channel



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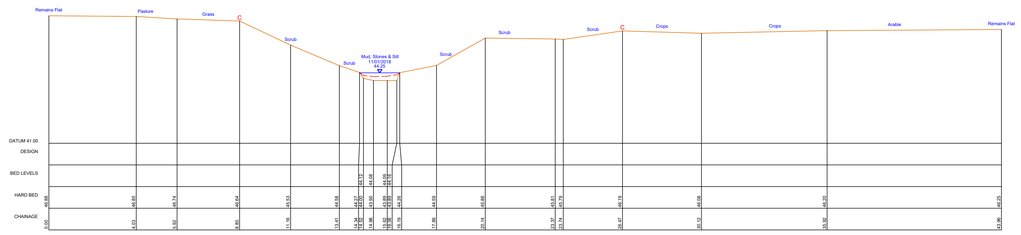

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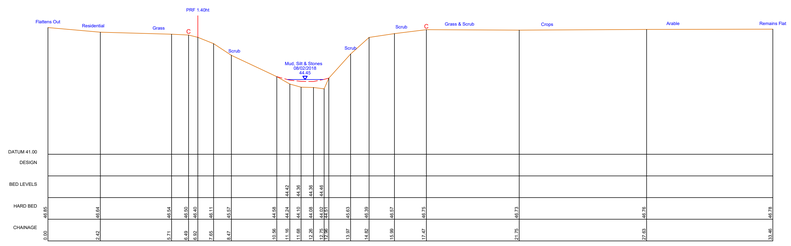
Open Channel



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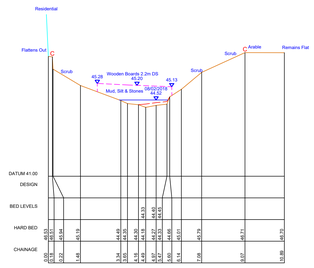
Open Channel



ESTO01_10190
606335.1mE 138124.18mN Brg 318
Weir Toe

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PM	PARAPET WALL
AP	ACCESS PANEL	FL	FLOOD LEVEL MARKER	RB	RODDING EYE
B	BOLLARD	FL	FLOOR (LEVEL)	RC	RIGHT CREST
BB	BECHAM BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BF	BUILDING	FW	FOUL WATER MANHOLE	RW	RAINWATER PIPE
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BM	BENCH MARK	GI	GRATED INLET	SD	SOUNDING
BO	BLIG STOP	GP	GATE POST	SI	SIGNAWAY
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LINES
BP	BOLLARD POST	GR	GRATED DRAIN	SMW	SURFACE WATER MANHOLE
BWF	BARGE WAIL FENCE	H	INSPECTION CHAMBER	SMP	SHEET METAL PLING
CBF	CLOSE BOARDED FENCE	I	INVERT LEVEL	SP	SIGN POST
CLF	CHAIN LINK FENCE	IB	INDICATOR BOARD	SPL	SPOT LEVEL
CL	COVER LEVEL	INF	INFORMATION FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SMP	SOIL VENT PIPE
CP	CONCRETE POST	JG	JUNCTION GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LD	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CHESHIRE PALING FENCE	LI	LEFT CREST	TCP/TCP	TELEPHONE CALL BOX/POST
CR	CREST LEVEL	LL	LOW LEVEL	TP	TELEGRAPH POLE
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
DF	DRAIN	MF	MESH FENCING/FENCING	TR	TRAFFIC LIGHT
DG	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DL	DRAIN LEVEL	MP	MOORING POST	TLB	TELEPHONE BOX
DS	DESK LEVEL	MR	MOORING RING	TLP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DW	DOG WATER	NB	NOTICE BOARD	TS	TRAFFIC SIGNAL
DWB	DOG WASTE BIN	NS	NOTICE BOARD	TSB	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRIC BOX	OA	ORDNANCE DATUM	VT	VISITOR TRAFFIC SURVEY
ECF	ELECTRIC CABLE FENCE	OD	ORDNANCE SURVEY	W	WATER LEVEL/WATER LINE
EOP	ELECTROPTI CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EP	ELECTRICITY POLE	P	PIPE	WF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ER	EARTHING ROD	PM	PARKING METER	WPB	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PP	PIPE POST	WS	WOODEN STILE
FL	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to CX survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	36.337
E20730500	TR 0221 4025	38.486
E20730023	TR 0149 3930	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4189	37.732
E20731497	TR 0651 3791	47.711
E20731538	TR 0671 3814	53.062
E20731537	TR 0666 3814	50.976
E20730004	TR 1067 3800	42.549
E20730005	TR 1066 3791	42.647
E20731483	TR 0151 4020	39.316
E20731484	TR 0131 4229	37.451
E20731539	TR 0671 3826	52.251

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PROJECT/WATERCOURSE
EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS
EAST STOUR (EST001)
CROSS SECTIONS
EST001_09412 TO EST001_10190

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_132
SURVEY DATE: DECEMBER 2017 – MARCH 2018		
SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-16	REV. –
CAD FILENAME: F:\J01058-01-30.dwg		

Original Drawing Size: A0

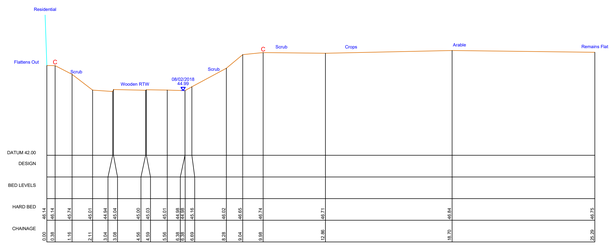
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

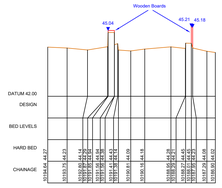
KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

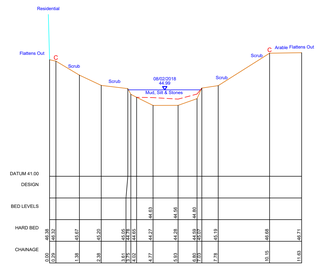
} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS



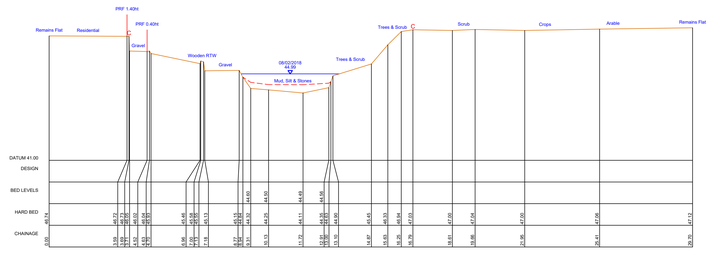
ESTO01_10192
606336.38mE 138125.1mN Brg 320
Weir Crest



Through Section ESTO01_10192
Weir Crest



ESTO01_10195
606338.54mE 138126.57mN Brg 322
Weir Heel



ESTO01_10213
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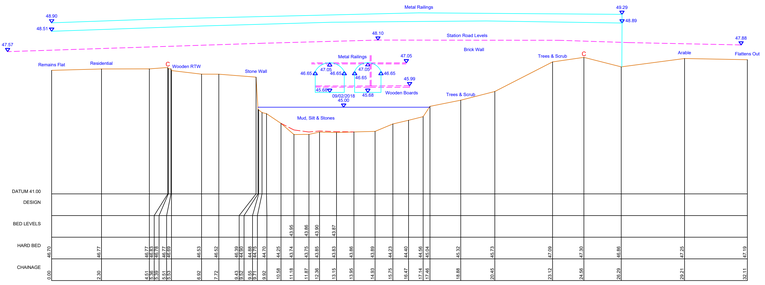
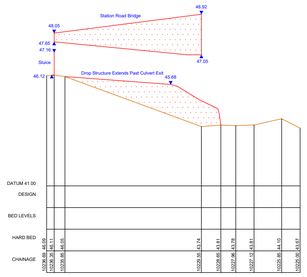
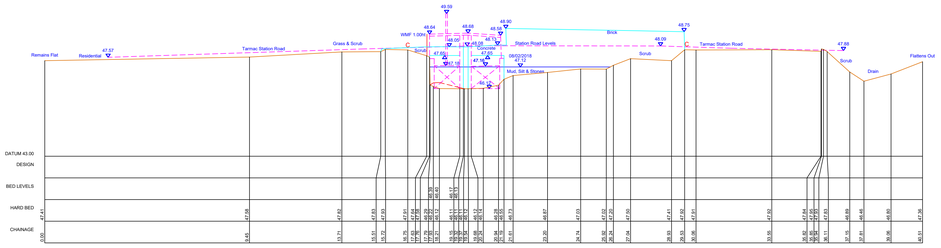
Open Channel



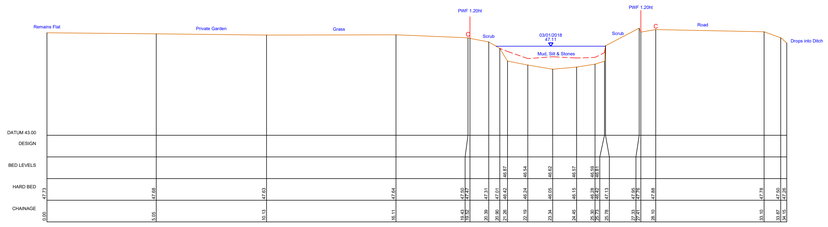
ESTO01_10230
606362.43mE 138121.98mN Brg 25
Station Road Sluice Gate D/S Face
Tunnel Length = 6.80m



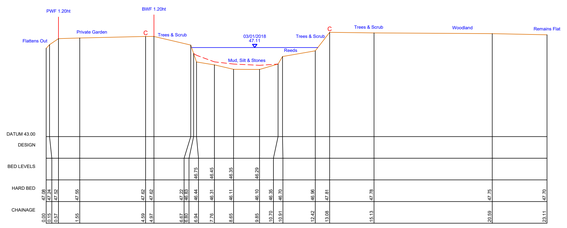
Through Section ESTO01_10230
Station Road Sluice Gate D/S Face



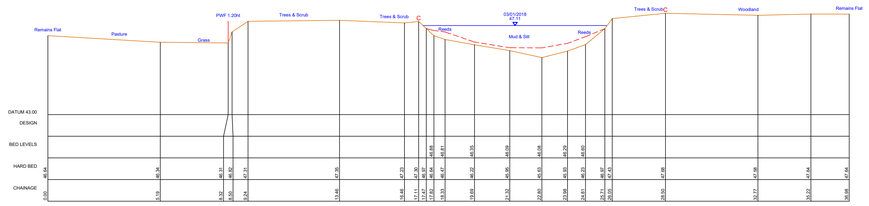
ESTO01_10236
606365.24mE 138115.21mN Brg 29
Station Road Sluice Gate U/S Face
Tunnel Length = 6.80m



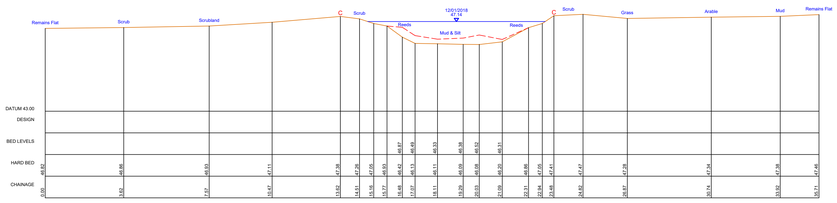
ESTO01_10253
606393.06mE 138112mN Brg 353
Open Channel



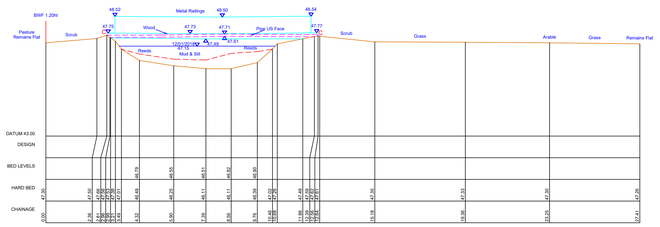
ESTO01_10295
606426.49mE 138121.71mN Brg 29
Open Channel



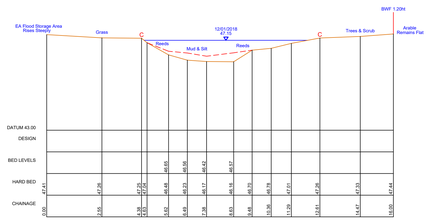
ESTO01_10322
606449.35mE 138097.42mN Brg 14
Open Channel



ESTO01_10422
606551.02mE 138095.61mN Brg 10
Open Channel



ESTO01_10482
606614.1mE 138115.26mN Brg 352
Footbridge
Tunnel Length = 0.69m



ESTO01_10520
606648.01mE 138140.08mN Brg 297
Open Channel

NOTES:

1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHW	FIRE HYDRANT MARKER	RB	RIGHT BANK
BH	BOREHOLE	FL	FLAGPOLE	RC	RECTANGULAR CULVERT
BS	BELLION BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BSY	BOUNDARY	FWM	FOUL WATER MANHOLE	RM	RUNNING METRE
BT	BOUNDARY TIE	G	GATE	RPW	RECTANGULAR PIPE
BL	BED LEVEL	GB	GRASSBANK	S	STOP LOG
BLL	BOTTOM LEVEL	GC	GRAVEL CHAMBER	SC	SCREW COVER
BTS	BUS STOP	GF	GATE POST	SV	SCHWARZVIT
BW	BRICK WORK	GM	GAS MANHOLE	SW	SOLID WALL
BW	BRICK WALL	HW	HEAD WALL	SWM	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SWP	SHEET METAL PILING
CBF	CONCRETE BLOCK FENCE	IL	INVERT LEVEL	TB	TIMBER BEAM
CF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	CON	CONCRETE
CL	COVER LEVEL	IWF	INTERWOVEN FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	K	KERB (TYPE UNKNOWN)	SWF	SHEEP WIRE FENCE
CONC	CONCRETE	KG	KERB HALF ROLLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LS	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CONCRETE PANEL FENCE	LP	LAMP POST	TCP	TEMPORARY CONTROL POST
CR	CYCLE RACK	LT	LIGHT POST	TC	TELECOM CABINET
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
D	DRAIN	MF	MESH & PALISADE FENCING	TP	TELEGRAPH POLE
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DL	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DP	DOWNPIPE	MP	METAL RAILING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DS	DOG STOP	NB	NATIONAL BOUNDARY	TSR	TRIPLE STEEL RAILINGS
DS	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UNDER SIDE
ES	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTL	UNABLE TO SURVEY
ESF	ELECTRICITY BOX FENCE	OHL	OVERHEAD TELEPHONE LINE	W	WATER LEVEL IN WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WA	WATER METER
EMH	ELECTRICITY MANHOLE	P	PIPE	WBF	WIRE BARBED FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WMF	WIRE MESH FENCE
EV	EARTHING VOLT	PM	PARKING METER	WP	WOODEN POST
FC	FIBRE OPTIC TRANSMISSION LINE	PR	PROFILE	WPR	WOODEN POST & RAIL FENCE
FG	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTN	PARKING TICKET MACHINE	(Abbreviations apply to GA survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	32.267
E20730403	TR 0222 4027	36.489
E20730536	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	38.131
E20730000	TR 0021 4020	38.496
E20730503	TR 0343 3916	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731934	TR 0667 3791	47.211
E20731938	TR 0671 3842	63.092
E20731921	TR 0666 3813	49.979
E20733004	TR 0604 3900	43.319
E20731483	TR 0157 4070	36.587
E20731484	TR 0131 4209	35.915
E60731539	TR 0671 3828	52.251

Environment Agency

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_10192 TO EST001_10520

SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_332

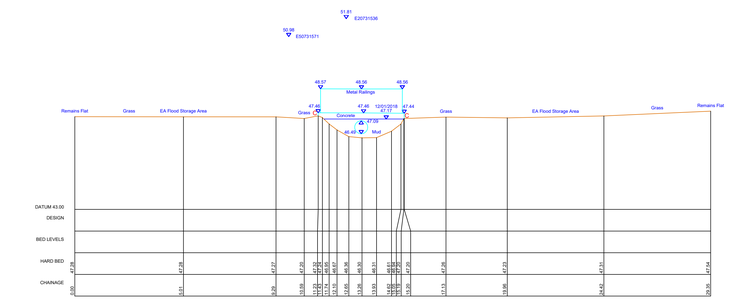
SURVEY DATE: DECEMBER 2017 – MARCH 2018

SCALE: 1:100 | DRN: RC | CHKD: ITS

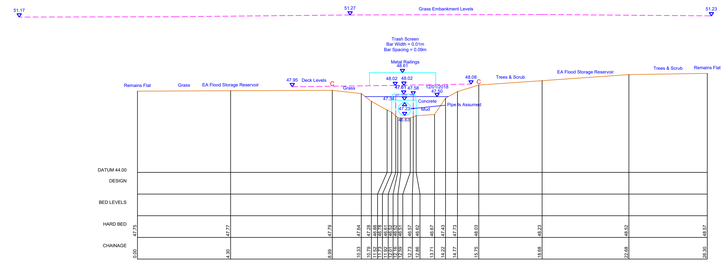
DATUM: OS GPS ACTIVE | DATE: MAR 18 | DATE: MAR 18

GRID: NATIONAL GRID | DRAWING NO. X-J01058-17 | REV. –

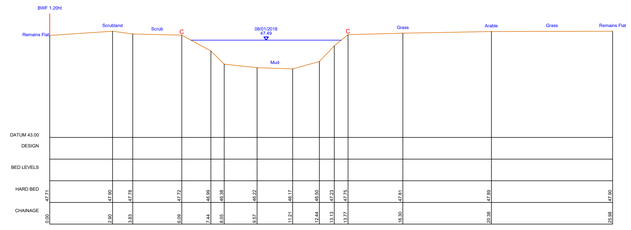
CAD FILENAME: X-J01058-01-30.dwg



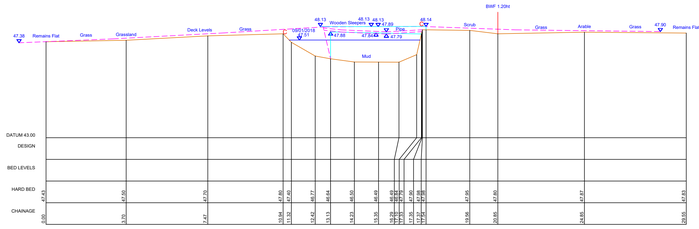
ESTO01_10528
606641.23mE 138134.91mN Brg 19
Culvert Exit
Tunnel Length = 46.12m



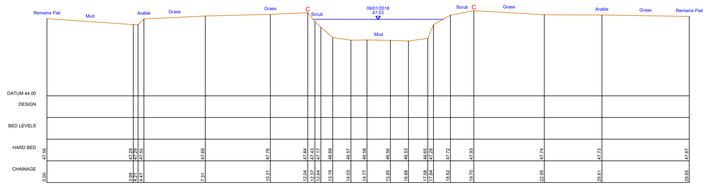
ESTO01_10574
606682.98mE 138121.79mN Brg 22
Culvert Entrance
Tunnel Length = 46.12m



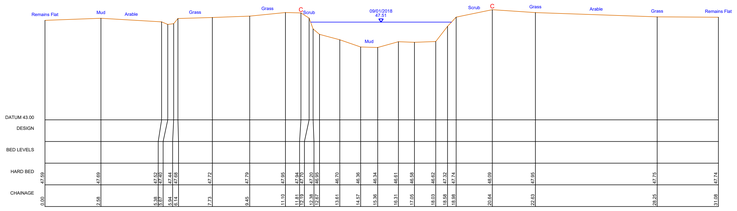
ESTO01_10644
606745.39mE 138172.99mN Brg 314
Open Channel



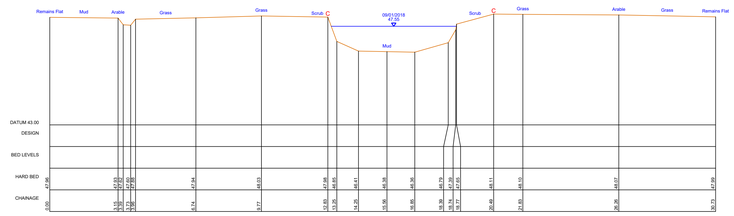
ESTO01_10723
606813.14mE 138194.15mN Brg 347
Access Bridge
Tunnel Length = 3.82m



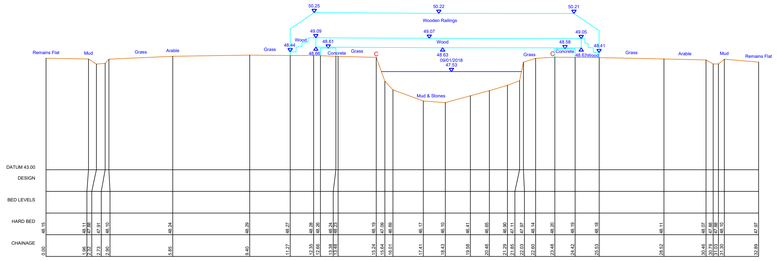
ESTO01_10827
606913.96mE 138188.67mN Brg 357
Open Channel



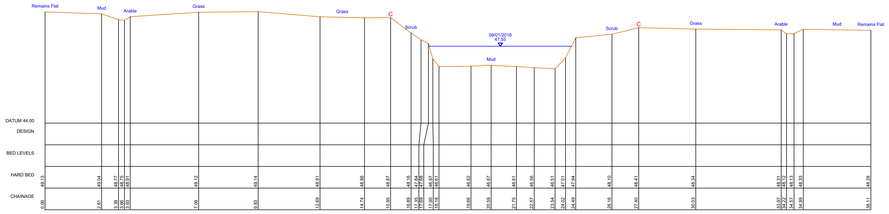
ESTO01_10924
607011.05mE 138191.23mN Brg 358
Open Channel



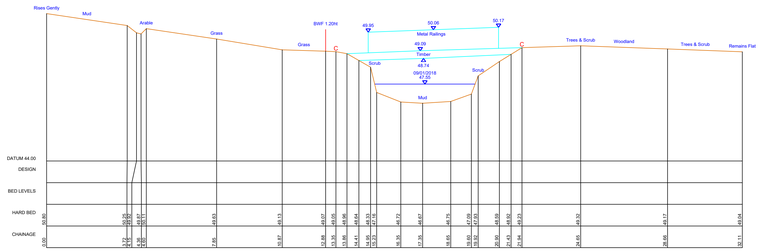
ESTO01_11027
607108.44mE 138191.63mN Brg 359
Open Channel



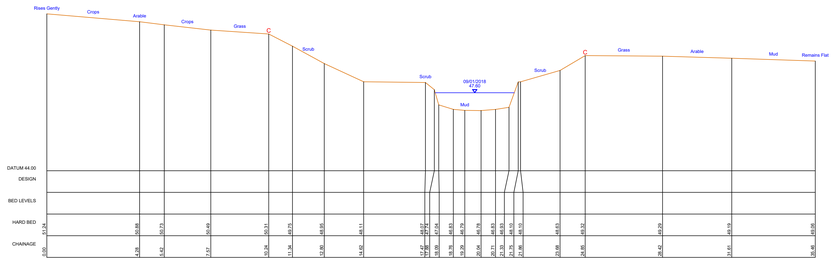
ESTO01_11157
607200.26mE 138153.29mN Brg 3
Footbridge
Tunnel Length = 1.14m



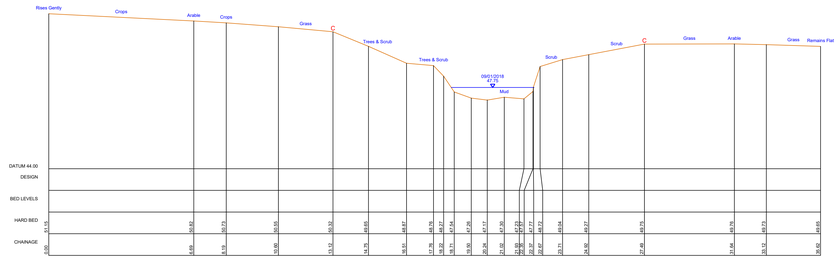
ESTO01_11228
607271.21mE 138151.68mN Brg 349
Open Channel



ESTO01_11320
607358.95mE 138158.66mN Brg 1
Footbridge
Tunnel Length = 0.69m



ESTO01_11425
607467.31mE 138161.04mN Brg 347
Open Channel



ESTO01_11532
607573.38mE 138186.09mN Brg 335
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
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SURVEY LEGEND

AB	AIR BROW	FH	FIRE HYDRANT	PM	PARKING METER
AV	AIR VALVE	FM	FIRE HYDRANT MARKER	PR	RIGHT SIGN
B	BOLLARD	FL	FLOOR LEVEL	PC	PROJECT CRS
BA	BALLAST BEACON	FS	FLOOD SIGN	PG	PROJECT POSTS JOIST
BDY	BOUNDARY	FWV	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GATE	RP	RODDING POINT
BL	BOLLARD	GB	GRATEBOARD	S	STOP COCK
BRM	BRICKWORK	GL	GROUND LEVEL	SGP	STAND PIPE
BS	BUS STOP	GR	GRAVEL	SP	SIGNPOST
BW	BLOCK WORK	GM	GAS MARKER	SL	SOFFIT LEVEL
BWM	BRICK WALL	HW	HEAD WALL	SMH	SURVICE WATER MANHOLE
CBF	CLOSE BOARDED FENCE	I	INVERT LEVEL	SPM	SOIL PIPE MANHOLE
CHF	CLOSE WARREED FENCE	L	SHORT LEVEL	SP	SOIL PIPE
CIF	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	STN	STATION NUB
CL	CLOTHES LINE	RW	IRON RAILING FENCE	SV	SOIL VENT PIPE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	L	LAMP POST	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LE	LEFT GREST	TELPOLE	TELEPHONE CALL WALPOST
CV	CYCLE BAY	LV	LAMP POST	TC	TELECOM CABINET
CVM	CABLE TV MANHOLE	LP	LAMP POST BOLLARD	TCB	TELECOM CABINET
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MK	MARKER POST	TLB	TELEPHONE BOX
D	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DRN	DRAINAGE	MS	MILE STONE	TS	TRAFFIC SIGNAL
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSB	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NW	NATIONAL WATERWAYS AUTHORITY	UT	UPSTAND TO
EB	ELECTRIC BOX	OHC	OVERHEAD CABLE	VS	VERTICAL SIGN SURVEY
ECP	ELECTRIC CABLE PIPE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EGM	ELECTRIC GAS MARKER	PA	PARKING RAILINGS	WM	WATER METER
EMM	ELECTRICITY MANHOLE	PT	PILE TOP	WMF	WIRE MESH FENCE
ER	ELECTRICITY RISER	PB	PILE BOX	WP	WOODEN POST
E	ELECTRICITY	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIBRE BOX	PR	POST & RAIL FENCE	YB	YARD BASIN
FBH	FLOWBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to OS Survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E00730012	TR 0103 4107	35.975
E00730401	TR 0149 4253	36.757
E00730403	TR 0222 4227	38.489
E00730136	TR 0665 3814	51.808
E00730013	TR 0132 4202	38.489
E00730020	TR 0159 4081	36.114
E00730021	TR 0159 4291	38.337
E00730050	TR 0221 4025	38.486
E00730503	TR 0343 3936	40.259
E00731495	TR 0152 4070	37.864
E00731496	TR 0128 4199	37.732
E00731537	TR 0667 3791	47.711
E00731538	TR 0671 3842	63.022
E00731571	TR 0666 3813	50.976
E00733004	TR 0504 3900	43.712
E00733005	TR 1056 3751	60.587
E00731483	TR 0151 4070	35.916
E00731484	TR 0133 4200	37.463
E00731539	TR 0671 3828	52.251

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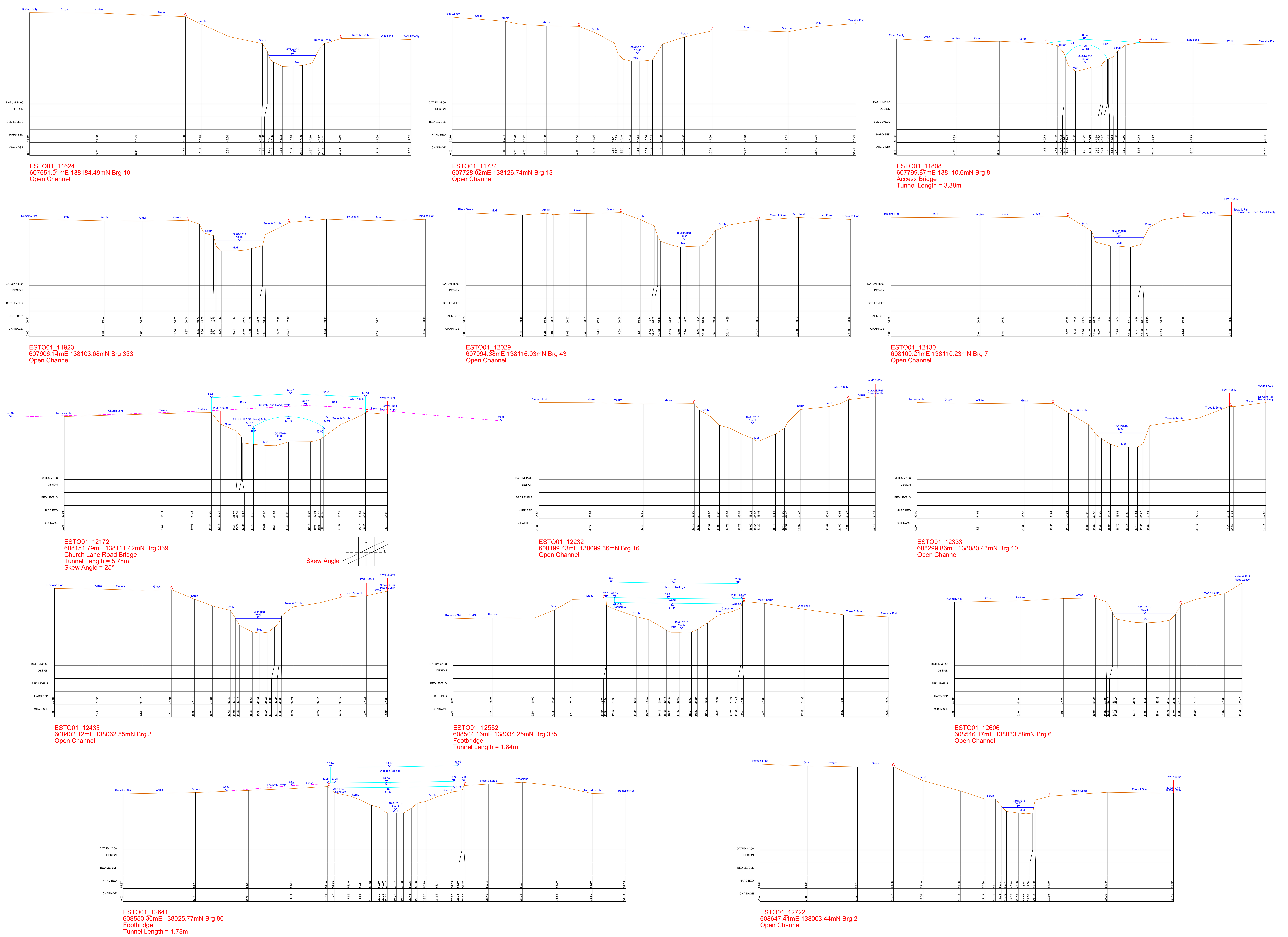
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_10528 TO EST001_11532

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_132	
SURVEY DATE: DECEMBER 2017 – MARCH 2018			
SCALE: 1:100	DRN: RC	CHKD: ITS	
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18	
GRID: NATIONAL GRID	DRAWING NO. X-J01058-18		REV. —
CAD FILENAME: X-J01058-01-30.dwg			



Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
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SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELISHA BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BUS STOP	GP	GATE POST	SK	SOAKAWAY
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BW	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CBF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CIF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION
CL	COVER LEVEL	IWF	INTERWOVEN FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KIG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LB	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LC	LEFT CREST	TCB/TCP	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DL	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DP	DOWNPIPE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ER	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		

(Abbreviations apply to EA survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E50730013	TR 0132 4202	38.489
E50730020	TR 0159 4061	36.314
E50730021	TR 0159 4291	36.337
E50730500	TR 0223 4025	38.486
E50730503	TR 0343 3935	40.259
E50731495	TR 0152 4070	37.864
E50731496	TR 0128 4199	37.732
E50731537	TR 0667 3791	47.711
E50731538	TR 0671 3842	63.022
E50731571	TR 0666 3813	50.976
E50733004	TR 0504 3900	43.712
E50733005	TR 1056 3751	60.587
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

Orchard House, Endeavour Park, London Road, Addington, West Malling, Kent, ME19 5SH

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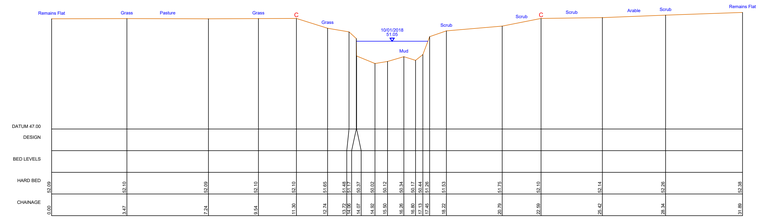
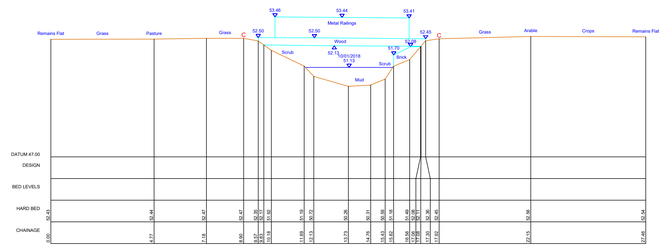
PROJECT/WATERCOURSE: EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS: EAST STOUR (ESTO01) CROSS SECTIONS ESTO01_11624 TO ESTO01_12722

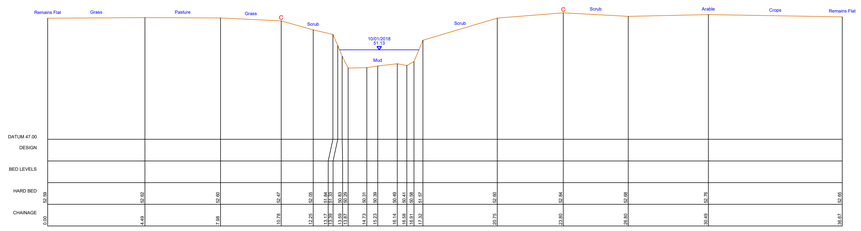
SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_332
SURVEY DATE: DECEMBER 2017 – MARCH 2018
SCALE: 1:100 | DRN: RC | CHKD: ITS
DATUM: OS GPS ACTIVE | DATE: MAR 18 | DATE: MAR 18
GRID: NATIONAL GRID | DRAWING NO. X-J01058-19 | REV. —
CAD FILENAME: X-J01058-01-30.dwg



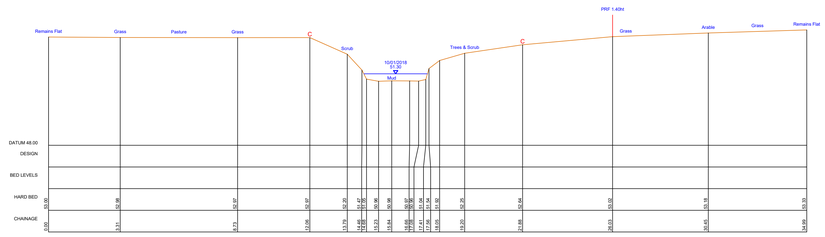
ESTO01_12839
608746.93mE 137997.83mN Brg 53
Open Channel



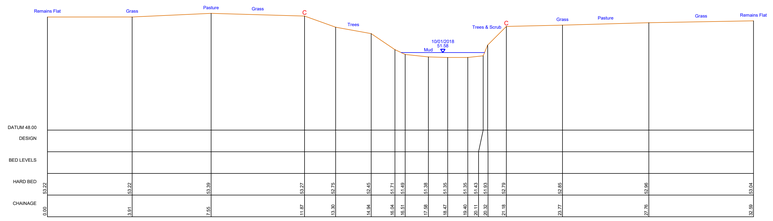
ESTO01_12946
608809.06mE 137913.52mN Brg 33
Footbridge
Tunnel Length = 0.81m



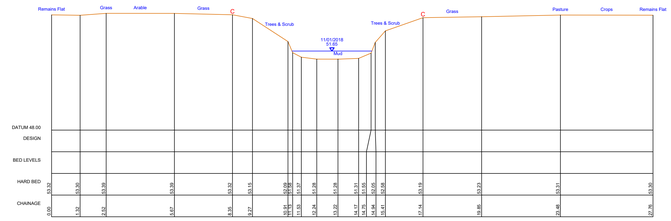
ESTO01_13012
608843.58mE 137863.14mN Brg 16
Open Channel



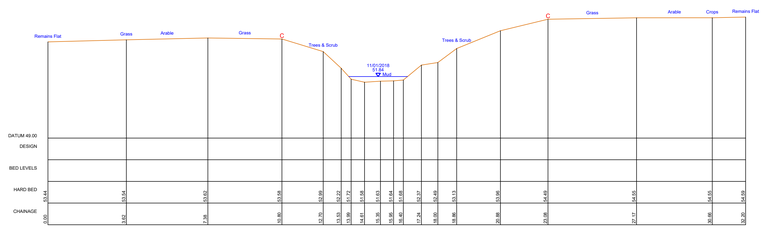
ESTO01_13123
608887.63mE 137789.22mN Brg 26
Open Channel



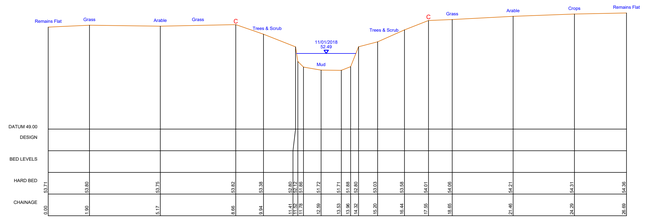
ESTO01_13264
608941.92mE 137753.79mN Brg 89
Open Channel



ESTO01_13327
609003.38mE 137727.55mN Brg 318
Open Channel



ESTO01_13421
609070.6mE 137757.72mN Brg 6
Open Channel



ESTO01_13509
609152.74mE 137753.04mN Brg 30
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE. © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
BH	BOREHOLE	FL	FENCE LOOSE	RC	RECTANGULAR CULVERT
BR	BOLLARD BEACON	FS	FENCE STOT	RJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BM	BENCH MARK	G	GATE	SA	STANDARD ASTRIPE
BL	BED LEVEL	GB	GRASSBANK	SP	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SPP	STAND PIPE
BS	BUS STOP	GM	GAS METER	SV	SLUICE VALVE
BW	BEACH WARP	GM	GAS MARKER	SL	SOFFIT LEVEL
BW	BRICK WALL	HB	HEAD WALL	SMH	SURFACE WATER MANHOLE
CBF	CLOSE BOARDED FENCE	HC	HOT WATER CHAMBER	SP	SIGN POST/PLATE
CHF	CLOSE BARBED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CF	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	STN	STATION
CH	CHAIN HOLE	JB	JUNCTION BOX	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LC	LEFT CREST	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LI	LEFT INVEST	TCP/TP	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CS	CABLE TV MANHOLE	LB	LOCKABLE BOLLARD	TF	TIMBER FENCE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	TFL	THREADLED LEVEL
DH	DROP HOLE	MH	MANHOLE	TL	TRAFFIC LIGHT
DL	DROP LEVEL	MVB	MAGNETIC VALVE BOX	TLB	TELEGRAPH LINE BOX
DP	DOWNPIPE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPF	DOUBLE STRUT COURSE	MPF	MOORING PALING FENCE	TR	TRAFFIC RADIO JAMP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DW	DRAIN WALL	NB	NATIONAL BOUNDARY	TSR	TRUSSED STEEL RAILINGS
EN	ENGINEERING BUSINCH	NRA	NATIONAL RIVERS AUTHORITY	UB	UPSTREAM BED
ES	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UFL	UNABLE TO SURVEY
EF	ELECTRICITY BARBED FENCE	OP	OPEN PIPE (DIAMETER)	UL	UNDER LEVEL/ WATER LINE
ELF	ELECTRICITY CABLE_RT	OSR	OPEN STEEL RAILINGS	WA	WATER ACCESS
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PARKING BOX	WP	WOODEN POST
E	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POSTS & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIBRE BOX	PR	PALING & RAIL FENCE	WW	WIRE WALL
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to OS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.757
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	38.337
E20730500	TR 0223 4025	38.486
E20730503	TR 0343 3936	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731571	TR 0666 3813	50.975
E20733004	TR 0504 3900	43.712
E20733005	TR 1056 3721	60.087
E20731483	TR 0151 4070	35.916
E20731484	TR 0133 4200	37.463
E20731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_12839 TO EST001_13509

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_152
SURVEY DATE: DECEMBER 2017 - MARCH 2018		
SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO.	REV.
CAD FILENAME: X-J01058-01-30.dwg	X-J01058-20	--

Original Drawing Size: A0

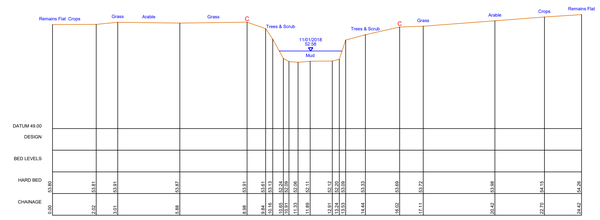
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS



ESTO01_13630
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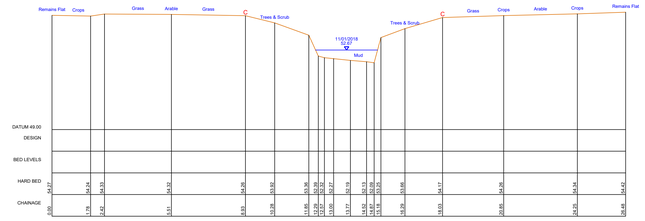
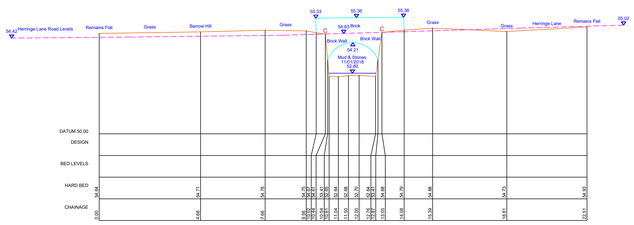
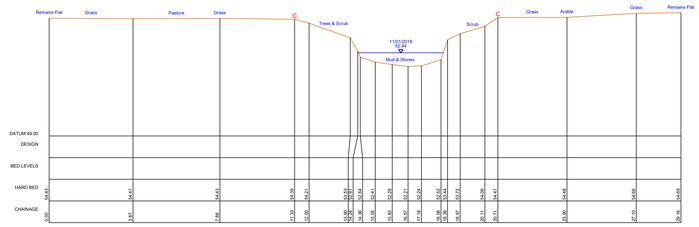
Open Channel



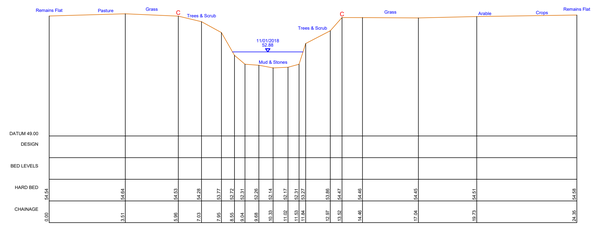
ESTO01_13725
609349.24mE 137708.42mN Brg 358
Open Channel



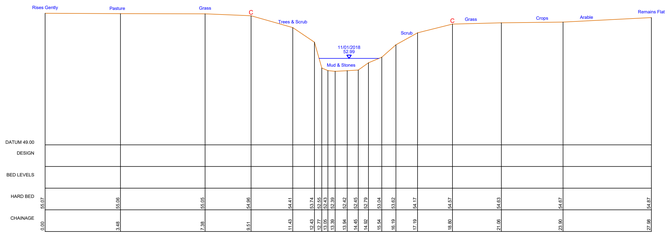
ESTO01_13799
609422.83mE 137700.4mN Brg 353
Herringe Lane Road Bridge
Tunnel Length = 5.35m
Skew Angle = 15°



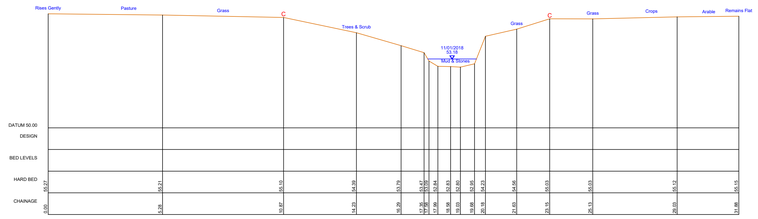
ESTO01_13809
609430.13mE 137696.15mN Brg 7
Open Channel



ESTO01_13827
609449.37mE 137699.27mN Brg 5
Open Channel



ESTO01_13936
609544.13mE 137707.16mN Brg 34
Open Channel



ESTO01_14026
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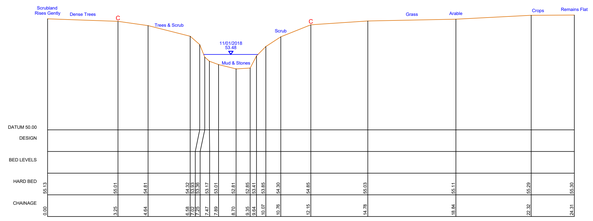
Open Channel



ESTO01_14125
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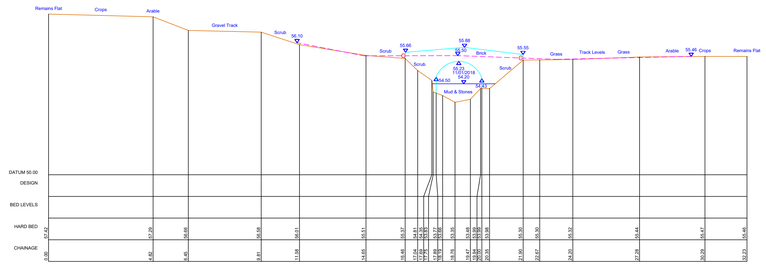
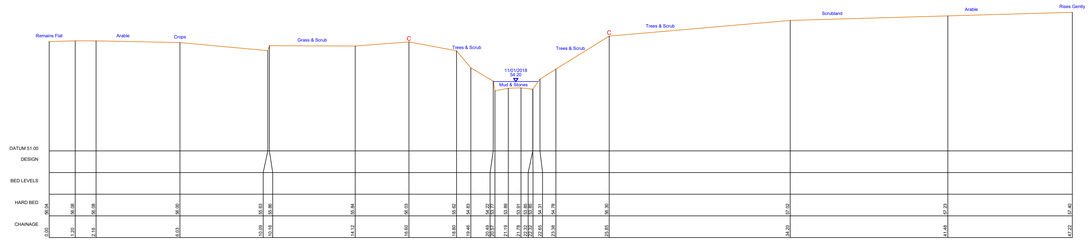
Open Channel



ESTO01_14211
609785.08mE 137635.94mN Brg 30
Access Bridge
Tunnel Length = 3.13m



ESTO01_14325
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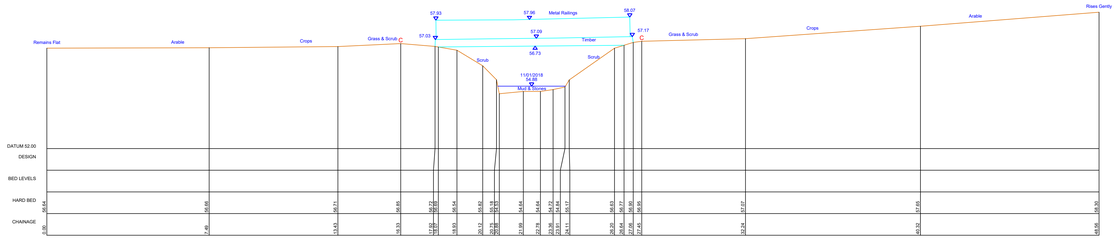
Open Channel



ESTO01_14452
610006.46mE 137535.41mN Brg 353
Footbridge
Tunnel Length = 0.43m

NOTES:

1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AP	ACCESS PLATE	FM	FIRE MAIN MARKER	R	RIVER GAUGE
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BE	BELISHA BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BH	BOREHOLE	FRM	FOUL WATER MANHOLE	RWP	RAINWATER PIPE
BV	BURIEDVALVE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BS	BUS STOP	GI	GRATED INLET	SC	STOP COCK
BS	BUS STOP	GP	GATE POST	SG	SIGNAGANTRY
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BMP	BARRIER MAST	GR	GRATE/ROD	SMH	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	C	INSPECTION CHAMBER	SWP	SHEET WATER PILING
CBF	CLOSE BOARDED FENCE	I	INVERT LEVEL	SP	SIGN POST
CL	CHAINLINK FENCE	KF	KICKING FENCE	SP	SIGN POST
CL	COVER LEVEL	MF	MOONRAKER FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JC	JUNCTION BOX	SMP	SOIL VENT PIPE
CP	CONCRETE POST	JG	JUNCTION GULLY	SPF	SPIKED PALING FENCE
CP	CONCRETE POST	LD	LEFT DRAIN	TBM	TEMPORARY BENCH MARK
CPF	CHESSWOOD PALING FENCE	LT	LEFT TREED	TOUTCO	TELEPHONE CALL BOX/POST
CR	CREST LEVEL	LV	LEFT VENTED	TP	TELEGRAPH POLE
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TP	TELEGRAPH POLE
CW	CREOSOTED WIRE FENCING	MF	MOONRAKER FENCING	TL	TRAFFIC LIGHT
DK	DROP KERB	MK	MARKER	TL	TRAFFIC LIGHT
DS	DOWN SPOUT	MP	MOORING PILE	TS	TELEGRAPH STUB BOX
DS	DOWN SPOUT	MP	MOORING PILE	TS	TELEGRAPH STUB
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DW	DOG WASTE BIN	MS	MOTOR SIGN	TS	TUBULAR STEEL
DWB	DOG WASTE BIN	NG	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRIC BOX	OB	ORDNANCE BENCH MARK	VP	VENT PIPE / SURVEY
ECF	ELECTRIC CABLE FENCE	OK	ORDNANCE SURVEY	W	WATER LEVEL/WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EP	ELECTRICITY POLE	P	PIPE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ER	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICAL TRANSMISSION LINE	PP	PIPE	WV	WATER VALVE
FL	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to CX survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4231	36.337
E20730500	TR 0221 4025	38.486
E20730503	TR 0243 3930	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4189	37.732
E20731497	TR 0651 3791	47.711
E20731538	TR 0671 3814	53.062
E20731503	TR 0666 3900	50.976
E20730004	TR 0625 3910	49.647
E20731483	TR 0151 4151	37.347
E20731484	TR 0131 4200	37.916
E20731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

Orchard House, Endeavour Park, London Road, Addington, West Malling, Kent, ME19 5SH

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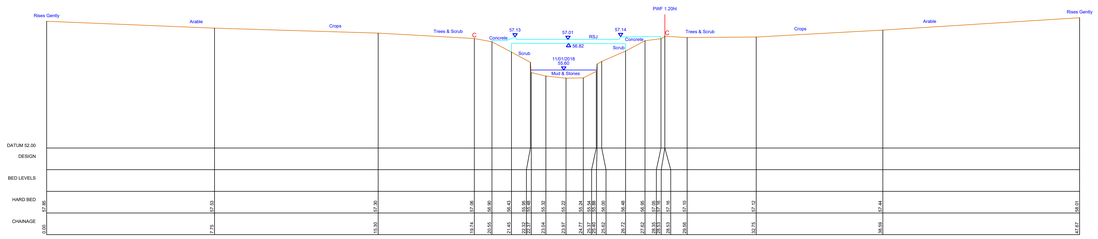
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

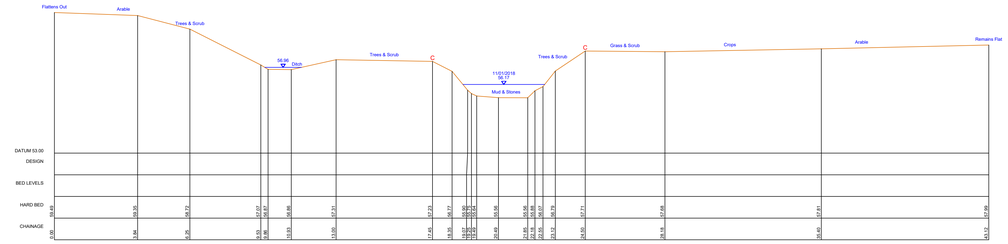
SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_13630 TO EST001_14452

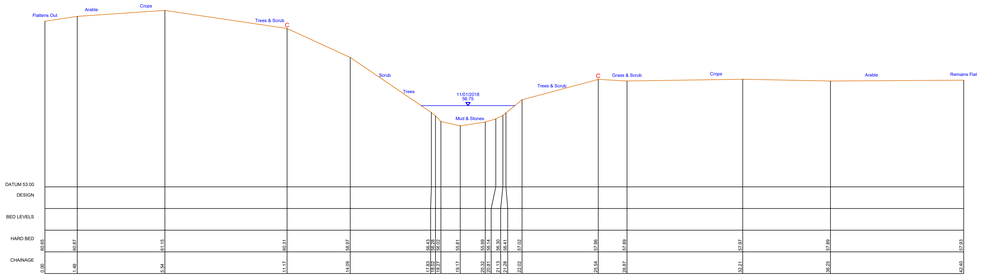
SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_132
SURVEY DATE: DECEMBER 2017 – MARCH 2018		
SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO.	REV.
CAD FILENAME: F:\J01058-01-30.dwg	X-J01058-21	–



ESTO01_14527
610084.61mE 137553.17mN Brg 339
Dilapidated Footbridge
Tunnel Length = 2.14m



ESTO01_14631
610180.01mE 137588.2mN Brg 345
Open Channel



ESTO01_14725
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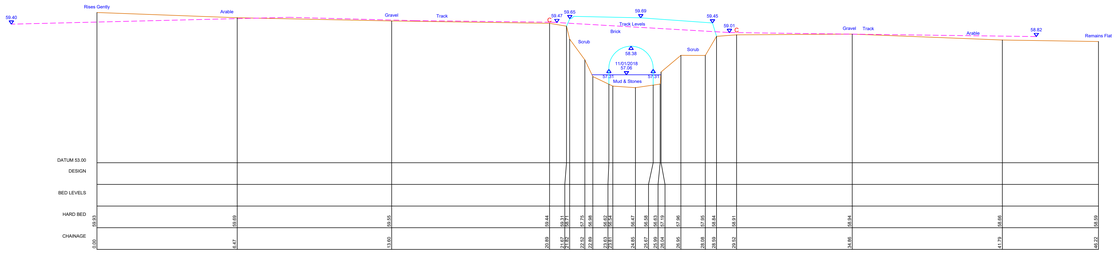
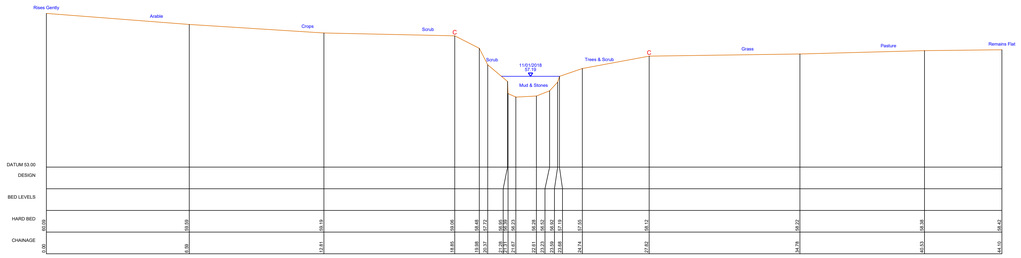
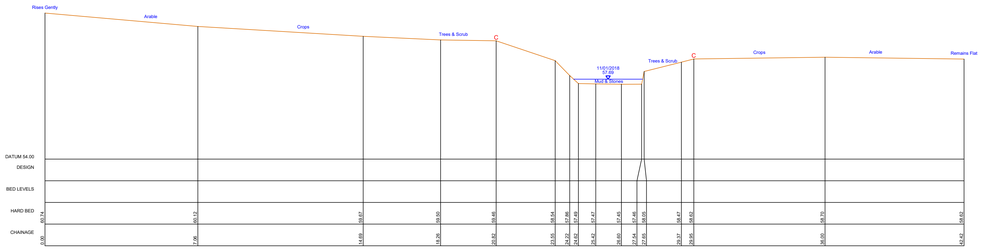
Open Channel



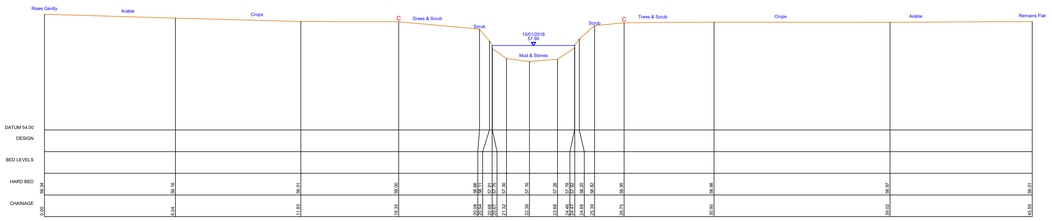
ESTO01_14781
610290.22mE 137567.02mN Brg 32
Access Bridge
Tunnel Length = 3.92m



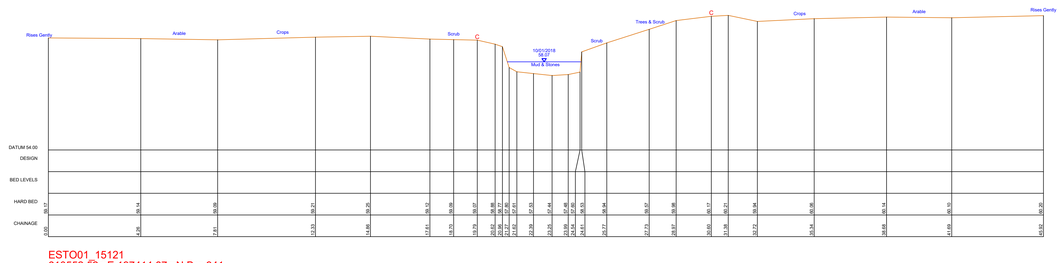
ESTO01_14833
610330.35mE 137535.82mN Brg 35
Open Channel



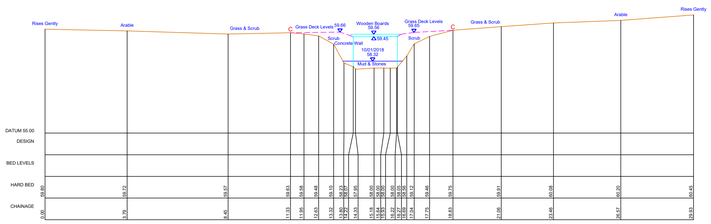
ESTO01_14932
610394.67mE 137474.12mN Brg 52
Open Channel



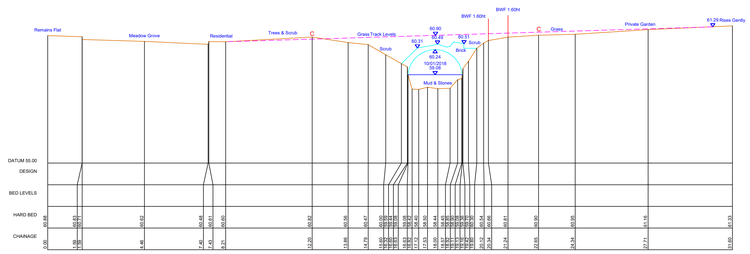
ESTO01_15026
610453.59mE 137407.07mN Brg 14
Open Channel



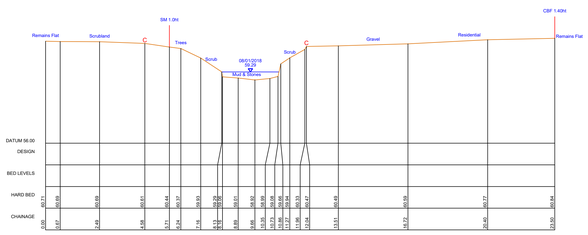
ESTO01_15121
610552.52mE 137414.87mN Brg 341
Open Channel



ESTO01_15220
610630.35mE 137481.74mN Brg 311
Footbridge
Tunnel Length = 3.69m



ESTO01_15347
610698.75mE 137593.18mN Brg 296
Footbridge
Tunnel Length = 2.64m



ESTO01_15375
610706.45mE 137612.14mN Brg 329
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE. © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHW	FIRE HYDRANT MARKER	RB	RIGHT BANK
BH	BOREHOLE	FL	FLOOD LEVEL	RC	RAILWAY CROSS
BR	BOLLARD BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BOY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BP	BOREHOLE PIPE	G	GATE	SA	SOAKAWAY PIPE
BL	BED LEVEL	GB	GRIDBOARD	SC	STOP COCK
BMK	BREAKBOX	GL	GROUND LEVEL	SOP	STAND PIPE
BS	BUS STOP	GP	GUIDE POST	SP	SIGNPOST
BM	BENCH MARK	GM	GAS MARKER	SL	SUPPLY LEVEL
BWP	BARBED WIRE	H	HEDGE	SMH	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SMP	SUPPLY METAL PILING
CBF	CLOSE BOARDED FENCE	K	KERB LEVEL	SP	SIGN POST
CF	CHAIN LINK FENCE	KF	KICKBOARD FENCE	S	SLUICE
CT	CHAIR LEVEL POST	MF	INTERMEDIATE FENCE	SV	SLICE VALVE
CLF	CLOSE FENCE	N	NOTICE BOARD	SWP	SHEET WOOD PIPE
CHF	CHAIN LINK FENCE	OG	KERB VALVE (GULLY	SWF	SHEET WIRE FENCE
CP	CONCRETE POST	LB	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CONCRETE PANEL FENCE	LC	LAMP CABLE	TELPOL	TELEPHONE POLE/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
D	DRAIN	MF	MOORING FLOATS/ FENCING	TL	TOP OF BANK (LEVEL)
DP	DROP KERB	MK	MARKER	TS	TRAFFIC LIGHT
DL	DECK LEVEL	MKB	MARKER	TLB	TRAFFIC LIGHT BOX
DOY	DOUBLE OUTER	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MSF	METAL RAILING FENCE	TSS	TIMBER RUBBING STRIP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DT	DOUBLE TRUNK	NB	NATURAL BANK	TSR	TRUNCATED STEEL RAILINGS
DV	OVERCHARGE AGENCY	NRA	NATIONAL RIVERS AUTHORITY	U	UPSTREAM
ES	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
EOY	ELECTRICITY BOUNDARY FENCE	OP	OBSERVATION POINT	W	WATER LEVEL/ WATER LINE
EOP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WA	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
ER	ELECTRIC RISER	PB	PARKING BOX	WP	WOOD PILE
EX	EARTHING ROD	PM	PARKING METER	WPF	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIBRE BOX	PST	PORTA STUDS	WW	WOODWORK
FBB	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to CS survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20730136	TR 0066 3814	51.806
E20730013	TR 0132 4202	38.489
E20730120	TR 0159 4061	36.314
E20730021	TR 0159 4291	36.137
E20730000	TR 0223 4020	38.486
E20730503	TR 0343 3930	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731571	TR 0666 3813	50.978
E20733004	TR 0504 3900	43.375
E20733005	TR 1096 3751	60.587
E20731483	TR 0151 4070	35.916
E20731494	TR 0133 4200	37.863
E60731539	TR 0671 3828	52.251

Environment Agency
KENT & SOUTH LONDON REGION
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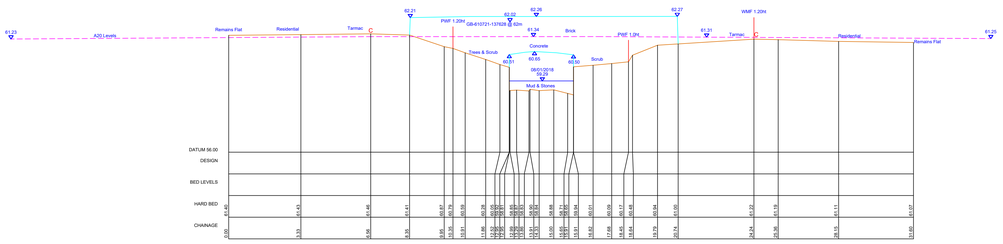
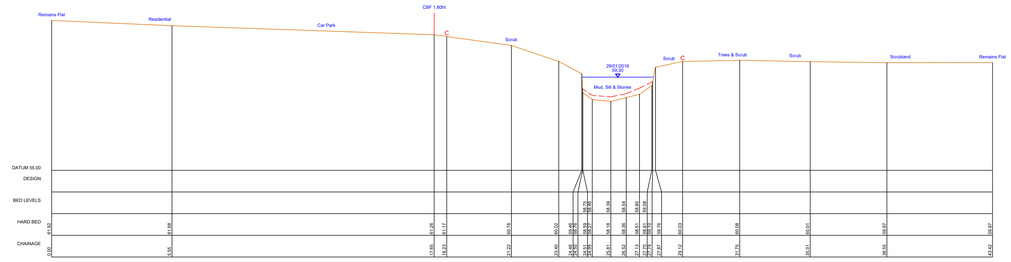
PROJECT/WATERCOURSE
EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS
EAST STOUR (EST001)
CROSS SECTIONS
EST001_14527 TO EST001_15375

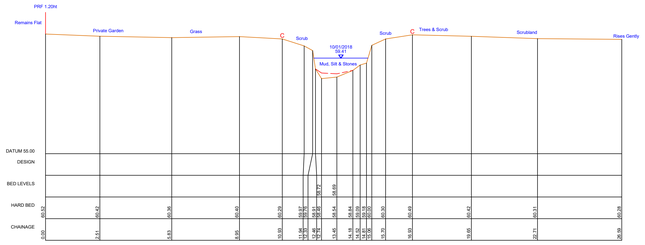
SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_332
SURVEY DATE: DECEMBER 2017 – MARCH 2018
SCALE: 1:100 — DRN: RC — CHKD: ITS
DATUM: OS GPS ACTIVE — DATE: MAR 18 — DATE: MAR 18
GRID: NATIONAL GRID — DRAWING NO. X-J01058-22 — REV. —
CAD FILENAME: X-J01058-01-3D.dwg



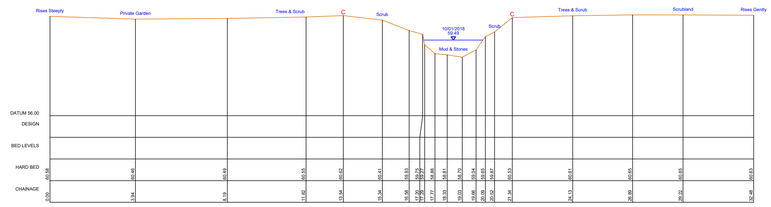
ESTO01_15396
610725.93mE 137615.86mN Brg 339
A20 Road Bridge
Tunnel Length = 11.14m



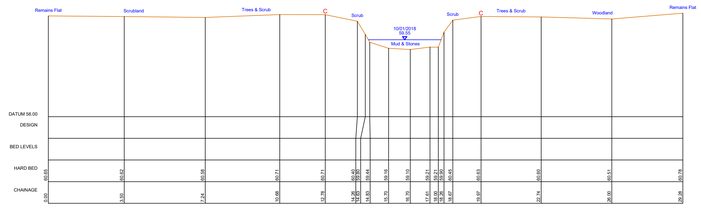
ESTO01_15433
610757.81mE 137608.84mN Brg 359
Open Channel



ESTO01_15544
610844.96mE 137604.03mN Brg 1
Open Channel



ESTO01_15623
610896.51mE 137570.16mN Brg 19
Open Channel



ESTO01_15694
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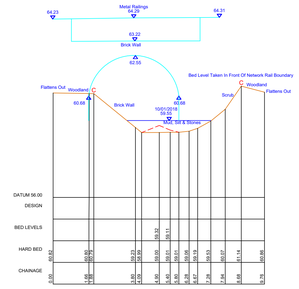
Open Channel



ESTO01_15708
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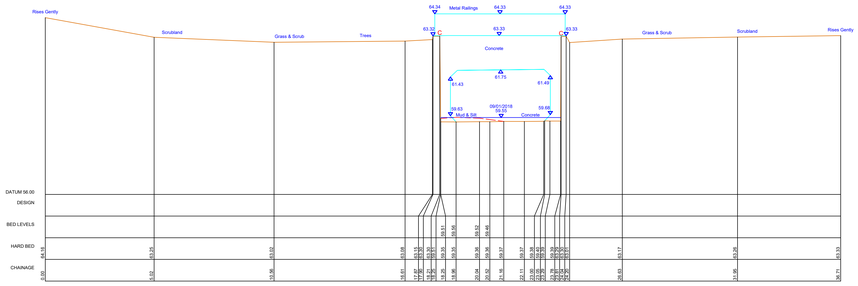
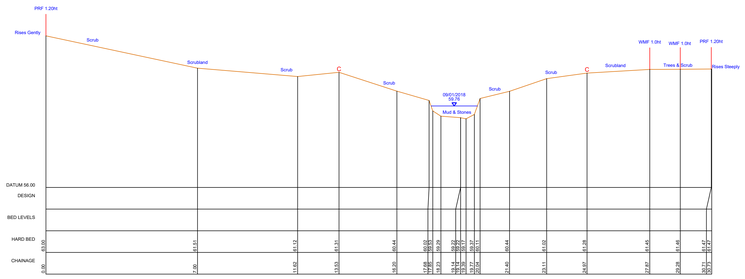
Culvert Exit
Tunnel Length = 69.67m Skew Angle
Skew Angle of Structure = 35°



EST001_15786
611043.39mE 137655.6mN Brg 310
Culvert Entrance
Tunnel Length = 69.67m



ESTO01_15824
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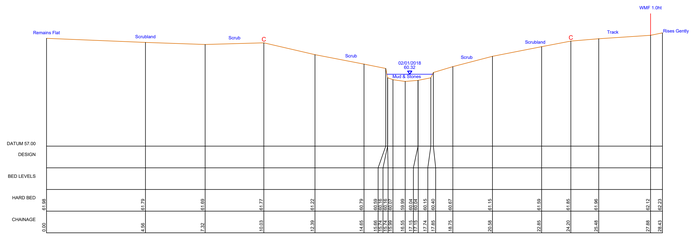
Open Channel



ESTO01_15929
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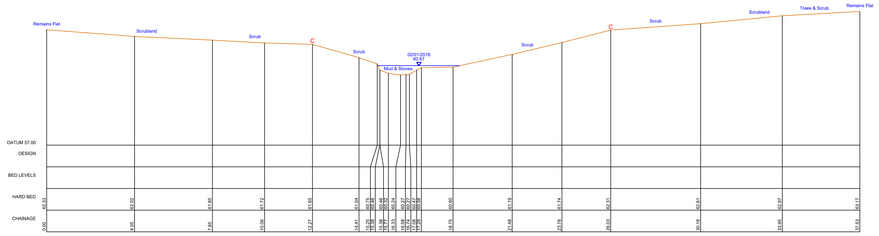
Open Channel



ESTO01_16034
611257.5mE 137651.78mN Brg 22
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY "C" ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE. © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PM	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
BB	BUSH BEACH	FL	FLOOD LEVEL	RC	RIGHT CREST
BR	BULLISH BEACON	FS	FENCE (GUT)	RJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GATE	SA	SOAKAWAY PIPE
BL	BED LEVEL	GB	GRAVEBOARD	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SGP	STAND PIPE
BS	BUSH STAKE	GM	GAS METER	SL	SOFFIT LEVEL
BW	BEACH WARP	GR	GAS MARKER	SP	SOFFIT LEVEL
BM	BRICK WALL	HB	HEAD WALL	SMH	SURFACE WATER MANHOLE
CBF	CONCRETE BRIDGE	HC	HEAD WALL CHAMBER	SPL	SOCKET PIPE PLUG
CHF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CR	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	STN	STATION
CP	CONCRETE POST	JB	JUNCTION BOX (BT)	SV	STOP VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SJP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LC	LEFT CREST	TBM	TEMPORARY BENCH MARK
CH	CHESTNUT PALING FENCE	LE	LEFT BANK	TOL/TOP	TELEPHONE CALL BOX/POST
CV	CYCLE BAR	LP	LAMP POST	TC	TELECOM CABINET
CM	CABLE TV MANHOLE	LB	LOCKED BOLLARD	TP	TELEGRAPH POLE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DH	DROP HYDR	MH	MANHOLE	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MKR	MARKER	TJB	TELEPHONE JOINT BOX
DP	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DRF	DOUBLE ROBUST COURSE	MP	MOVEABLE PALING FENCE	TRP	TRAFFIC LIGHT STAMP
DM	DOMESTIC METER	MS	MILE STONE	TS	TREE STUMP
DW	DOWN WARP	NB	NATIONAL BOUNDARY	TSP	TRIANGULAR STEEL RAILINGS
EMB	EMBANKMENT BUSHCH	NRA	NATIONAL RIVERS AUTHORITY	TP	UPRIGHT POST
ES	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTL	UNABLE TO SURVEY
ESF	ELECTRICITY BOARD FENCE	OHL	OVERHEAD TELEPHONE	WL	WATER LEVEL/WATER LINE
ELF	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POST	PB	PARKING BOX	WP	WOODEN POST
E	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIRE BELL	PR	PALING & RAIL FENCE	WT	WELL TOP (UNCHECKED)
FBM	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to OS survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.757
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	38.337
E20730500	TR 0223 4025	38.486
E20730503	TR 0343 3936	40.559
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731371	TR 0666 3813	50.975
E20733004	TR 0504 3900	43.712
E20733005	TR 1056 3751	60.087
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

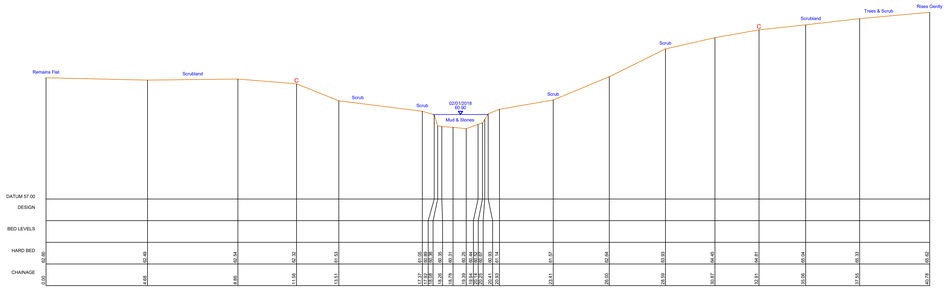
EAST STOUR (EST001)
CROSS SECTIONS
EST001_15396 TO EST001_16034

SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_152

SURVEY DATE: DECEMBER 2017 – MARCH 2018

SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-23	REV. --

CAD FILENAME: X-J01058-01-30.dwg



ESTO01_16149
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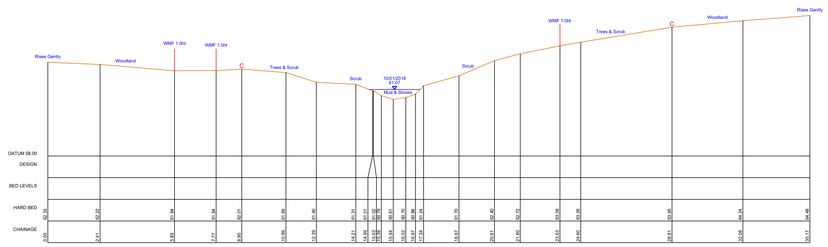
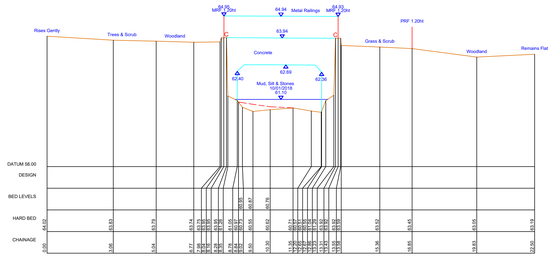
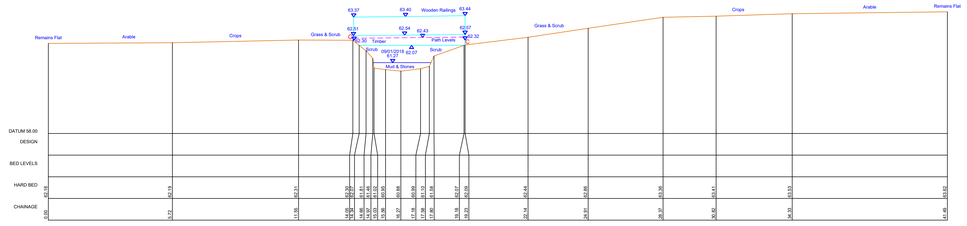


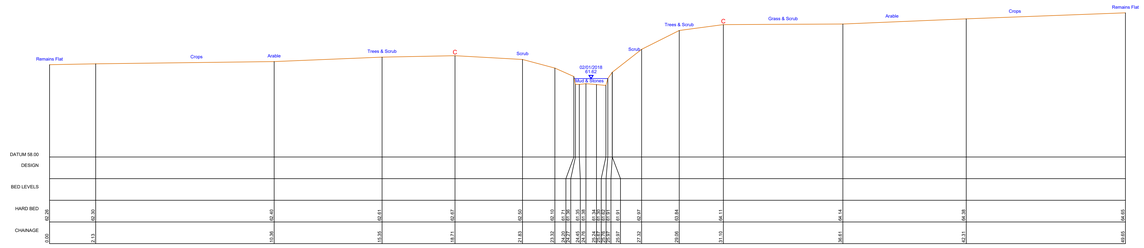
ESTO01_16223
611415.08mE 137612.25mN Brg 51
Open Channel



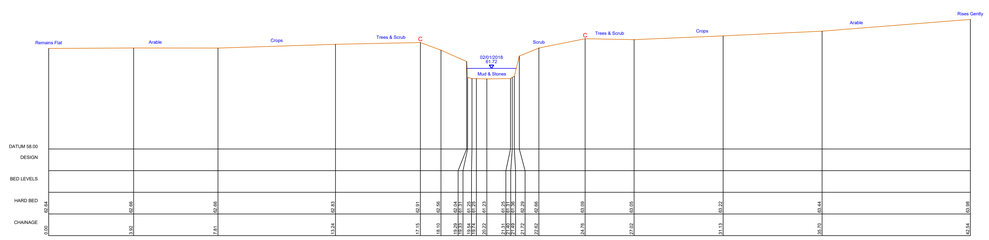
ESTO01_16264
611429.34mE 137584.38mN Brg 84
Culvert Exit
Tunnel Length = 58.13m



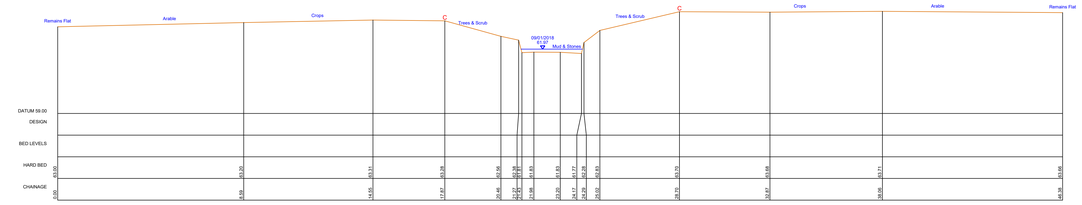
ESTO01_16351
611422.38mE 137499.73mN Brg 86
Footbridge
Tunnel Length = 0.62m



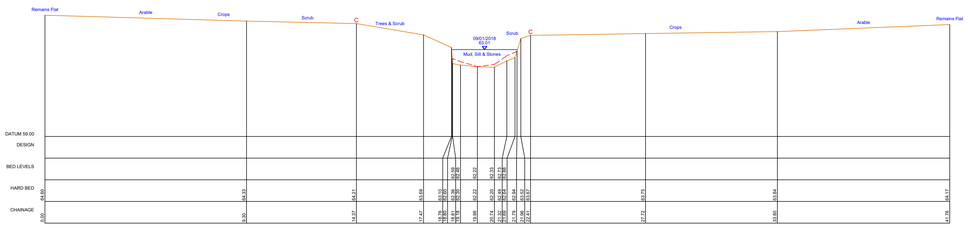
ESTO01_16425
611403.45mE 137449.93mN Brg 125
Open Channel



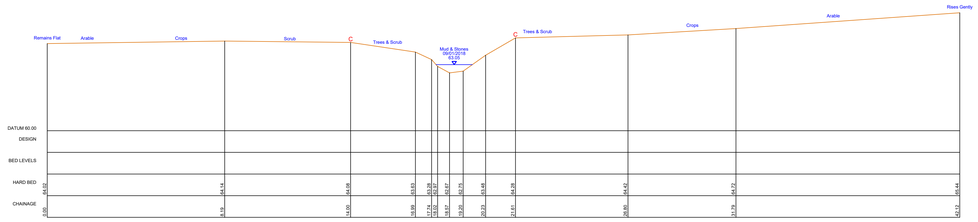
ESTO01_16528
611345.72mE 137376.98mN Brg 130
Open Channel



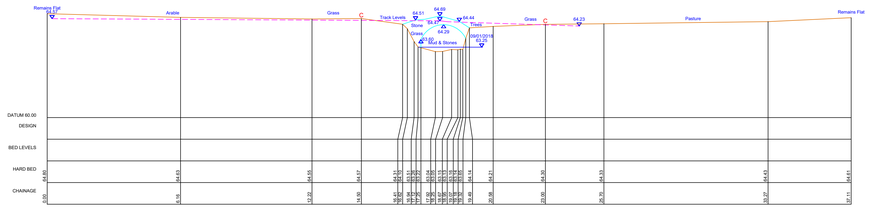
ESTO01_16614
611312.52mE 137338.53mN Brg 206
Open Channel



ESTO01_16731
611231.41mE 137258.81mN Brg 123
Open Channel



ESTO01_16819
611194.52mE 137171.57mN Brg 99
Open Channel



ESTO01_16868
611158.83mE 137151.07mN Brg 109
Access Bridge
Tunnel Length = 3.65m

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:

1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BROV	FH	FIRE HYDRANT	PM	PARKING METER
AV	AIR VALVE	FHW	FIRE HYDRANT MARKER	PR	RIGHT SIGN
B	BOLLARD	FL	FLOOR LEVEL	RL	ROOF LEVEL
BA	BALL ARRESTOR	FS	FLOOD SIGN	RJ	RIVETED JOISTS, JOIST
BDY	BOUNDARY	FWV	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GATE	RW	RAINWATER PIPE
BL	BOLLARD	GB	GRATEBOARD	SC	STOP COCK
BRM	BRICKWORK	GL	GROUND LEVEL	SGP	STAND PIPE
BS	BUS STOP	GM	GAS METER	SI	SOFFIT LEVEL
BW	BEACH WARP	GR	GAS MARKER	SL	SOFFIT LEVEL
BWM	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
CBF	CLOSE BOARDED FENCE	I	INVERT LEVEL	SP	SOIL VENT PIPE
CHF	CLOSE WARPED FENCE	IL	INVERT LEVEL	SP	GAS VENT PIPE
CIF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION WALL
CLF	CHAIN LINK FENCE	JBF	JUNCTION BOX FENCE	SV	SOIL VENT PIPE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	L	LEVEL	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LC	LEFT CREST	TD/TW	TELEPHONE DIAL BOX/POST
CS	CYCLE SIGN	LP	LAMP POST	TC	TELECOM CABINET
CW	CLOSE WARPED	LV	LOCKABLE BOLLARD	TF	TIMBER FENCE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	TFL	THRESHOLD LEVEL
DK	DROP KERB	MK	MARKOUT	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MP	MILE POST	TLB	TELEPHONE BOX
D	DOMPEDE	MP	ACCORDIC PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DW	DOWN WARP	NB	NATIVE BOARD	TS	TRAFFIC SIGNAL
DWS	DOG WASTE BIN	NS	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NW	NATIONAL RIVERS AUTHORITY	UL	UPPER LEVEL
EB	ELECTRIC BOX	OBC	OBSERVATION CHAMBER	US	UPSTREAM SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EGF	ELECTRIC GATE FENCE	PG	PADDOCK RAILINGS	WF	WIRE FENCE
EMH	ELECTRICITY MANHOLE	PI	PILE IRON	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PL	PILE TEST	WP	WOODEN POST
E	ELECTRICITY SUPPLY	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIBRE BOX	PR	POST & RAIL FENCE	YL	YARD GULLY
FBH	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to OS survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E00730012	TR 0103 4107	35.975
E00730401	TR 0149 4155	36.757
E00730403	TR 0222 4227	38.489
E00731436	TR 0665 3814	51.806
E00730013	TR 0132 4202	38.489
E00730020	TR 0159 4081	38.114
E00730021	TR 0159 4291	38.337
E00730500	TR 0021 4025	38.486
E00730503	TR 0343 3935	40.259
E00731495	TR 0152 4070	37.864
E00731496	TR 0128 4199	37.732
E00731537	TR 0667 3791	47.711
E00731538	TR 0671 3842	63.022
E00731671	TR 0666 3813	50.976
E00733004	TR 0504 3900	43.712
E00733005	TR 1056 3751	60.587
E00731483	TR 0151 4070	35.916
E00731484	TR 0133 4200	37.463
E00731539	TR 0671 3828	52.251

Environment Agency

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_16149 TO EST001_16868

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_132
SURVEY DATE: DECEMBER 2017 – MARCH 2018		
SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-24	REV. —
CAD FILENAME: X-J01058-01-30.dwg		

Original Drawing Size: A0

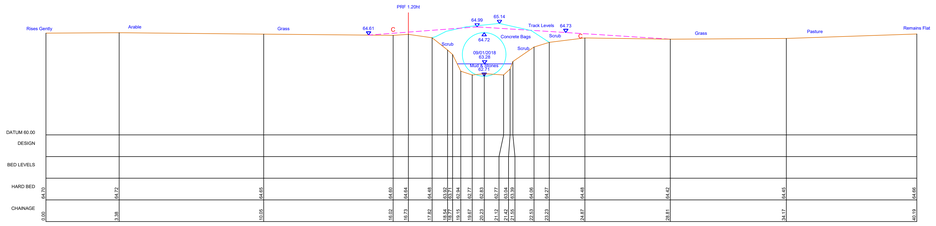
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

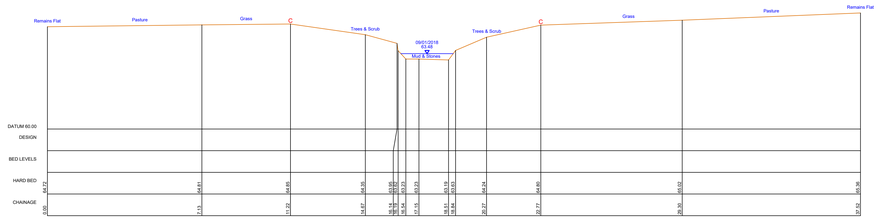
KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

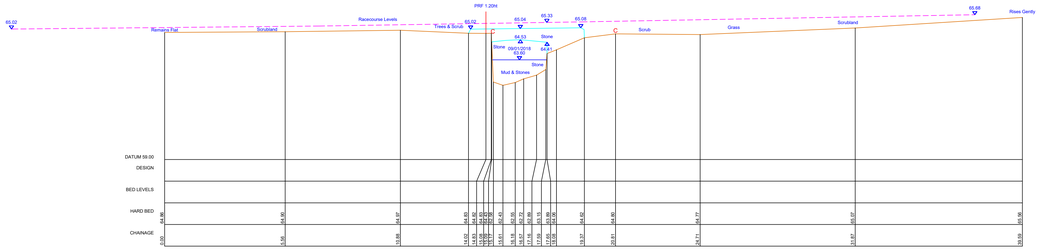
} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS



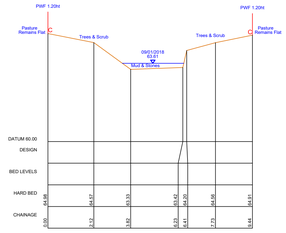
ESTO01_16877
611155.54mE 137135.87mN Brg 88
Access Bridge
Tunnel Length = 7.11m



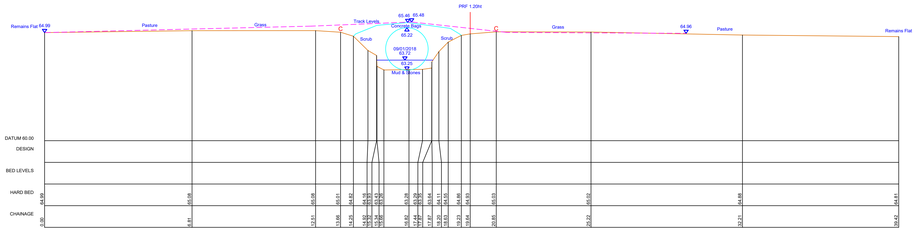
ESTO01_16924
611166.19mE 137089.73mN Brg 87
Open Channel



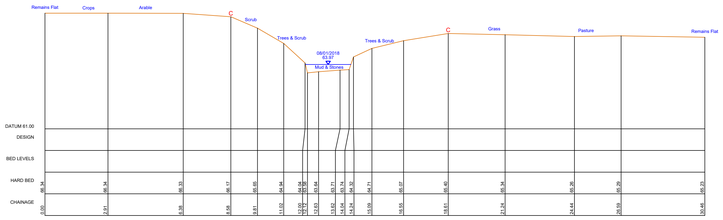
ESTO01_16971
611186.23mE 137049.03mN Brg 89
Culvert Entrance
Tunnel Length = 30.52m
Skew Angle = 35°



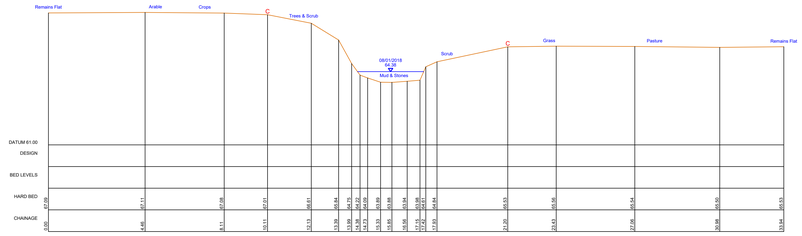
ESTO01_16975
611204.32mE 137042.13mN Brg 41
Open Channel



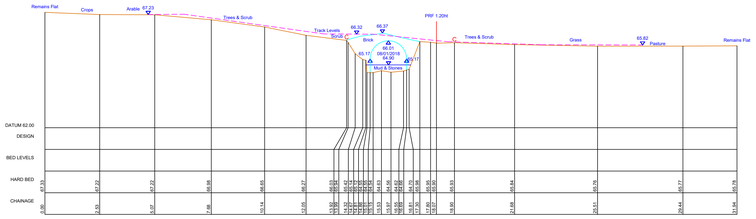
ESTO01_16998
611201.32mE 137032.56mN Brg 110
Access Bridge
Tunnel Length = 4.18m



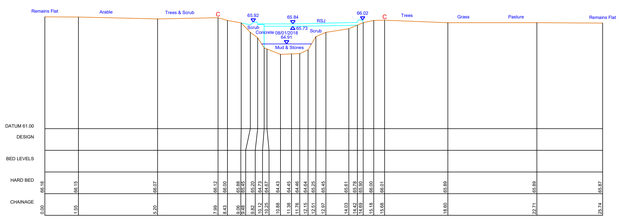
ESTO01_17135
611280.33mE 136960.24mN Brg 32
Open Channel



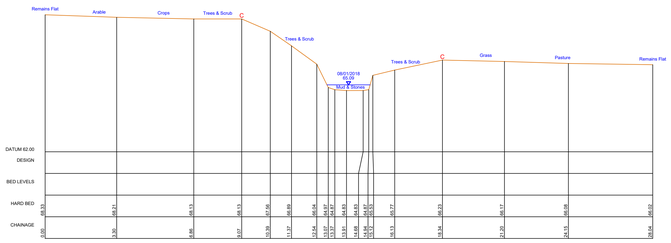
ESTO01_17237
611365.92mE 136936.66mN Brg 51
Open Channel



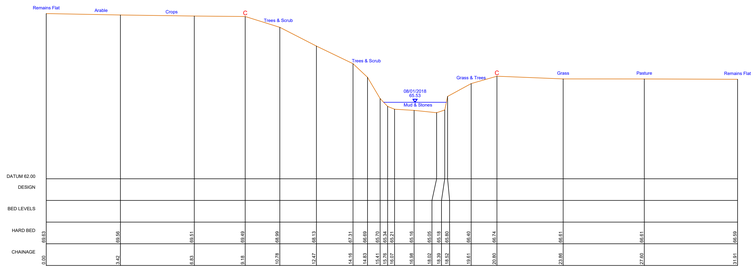
ESTO01_17331
611473.32mE 136920.38mN Brg 345
Access Bridge
Tunnel Length = 2.85m



ESTO01_17350
611490.19mE 136922.08mN Brg 350
Dilapidated Footbridge
Tunnel Length = 1.37m



ESTO01_17414
611547.21mE 136945.09mN Brg 352
Open Channel



ESTO01_17541
611672.29mE 136985.58mN Brg 326
Open Channel

NOTES:

1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
B	BOLLARD	FM	FLOW METER / MARKER	PC	PLASTIC COVER
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CHECK
BB	BECHIA BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BH	BOREHOLE	FWM	FOUL WATER MANHOLE	RWP	RAINWATER PIPE
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BL	BED LEVEL	GI	GRATED INLET	SC	STOP COCK
BO	BLIG STOP	GP	GATE POST	SI	SIGNAGE
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BM	BENCH MARK	GV	GAS VALVE	SMW	STORM WATER MANHOLE
BWF	BARBED WIRE FENCE	H	HORICULTURAL CHAMBER	SWF	SHEET METAL PILING
CBF	CLOSE BOARDED FENCE	L	INVERT LEVEL	SP	SIGN POST
CF	CHAINLINK FENCE	LP	LAMP POST / PILLAR	SP	SOAKAWAY
CL	COVER LEVEL	MF	MODMESH FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JC	JUNCTION BOX	SWP	SOIL VENT PIPE
CP	CONCRETE POST	JG	JUNCTION BOX / GULLY	TF	TEMPORARY FENCE
CP	CONCRETE POST	LV	LEFT WAIN	TBM	TEMPORARY BENCH MARK
CPF	CHESSWIG PALING FENCE	LT	LEFT TRUST	TOUTOT	TELEPHONE CAN, BOLLPOST
CTL	CABLE TV LEVEL	LP	LAMP POST	TP	TELEGRAPH POLE
CTM	CABLE TV MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
DA	DRAIN	MF	MOORING FENCE/PALING FENCING	TMH	TELECOM MANHOLE
DCW	DROP KERB	MW	MARKER	TL	TRAFFIC LIGHT
DL	DRAIN LEVEL	MH	MANHOLE	TP	TELEGRAPH POLE
DL	DRAIN LEVEL	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TPO	TIMBER RUBBING STRIP
DW	DRAIN WALL	NB	NOTICE BOARD	TR	TRAFFIC SIGNAL
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSB	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRIC BOX	OA	ORDNANCE SURVEY A	VC	VERTICAL CLOTH
EF	ELECTRIC CABLE FENCE	OA	ORDNANCE SURVEY	W	WATER LEVEL/WATER LINE
EOP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EP	ELECTRICITY POLE	P	PIPE	WF	WOODEN PALING FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
EX	EARTHING ROD	PM	PARKING METER	WPB	WOODEN POST & RAIL FENCE
FB	FIBRE OPTIC TRANSMISSION LINE	PRF	PORTAL FRAME	WV	WATER VALVE
FL	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to OS survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E20730013	TR 0133 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	36.337
E20730500	TR 0221 4025	38.486
E20731024	TR 0143 3930	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4189	37.732
E20731497	TR 0651 3791	47.711
E20731538	TR 0671 3814	53.062
E20731537	TR 0666 3826	50.976
E20730004	TR 0104 3910	42.647
E20730005	TR 0102 3791	42.647
E20731483	TR 0159 4070	37.815
E20731484	TR 0133 4200	37.851
E20731539	TR 0671 3826	52.251

Environment Agency

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_16877 TO EST001_17541

SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_132

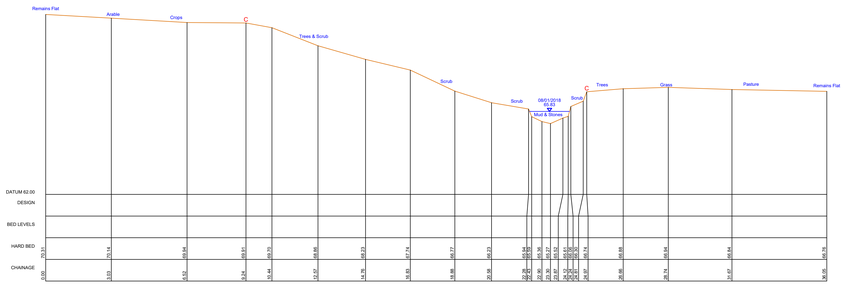
SURVEY DATE: DECEMBER 2017 – MARCH 2018

SCALE: 1:100 — DRN: RC — CHKD: ITS

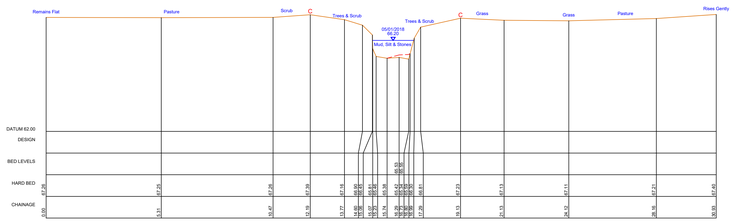
DATUM: OS GPS ACTIVE — DATE: MAR 18 — DATE: MAR 18

GRID: NATIONAL GRID — DRAWING NO. X-J01058-25 — REV. –

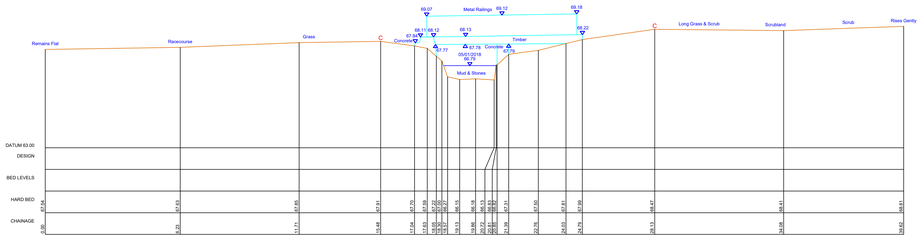
CAD FILENAME: X-J01058-25-J0.dwg



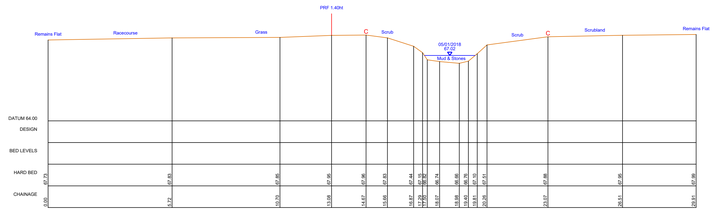
ESTO01_17618
611723.33mE 136980.71mN Brg 25
Open Channel



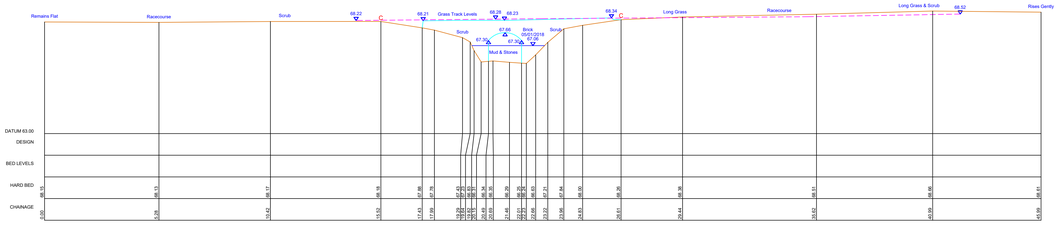
ESTO01_17722
611831.15mE 137002.2mN Brg 342
Open Channel



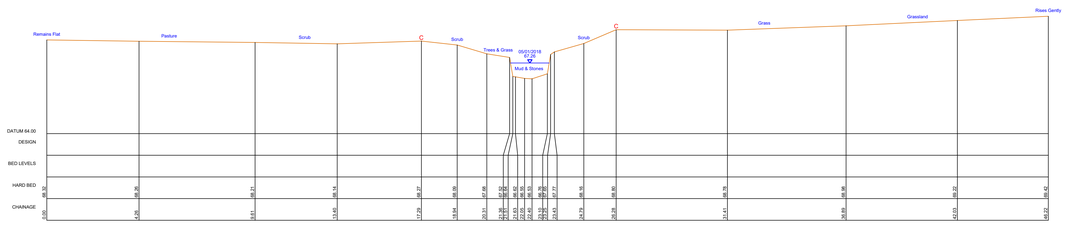
ESTO01_17845
611937.45mE 136995.18mN Brg 16
Footbridge
Tunnel Length = 0.78m



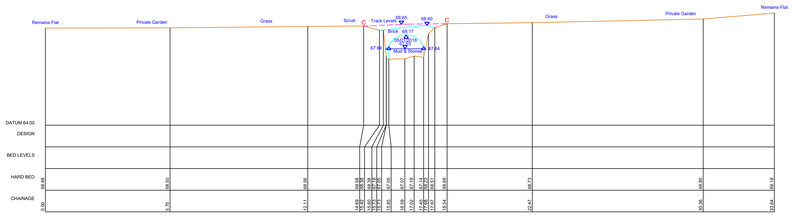
ESTO01_17913
612016.3mE 137022.01mN Brg 322
Open Channel



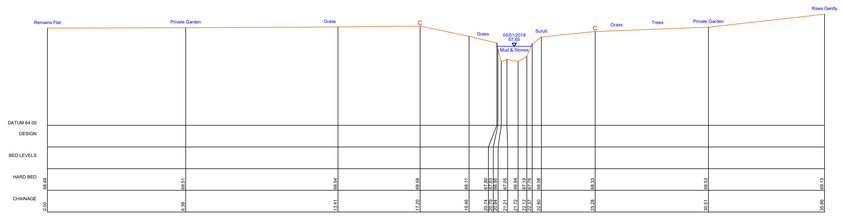
ESTO01_17959
612053.53mE 137073.24mN Brg 270
Culvert Entrance
Tunnel Length = 32.50m
Skew Angle = 40°



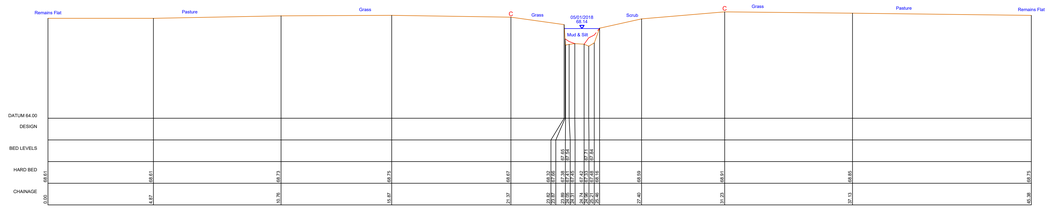
ESTO01_18038
612095.02mE 137126.58mN Brg 304
Open Channel



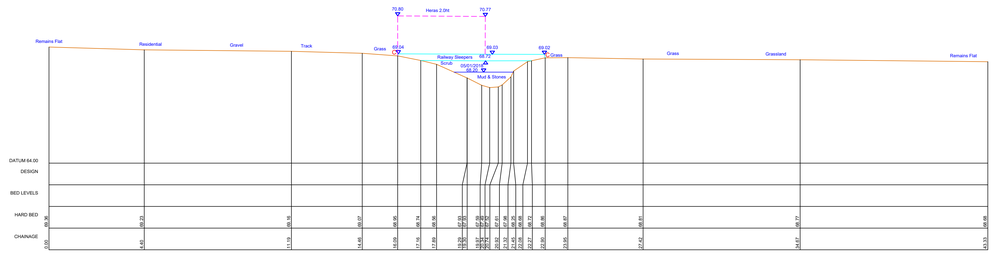
ESTO01_18115
612135.36mE 137189.81mN Brg 307
Access Bridge
Tunnel Length = 3.75m



ESTO01_18131
612149.29mE 137201.32mN Brg 305
Open Channel



ESTO01_18228
612171.31mE 137223mN Brg 68
Open Channel



ESTO01_18248
612204.25mE 137199.54mN Brg 4
Access Bridge
Tunnel Length = 3.07m

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
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2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FV	FIRE HYDRANT	PM	PARAPET WALL
A	AIR VALVE	FVM	FIRE HYDRANT MARKER	RB	RIGHT BANK
B	BOLLARD	FZ	FIRZE (GOD)	RD	ROOF DRAIN
BM	BELGIAN BEACON	FZ	FIRZE (GOD)	RJ	ROLLED STEEL JOIST
BOY	BOUGHDY	FWM	FULL WATER MANHOLE	RW	RETAINING WALL
BS	BUSHES	G	GATE	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GRIDSBOARD	SC	STOP COCK
BW	BOUNDARY WALL	GI	GRATED INLET	SD	SOUNDING
BRK	BRICKWORK	GL	GAVE (FLUT)	SG	SURGERY
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BH	BOREHOLE	GO	GAS OUTLET	SMH	SOUTHERN WATER MANHOLE
BMP	BARBED WIRE FENCE	H	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CBF	CLOSE BOARDED FENCE	L	INVERT LEVEL	SP	SIGN POST
CL	CHAIN LINK FENCE	LBF	LOW BRICK FENCE	SR	SIGNAL
CL	COVER LEVEL	MF	MOTORWAY FENCE	SV	SLUICE VALVE
CLY	CHAIN LINK FENCE	JB	JUNCTION BOX	SWP	SOIL VENT PIPE
CP	CONCRETE POST	LC	LOW CONCRETE KERBS	TBM	TEMPORARY BENCH MARK
CP	CONCRETE POST	LD	LUTT GRAT	TBM	TEMPORARY BENCH MARK
CPY	CHESTNUT PALING FENCE	LC	LUTT CREST	TOILTOP	TELEPHONE CALL BOX/POST
CT	CABLE TV MANHOLE	LI	LUTT INVERT	TP	TELEGRAPH POLE
CTV	CABLE TV MANHOLE	MB	MOORING BOLLARD	Tpo	TELECOM MANHOLE
DUL	DULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DP	DOWN PIPE	MP	MARKER POST	TL	TRAFFIC LIGHT
DL	DECK LEVEL	MKR	MARKER	TJ	TRAFFIC LIGHT BOX
DP	DAMPPROF	MP	MOORING PILE	TP	TELEGRAPH POLE
DC	DAMPPROF COURSE	MPF	MOORING PALING FENCE	TS	TRAFFIC SIGNAL STRIP
DK	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DMB	DOG MASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
E	ELECTRICITY AGENCY	NRA	NATIONAL RIVERS AUTHORITY	UL	UNDERSIDE LEVEL
ES	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
EOF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EP	ELECTRICITY POLE/PILLAR	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EMF	ELECTRICITY MARKER	P	PILE	WMF	WIRE MESH FENCE
ER	ELECTRICITY RISER	PB	PILLAR BOX	WP	WATER PIPE
EN	EARTHING NOD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WS	WATER STOP
FL	FLOOR LEVEL	PRF	POST & RAIL FENCE	WV	WATER VALVE
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to DI survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.287
E20730403	TR 0227 4027	38.889
E20731536	TR 0666 3814	51.606
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	36.337
E20730500	TR 0223 4025	38.486
E20730503	TR 0343 3935	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0667 3791	47.711
E20731538	TR 0671 3842	63.022
E20731571	TR 0666 3813	50.976
E20733004	TR 0504 3900	43.712
E20733005	TR 1056 3751	60.587
E20731483	TR 0151 4070	35.916
E20731484	TR 0133 4200	37.463
E20731539	TR 0671 3828	52.251

Environment Agency
KENT & SOUTH LONDON REGION
Orchard House, Endeavour Park, London Road, Addington, West Malling, Kent, ME19 5SH

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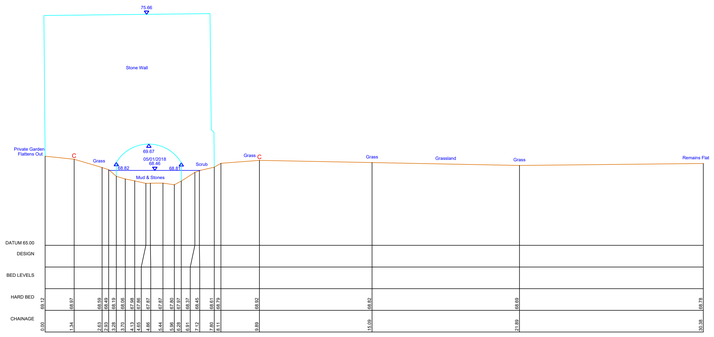
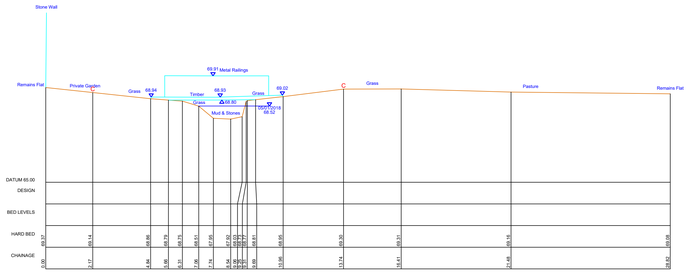
PROJECT/WATERCOURSE
EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS
EAST STOUR (EST001)
CROSS SECTIONS
EST001_17618 TO EST001_18248

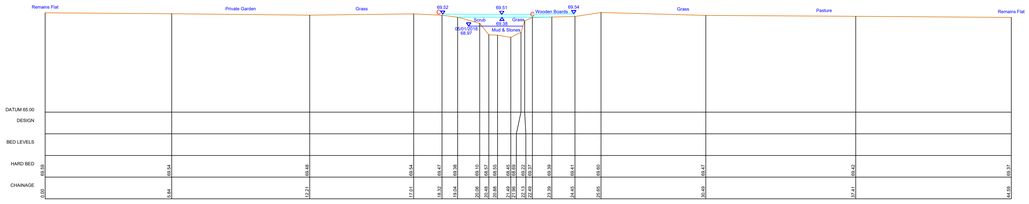
SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_152	
SURVEY DATE: DECEMBER 2017 – MARCH 2018			
SCALE: 1:100	DRN: RC	CHKD: ITS	
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18	
GRID: NATIONAL GRID	DRAWING NO. X-J01058-26		REV. –
CAD FILENAME: X-J01058-01-30.dwg			



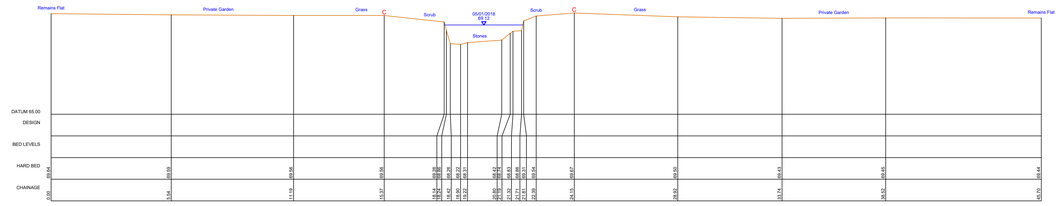
ESTO01_18307
612261.18mE 137218.29mN Brg 9
Culvert Entrance
Tunnel Length = 9.58m



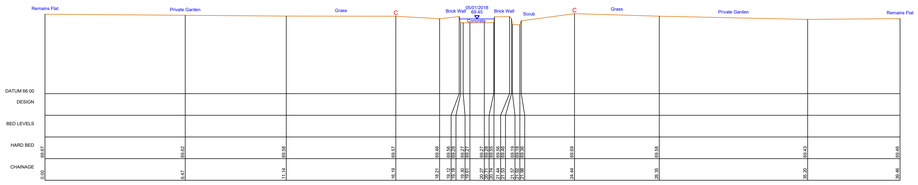
ESTO01_18328
612286.77mE 137211.57mN Brg 334
Footbridge
Tunnel Length = 0.81m



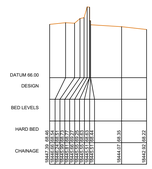
ESTO01_18435
612382.99mE 137225.92mN Brg 338
Footbridge
Tunnel Length = 0.93m



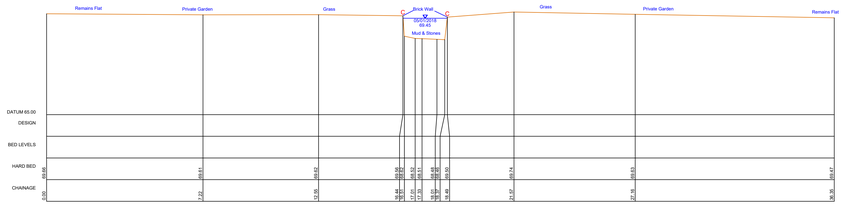
ESTO01_18443
612389.51mE 137230.47mN Brg 336
Weir Toe



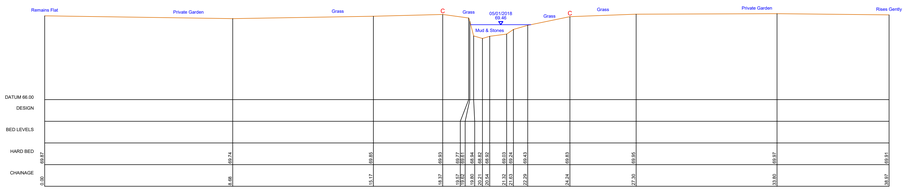
ESTO01_18446
612392.04mE 137231.05mN Brg 337
Weir Crest



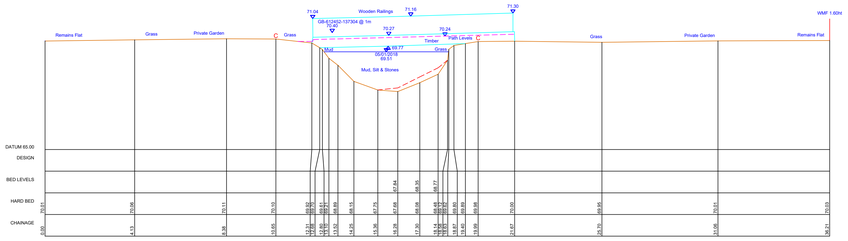
Through Section ESTO01_18446
Weir Crest



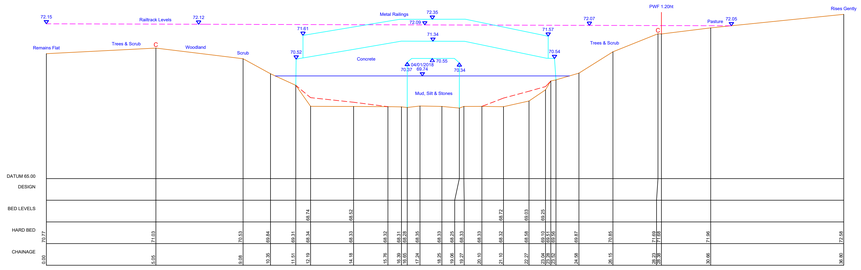
ESTO01_18447
612391.62mE 137233.89mN Brg 340
Weir Heel



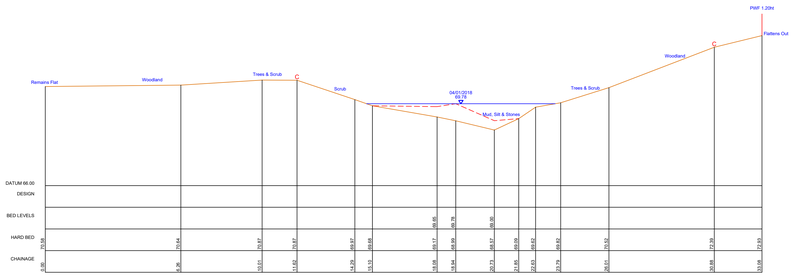
ESTO01_18509
612449.6mE 137270.65mN Brg 317
Open Channel



ESTO01_18526
612462.48mE 137293.66mN Brg 286
Footbridge
Tunnel Length = 0.76m



ESTO01_18583
612479.25mE 137349.56mN Brg 283
Culvert Entrance
Tunnel Length = 50.42m



ESTO01_18620
612494.24mE 137352.33mN Brg 351
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:

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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
B	BOLLARD	FM	FLOOD MONITORING MARKER	R	RIVER BED
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELISHA BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BH	BOREHOLE	FMH	FOUL MANHOLE	RM	RAINWATER MANHOLE
BH	BOREHOLE	G	GATE	RMP	RAINWATER PIPE
BL	BED LEVEL	GA	GALVANISED	SA	STAY ANCHOR
BL	BUILDING	GL	GROUND LEVEL	SP	STAY POST
BS	BILL STICKER	GS	GATE STOP	SP	SOFFIT PIPE
BW	BRICK WALL	GT	GATE POST	SP	SUPERVISOR
BWM	BRICK WALL	HM	HEAD WALL	SMH	SURFACE WATER MANHOLE
CBF	CLOSE BOARDED FENCE	K	KERB STONE	SP	SOIL VENT PIPE
CBF	CLOSE BOARDED FENCE	L	BASEET LEVEL	SP	DRAIN PIPE
CF	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	STN	STATION
CL	CHAIN LINK FENCE	RF	ROUND RAILING FENCE	SV	SOIL VENT PIPE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWP	SHEER WIRE FENCE
CP	CONCRETE POST	L	LIGHT POLE	TBM	TEMPORARY BENCH MARK
CP	CHESTNUT PALING FENCE	LC	LEFT CREST	TCP/SP	TELEPHONE CALL MULTIPOST
CR	CYCLE RACK	LP	LAMP POST	TC	YELLOW CABINET
CS	CAST IRON MANHOLE	LS	LIGHTING BOLLARD	TC	TELEPHONE CABINET
CUL	CULVERT	MF	MISCELLANEOUS FENCING	TL	THRESHOLD LEVEL
DK	DECK KERB	MH	MANHOLE	TS	TRAFFIC LIGHT
DP	DOWN PIPE	MP	MILE POST	TSB	TELEPHONE SUPPLY BOX
DS	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DW	DOUBLE WIRE	NB	NOTICE BOARD	TW	TIMBER WALL
DWS	DOG WASTE BIN	NG	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRIC BOX	OS	ORDNANCE SURVEY	UT	UNKNOWN TUBE
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EP	ELECTRICITY PANEL	P	POST	WMP	WATER MAIN PIPE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WF	WOODEN FENCE
ER	EARTHING ROD	PF	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ES	ELECTRICITY TRANSMISSION LINE	PM	PLANTER	WS	WATER STOP
FG	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to OS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E40730012	TR 0103 4107	35.975
E40730401	TR 0149 4229	36.789
E40731036	TR 0222 4014	38.409
E40731036	TR 0222 4014	31.406
E40730020	TR 0133 4007	38.919
E40730020	TR 0133 4007	38.314
E40730501	TR 0159 4291	38.136
E40730501	TR 0159 4291	38.286
E40730503	TR 0343 3935	40.259
E40731495	TR 0152 4070	37.864
E40731498	TR 0128 4199	37.732
E40731537	TR 0687 3791	47.711
E40731538	TR 0671 3842	53.022
E40731571	TR 0666 3813	52.076
E40733004	TR 0504 3900	43.712
E40733005	TR 1056 3751	60.587
E40731483	TR 0151 4070	35.916
E40731484	TR 0133 4200	37.463
E40731539	TR 0671 3828	52.251

Environment Agency

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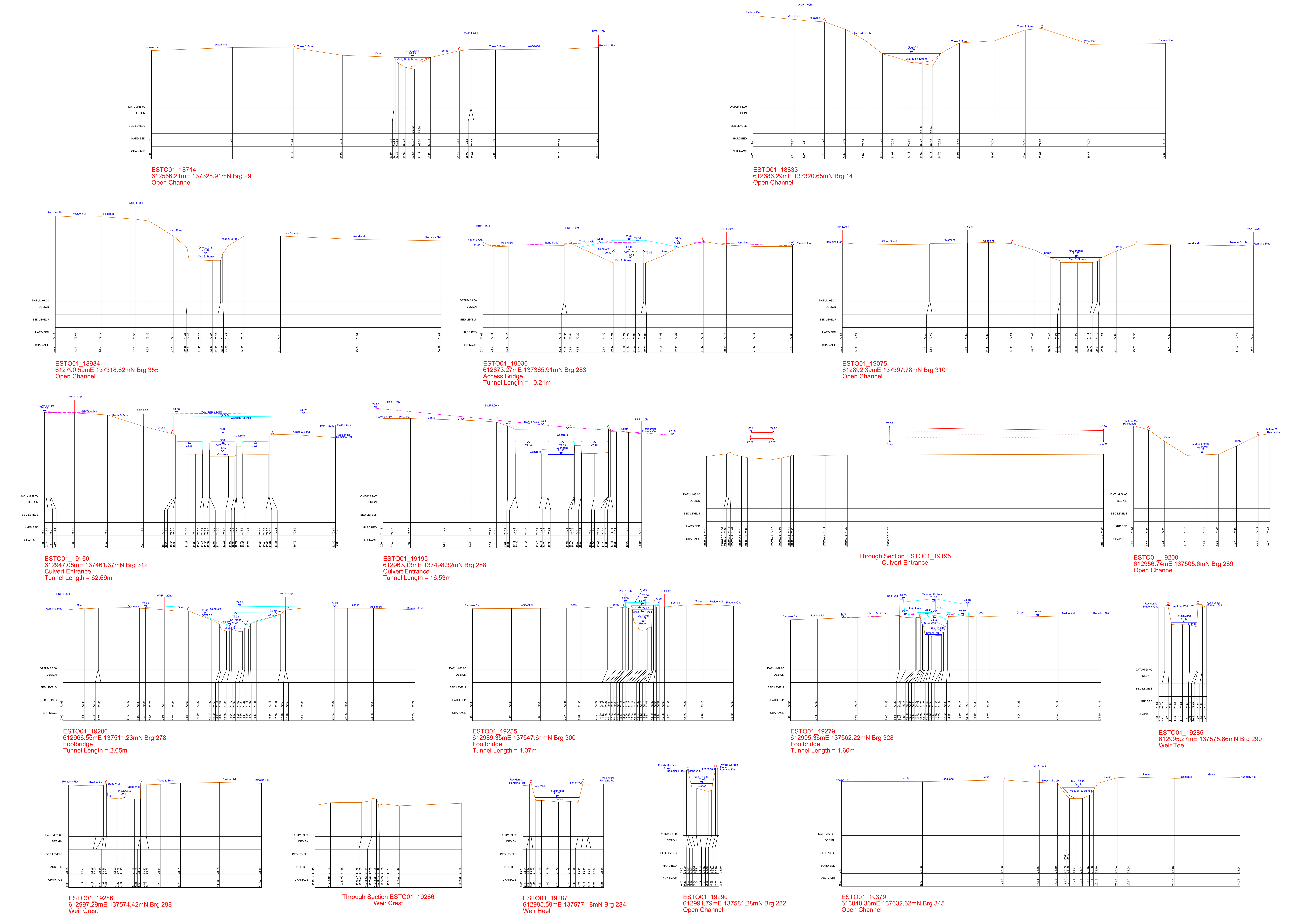
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST001)
CROSS SECTIONS
EST001_18307 TO EST001_18620

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_552
SURVEY DATE: DECEMBER 2017 - MARCH 2018		
SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-27	REV. —
CAD FILENAME: X-J01058-01-30.dwg		



Original Drawing Size: A0

KEY TO SECTIONS:

WATER LEVEL

VISIBLE BED (TOP OF SILT) AND GROUND

HARD BED (DETERMINED BY PROBING)

C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

LEFT BANK CREST
RIGHT BANK CREST
VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELISHA BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BUS STOP	GP	GATE POST	SK	SOAKAWAY
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BW	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CBF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CIF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION
CL	COVER LEVEL	IWF	INTERWOVEN FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KIG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LB	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LC	LEFT CREST	TCB/TCP	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DL	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DP	DOWNPIPE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ER	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		

(Abbreviations apply to EA survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E50730013	TR 0132 4202	38.489
E50730020	TR 0159 4061	36.314
E50730021	TR 0159 4291	36.337
E50730500	TR 0223 4025	38.486
E50730503	TR 0343 3935	40.259
E50731495	TR 0152 4070	37.864
E50731496	TR 0128 4199	37.732
E50731537	TR 0667 3791	47.711
E50731538	TR 0671 3842	63.022
E50731571	TR 0666 3813	50.976
E50733004	TR 0504 3900	43.712
E50733005	TR 1056 3751	60.587
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (ESTO01)
CROSS SECTIONS
ESTO01_18714 TO ESTO01_19379

SURVEYED BY: MALTBY LAND SURVEYS LTD Ref: 17_332

SURVEY DATE: DECEMBER 2017 – MARCH 2018

SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-28	REV. —
CAD FILENAME: X-J01058-01-30.dwg		

Original Drawing Size: A0

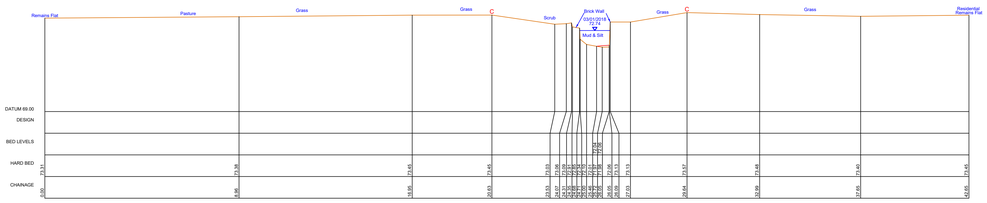
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

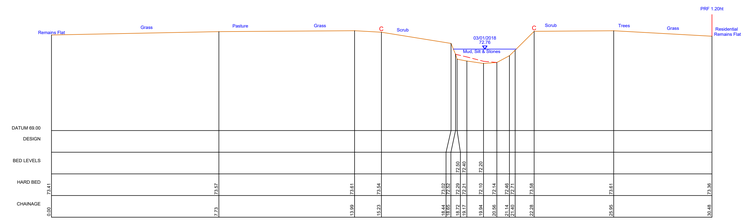
KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

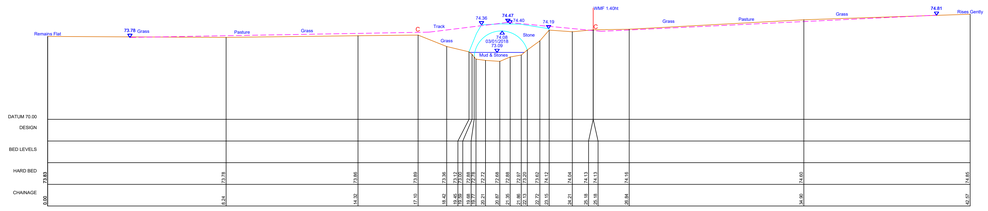
} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS



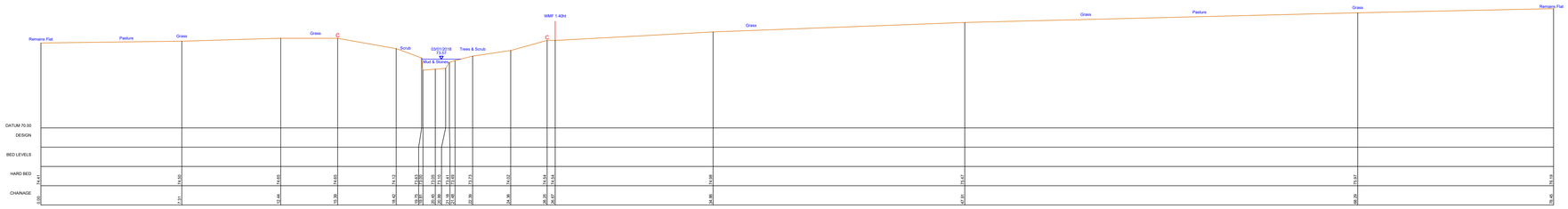
ESTO01_19399
613068.21mE 137672.01mN Brg 256
Open Channel



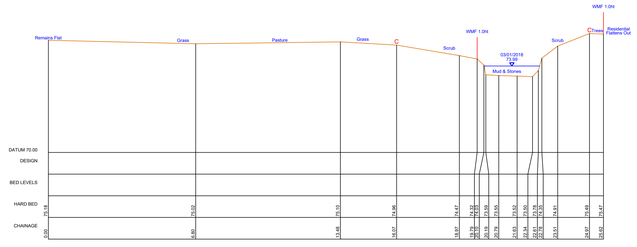
ESTO01_19411
613056.71mE 137681.38mN Brg 254
Open Channel



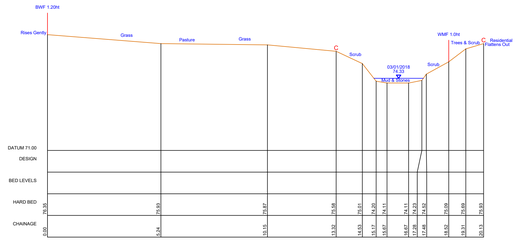
ESTO01_19524
613050.39mE 137784.9mN Brg 276
Footbridge
Tunnel Length = 2.82m



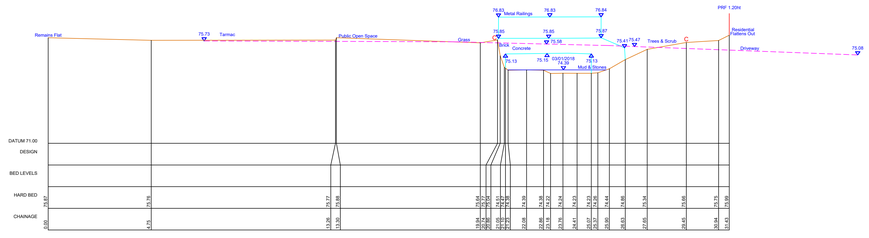
ESTO01_19632
613045.39mE 137890.96mN Brg 274
Open Channel



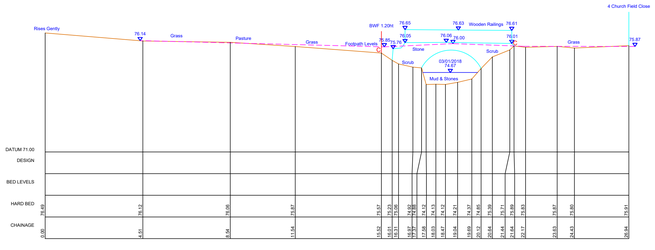
ESTO01_19727
613017.93mE 137992.94mN Brg 241
Open Channel



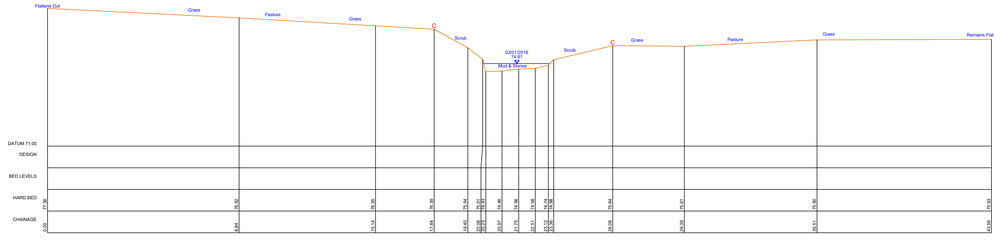
ESTO01_19830
612999.06mE 138078.28mN Brg 269
Open Channel



ESTO01_19852
613003.96mE 138087.48mN Brg 303
Access Bridge
Tunnel Length = 7.37m



ESTO01_19902
613028.95mE 138129.15mN Brg 300
Footbridge
Tunnel Length = 2.35m



ESTO01_19939
613064.37mE 138144.86mN Brg 295
Open Channel

NOTES:
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BCN	BLACK CONE BEACON	FP	FENCE POST	RJ	RAILWAY BRIDGE JOINT
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	SMP	BARMASTER PIPE
BM	BENCH MARK	GB	GRATED BOARD	SP	SIGN POST
BNK	BRICKWORK	GL	GROUND LEVEL	SS	STAND PIPE
BS	BUS STOP	GV	GATE VALVE	SV	SLUICE VALVE
BSP	BUSH SAPPER	HR	HOUSE RAIL	TP	TELEGRAPH POLE
BW	BRICK WALL	HW	HEAD WALL	SWM	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CAT	CATTLE GRID/CATTLE	K	KERBSTONE	TB	TRIAL BOREHOLE
CF	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	TCN	TUCKION
CLV	COVER LEVEL	LP	LAMPPOST/BLACK	SLV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	DMP	DUCK MOUNTED PIPE
CONC	CONCRETE	JG	JOINT GULLY GRATE	HWF	HAZEY WIRE FENCE
CP	CONCRETE POST	LC	LEVEL CROSSING	WMP	WATER MAIN MANHOLE
CPF	CHESTNUT PALING FENCE	LT	LEFT CREST	TCP/CP	TELEPHONE CALL BOX/POST
CR	CREST/CREST	LV	LOCKING VALVE	TC	TELEGRAPH CABLE
CTV	CABLE TV MANHOLE	MB	MOORING BOLLARD	TBL	TELEPHONE BOX
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DAM	DAMPER	MH	MANHOLE	TP	TRIAL PIT
DL	DECK LEVEL	MKP	MARKER	TLB	TIMBER LOOSE BOX
DP	DOWNPIPE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MPF	MESH PANEL FENCING	TSP	TRACK SPACING STRIP
DK	DOMESTICK	MS	MILE STONE	TS	TREE STUMP
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
E	ELECTRICITY AGENCY	NGA	NATIONAL GRID AUTHORITY	TW	TRAFFIC WARDEN
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	VTS	VANABLE TO SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EGM	ELECTRICITY GENERATOR	PSR	PALE STEEL RAILINGS	WSP	WATER SPIGOT
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ET	ELECTRIC TOWER	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to OS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.075
E20730401	TR 0149 4121	38.267
E20731403	TR 0227 4027	38.489
E20731498	TR 0666 3814	51.806
E20730013	TR 0139 4202	38.489
E20730020	TR 0159 4061	38.114
E20730021	TR 0159 4291	38.337
E20730000	TR 0223 4025	38.486
E20730003	TR 0343 3935	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.171
E20731538	TR 0671 3842	63.022
E20731671	TR 0666 3813	50.976
E20733004	TR 0504 3900	43.712
E20733005	TR 1056 3751	60.587
E20731483	TR 0151 4070	35.916
E20731484	TR 0133 4200	37.463
E20731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (ESTO01)
CROSS SECTIONS
ESTO01_19399 TO ESTO01_19939

SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_152

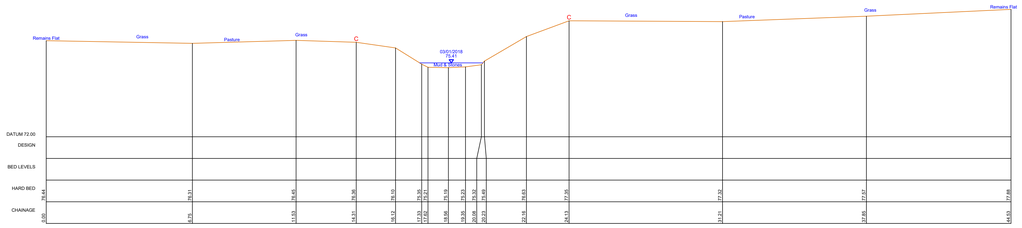
SURVEY DATE: DECEMBER 2017 – MARCH 2018

SCALE: 1:100 — DRN: RC — CHKD: ITS

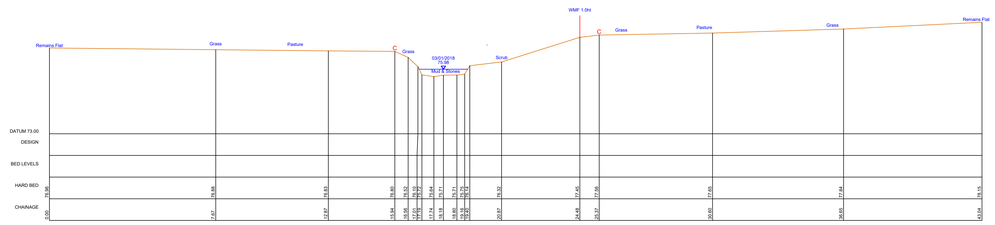
DATUM: OS GPS ACTIVE — DATE: MAR 18 — DATE: MAR 18

GRID: NATIONAL GRID — DRAWING NO. X-J01058-29 — REV. —

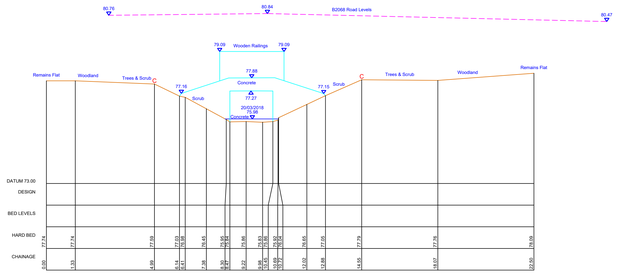
CAD FILENAME: X-J01058-01-30.dwg



ESTO01_20030
613070.39mE 138197.34mN Brg 352
Open Channel



ESTO01_20112
613149.06mE 138219.64mN Brg 348
Open Channel



ESTO01_20131
613168.27mE 138239.29mN Brg 314
Culvert Exit
Tunnel Length = 7.30m

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PM	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
BH	BOREHOLE	FP	FENCE POST	RC	RAILWAY CREST
BB	BULLISH BEACON	FS	FENCE STOP	RJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BM	BENCH MARK	G	GATE	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GRIDBOARD	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BUSH / SHRUB	GM	GAS METER	SF	SOFFIT LEVEL
BW	BEACH WARP	GM	GAS MARKER	SL	SOFFIT LEVEL
BW	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
CBF	CLOSE BOARDED FENCE	HC	HOT WATER CHAMBER	SP	SIGN POST / POLE
CHF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION
CH	CHAIN LINK FENCE	JB	JUNCTION BOX FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LC	LEFT CREST	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LE	LEFT BREST	TCP/EW	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CS	CAST IRON MANHOLE	LB	LOCKABLE BOLLARD	TF	TRIP WIRE FENCE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	TFL	THREADALE LEVEL
DH	DROP HYDR	MH	MANHOLE	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MKB	MARKER BOX	TLB	TELEPHONE BOX
DP	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MPF	MESH PALING FENCE	TRP	TRAFFIC LIGHT LAMP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
EW	EAST WEST	NB	NATIONAL BEACON	TSR	TRIPLE STEEL RAILINGS
EWB	EMERGENCY BUOACY	NBA	NATIONAL RIVERS AUTHORITY	UB	UNROOFED BIN
ES	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UFL	UNABLE TO SURVEY
ESF	ELECTRICITY BOX FENCE	OP	OPEN PALING FENCE	UL	UNDER LEVEL / WATER LINE
ESF	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WA	WATER VALVE
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
ET	ELECTRICITY TOWER	PB	PARKING BOX	WP	WATER PIPE
E	EARTHING BOX	PM	PARKING METER	WPF	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIRE BELL	PR	PADDOCK & RAIL FENCE	WW	WIRE WALL
FBB	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to GB survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	32.757
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	38.337
E20730500	TR 0223 4025	38.486
E20730503	TR 0343 3936	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731571	TR 0666 3813	50.975
E20733004	TR 0504 3900	43.712
E20733005	TR 1056 3751	60.087
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

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PROJECT/WATERCOURSE

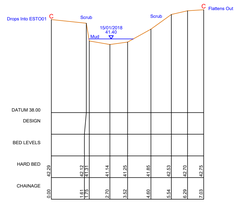
EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

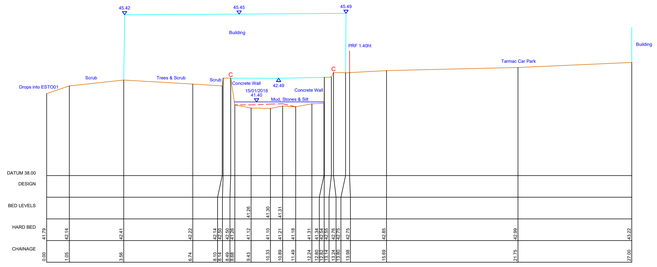
EAST STOUR (EST001)
CROSS SECTIONS
EST001_20030 TO EST001_20131

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_132
SURVEY DATE: DECEMBER 2017 – MARCH 2018		
SCALE: 1:100	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-30	REV. —
CAD FILENAME: X-J01058-01-30.dwg		

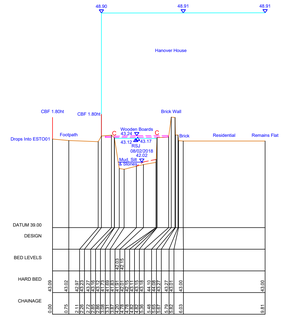
SCALE = 1:100



ESTO05_0013
604927.92mE 139098.33mN Brg 334
Open Channel

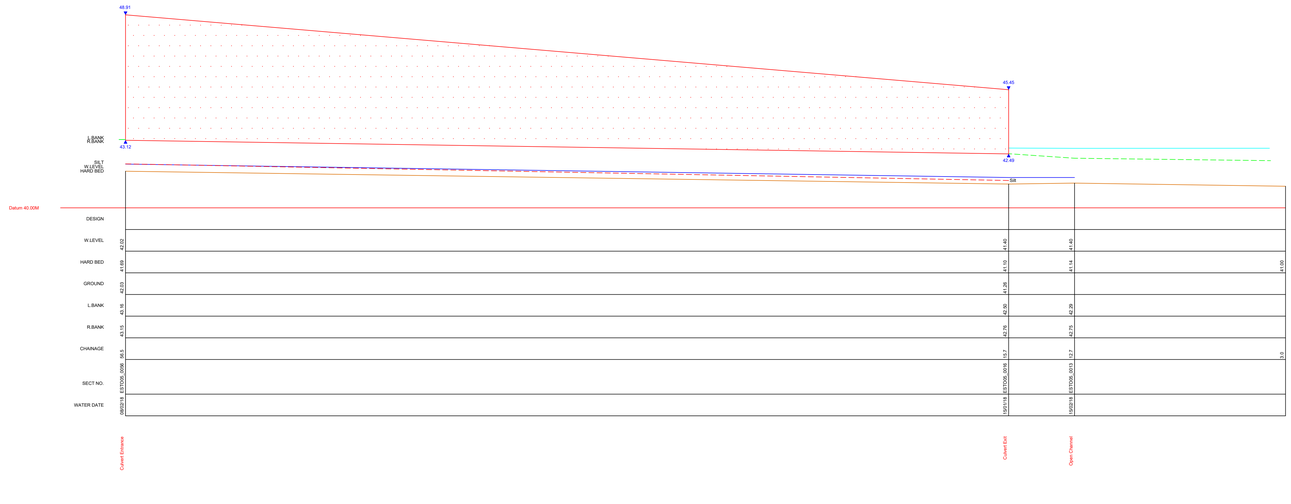


ESTO05_0016
604926.51mE 139092.5mN Brg 17
Culvert Exit
Tunnel Length = 40.76m

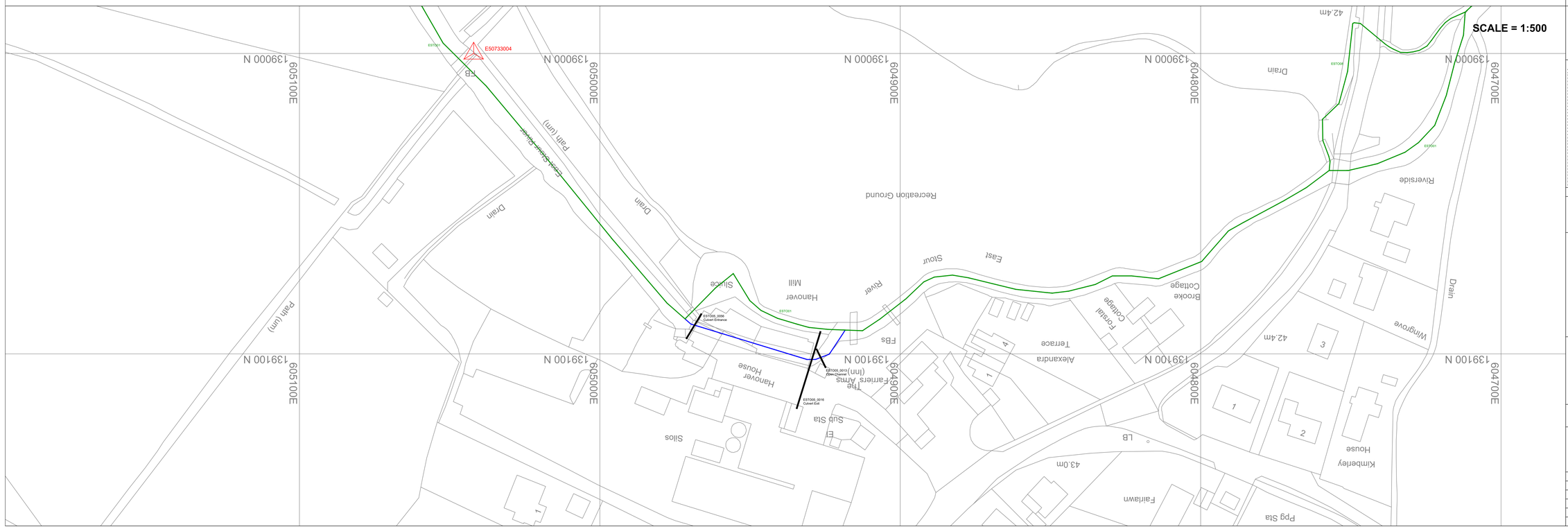


ESTO05_0056
604966.14mE 139086.6mN Brg 31
Culvert Entrance
Tunnel Length = 40.76m

SCALE = 1:100 H, 1:100 V



SCALE = 1:500



Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

LOCATION PLAN ORIENTATION

NOTES:
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RD	RIGHT DAMP
BH	BOREHOLE	FP	FENCE POST	RJ	RIGHT JOINT
BL	BOLLARD BEACON	FS	FENCE POST	RJS	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BM	BENCH MARK	G	GRATE	RW	RAINWATER PIPE
BL	BED LEVEL	GB	GARGBOARD	S	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BOTTOM SILL	GM	GAS METER	SL	SOFFIT LEVEL
BM	BENCH MARK	GR	GAS MARKER	SL	SOFFIT LEVEL
BW	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
CBF	CONCRETE BLOCK FENCE	I	INVERT LEVEL CHAMBER	SP	SOCKET PIPE PLANC
CHF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	GAS POST
CF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STW	STATION WALL
CH	CHAINAGE POINT	JB	JUNCTION BOX FENCE	SVP	SOIL VENT PIPE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB GRATE GULLY	TBM	TEMPORARY BENCH MARK
CP	CONCRETE POST	LG	LOW GRID	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LJ	LEFT JOIST	TCJ/VP	TELEPHONE CALL BOX/POST
CR	CREST LEVEL	LP	LAMP POST	TP	TRIAL PIT
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
DA	DAMP AREA	MC	MOORING CHAIN/ROPE FENCING	TP	TRIAL PIT
DS	DROP STOB	MF	MANHOLE	TS	TIMBER SILLS (CAL)
D	DECK LEVEL	MKR	MARKER	T.B	TRAFFIC LIGHT BOX
DP	DOWN PIPE	MP	MOORING PILE	T.P	TRAFFIC LIGHT POST
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
E	EAST/EASTING	N	NORTHING	TSF	TRIPLE STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	U	UPSTREAM
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTL	UNABLE TO SURVEY
EF	ELECTRICITY BOX FENCE	OP	OVERHEAD POWER LINE	W	WATER MANHOLE/ WATER LINE
EJP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	Wa	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POST	PB	PHONE BOX	WP	WATER PIPE
E	EARTHING ROD	PM	PARKING METER	WF	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	W	WATER VALVE
F	FENCE POST	PR	PALING & RAIL FENCE	WV	WATER VALVE
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to GIS survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.808
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	38.337
E20730500	TR 0223 4026	38.486
E20730503	TR 0343 3935	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731471	TR 0666 3813	50.976
E20733004	TR 0504 3900	43.172
E20732005	TR 1056 3751	60.967
E20731483	TR 0151 4070	35.916
E20731484	TR 0133 4200	37.863
E20731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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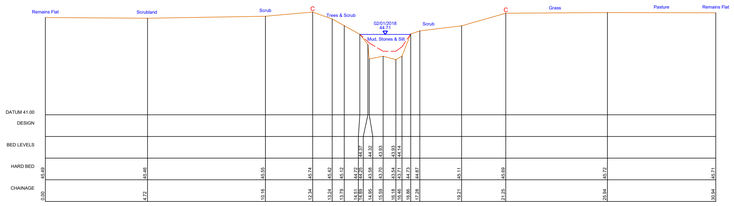
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

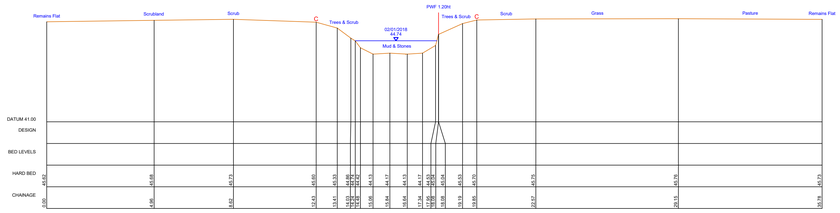
SITE/LIMITS

EAST STOUR (EST005)
CROSS SECTIONS, LONG SECTION
& LOCATION PLAN
EST005_0013 TO EST005_0056

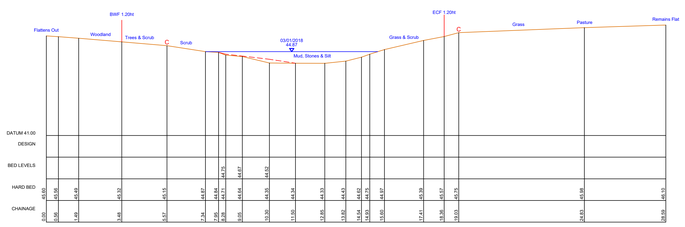
SURVEYED BY: MALTBY LAND SURVEYS LTD			Ref: 17_332
SURVEY DATE: JANUARY – FEBRUARY 2018			
SCALE: AS SHOWN	DRN: RC	CHKD: ITS	
DATUM: OS GPS ACTIVE	DATE: FEB 18	DATE: MAR 18	
GRID: NATIONAL GRID	DRAWING NO. X-J01058-35		REV. --
CAD FILENAME: X-J01058-35.dwg			



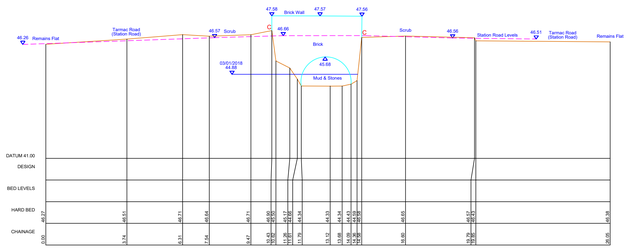
ESTO06_0036
606187.2mE 138053.63mN Brg 58
Open Channel



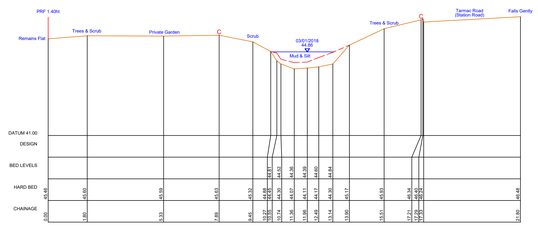
ESTO06_0096
606234.48mE 138025.55mN Brg 77
Open Channel



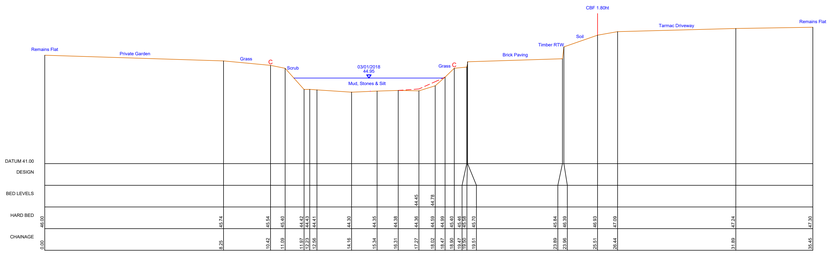
ESTO06_0216
606330.75mE 138029.61mN Brg 312
Open Channel



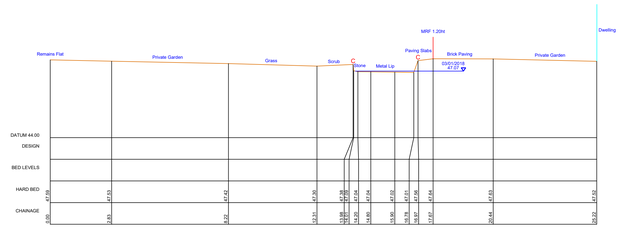
ESTO06_0229
606336.68mE 138031.05mN Brg 346
Station Road Bridge
Tunnel Length = 5.86m



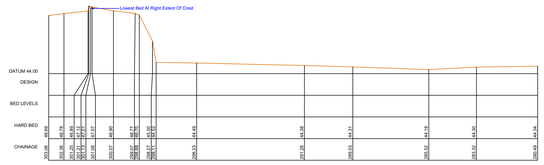
ESTO06_0242
606347.2mE 138047.84mN Brg 310
Open Channel



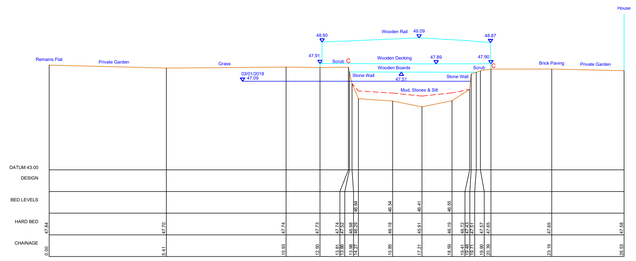
ESTO06_0280
606375.64mE 138067.88mN Brg 324
Open Channel



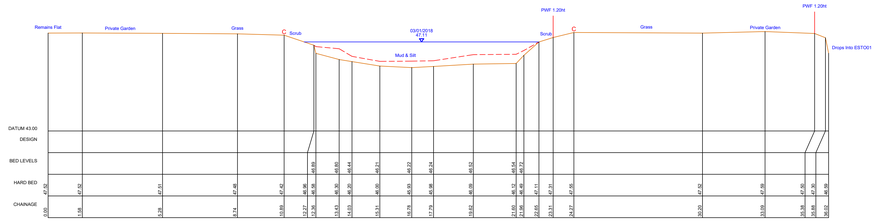
EST06_0301
606391.28mE 138081.53mN Brg 322
Disused Mill Wheel



EST06_0301
Disused Mill Wheel



ESTO06_0307
606394.92mE 138081.79mN Brg 331
Footbridge
Tunnel Length = 1.88m



ESTO06_0350
606433.86mE 138101.48mN Brg 328
Open Channel

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHW	FIRE HYDRANT MARKER	RB	ROOT BARK
BB	BUSH BARK	FL	FLOOD LEVEL	RC	RECTANGULAR CULVERT
BE	BOLLARD BEACON	FS	FENCE STOP	RJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GATE	S	SIGNPOST/SIGN
BL	BED LEVEL	GB	GRIDBOARD	SB	STOP BLOCK
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BUS STOP	GM	GAS METER	SF	SOFFIT LEVEL
BW	BEACH WARP	GM	GAS MARKER	SL	SUPPLY LEVEL
BM	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
CBF	CONCRETE BRIDGE FENCE	I	INVERT LEVEL CHAMBER	SP	SIGN POST/PLATE
CHF	CLOSE BOARDED FENCE	L	INVERT LEVEL	SP	SIGN POST
CF	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	STN	STATION VALVE
CL	CHAIN LINK FENCE	JB	JUNCTION BOX FENCE	SV	SOIL VENT PIPE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CHEQUER POST	LC	LEFT CREST	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LI	LEFT INVERT	TCP/TP	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CS	CAST IRON MANHOLE	LB	LOCKABLE BOLLARD	TF	TRIANGULAR FENCE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	TFL	THREADALE LEVEL
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MKR	MARKER	TJB	TELEPHONE JUNCTION BOX
DP	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DRF	DOUBLE ROBUST COURSE	MPF	MOVABLE PALING FENCE	TR	TRAFFIC RADIO STAMP
DR	DOWNSPOUT	MS	MILE STONE	TS	TREE STUMP
DW	DOG WASH	NB	NATIONAL BOUNDARY	TSR	TUBE STEEL RAILINGS
EAW	ENVIRONMENT AGENCY	NW	NATIONAL WORKS AUTHORITY	TW	UNTREATED WATER
ED	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTL	UNABLE TO SURVEY
EF	ELECTRICITY BOX FENCE	OP	OPEN PALING FENCE	VL	VISIBLE WATER LINE
ELF	ELECTRICITY CABLE RT	OSR	OPEN STEEL RAILING	WL	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PARKING BOX	WP	WOODEN POST
E	EARTHING BOLT	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIBRE BOX	PR	PALING & RAIL FENCE	WW	WIRE WORK FENCE
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to OS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.757
E20730403	TR 0222 4027	38.489
E20731606	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	38.337
E20730506	TR 0223 4025	38.486
E20730503	TR 0343 3936	40.559
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731571	TR 0666 3813	50.375
E20733004	TR 0504 3900	43.712
E20733005	TR 1056 3751	60.087
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST006)
CROSS SECTIONS
EST006_0036 TO EST006_0350

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_152
SURVEY DATE: JANUARY 2018		
SCALE: 1:100	DRN: RP	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: JAN 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-36	REV. --

CAD FILENAME: X-J01058-36.dwg

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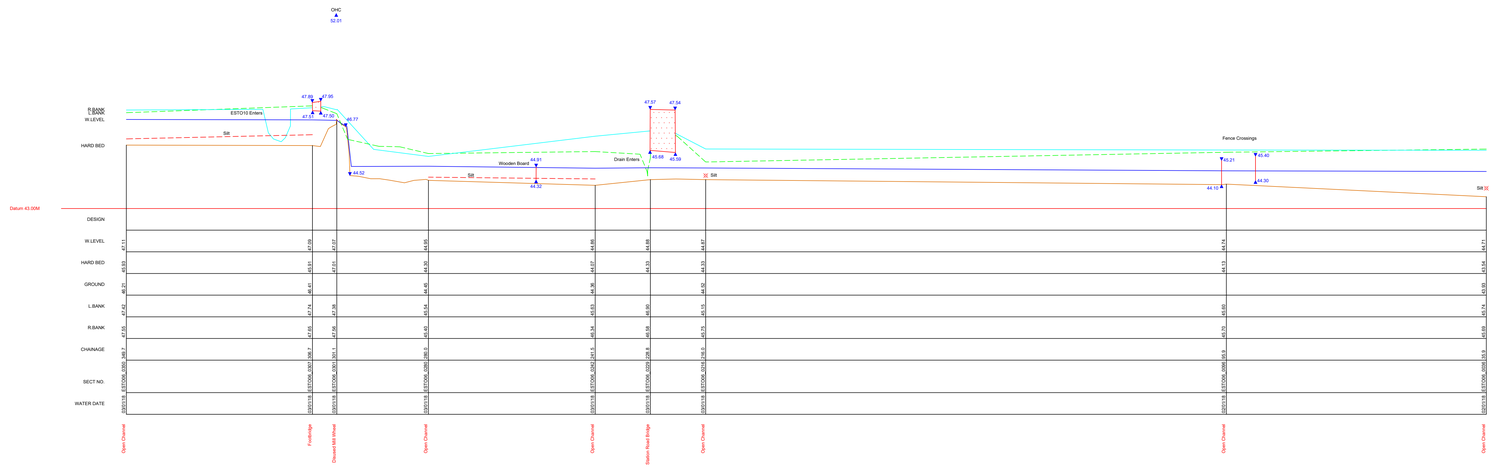

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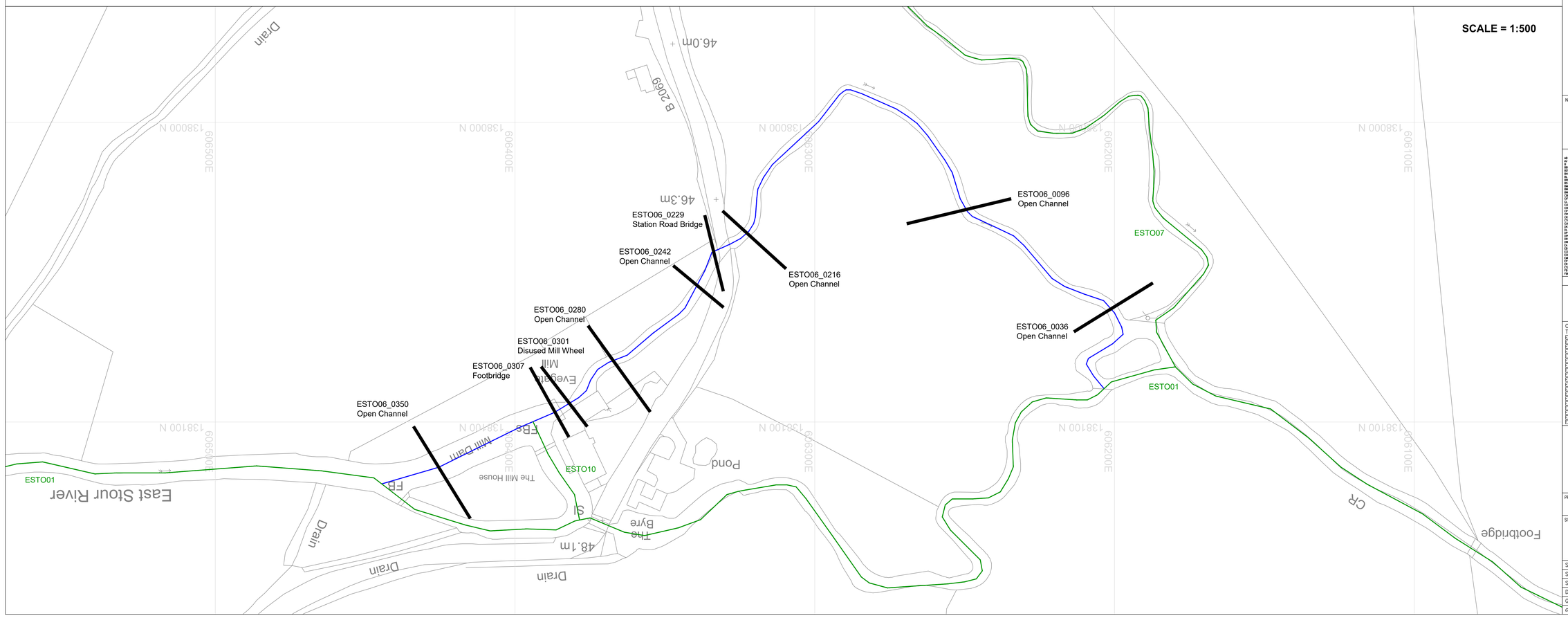

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

LOCATION PLAN ORIENTATION

NOTES:

1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
B	BOLLARD	FM	FIELD MARKER	R	RIVER GAUGE
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELGIAN BEACON	FP	FENCE POST	RJ	ROLLED STEEL JOIST
BH	BOREHOLE	FRM	FRAME WATER MANHOLE	RM	RAINWATER MPE
BH	BOREHOLE	G	GULLY	RMP	RAINWATER PIPE
BL	BED LEVEL	GB	GRADEBOARD	SC	STOP COCK
BL	BED LEVEL	GI	GALVANISED IRON	SC	STOP COCK
BS	BLIC STOP	GP	GATE POST	SK	GRAVAMMT
BW	BEACH MARK	GR	GAS MARKER	SL	SCRYP LEVEL
BWF	BARBED WIRE FENCE	GR	GRATED DRAIN	SMH	SHEET METAL MANHOLE
BWF	BARBED WIRE FENCE	C	INSPECTION CHAMBER	SMP	SHEET METAL PLANC
CBF	CLOSE BOARDED FENCE	H	HEDGE	SP	SIGN POST
CBF	CLOSE BOARDED FENCE	BF	IRON RAILING FENCE	STA	STAINLESS
CL	COVER LEVEL	BF	IRON RAILING FENCE	SV	SLUICE VALVE
CL	COVER LEVEL	W	JOINERWORK FENCE	TB	TELEPHONE BOX
CONC	CONCRETE	KG	KERB GULLY	SMF	SHEET WIRE FENCE
CP	CONCRETE POST	LG	KERB INLET GULLY	TBM	TEMPORARY BENCH MARK
CP	CONCRETE PALING FENCE	LE	LEFT EDGE	TELPOL	TELEPHONE (BAL WALPOST
CR	CYCLE RACK	LC	LAMP COVER	TC	TELECOM CABINET
CS	CLEAN OUT MANHOLE	LP	LAMP POST	TC	TELECOM CABINET
CTA	CULVERT	MB	MISCELLANEOUS BOLLARD	TFN	THREEBAR (STD)
DK	DROP KERB	MF	MISCELLANEOUS FENCING	TL	TRAFFIC LIGHT
DL	DRAIN LEVEL	MH	MANHOLE	TL	TRAFFIC LIGHT
D	DOMESTIC	MP	MOORING PILE	TP	TELEPHONE BOX
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TPS	TELEGRAPH POLE
DW	DOG WASTE	NB	NOTICE BOARD	TRS	TIMBER RUBBING STRIP
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TS	TRAFFIC SIGNAL
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	TSB	TUBULAR STEEL RAILINGS
EB	ELECTRIC BOX	OS	ORDNANCE SURVEY	UTL	UPSTREAM
EF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	V	VALVE (WATER)
EGP	ELECTRICITY CABLE PIT	OGR	OPEN STEEL RAILINGS	WL	WATER LEVEL/WATER LINE
EP	ELECTRICITY POLE	P	PIER	WM	WATER METER
EP	ELECTRICITY POLE	PB	PILLAR BOX	WMF	WIRE MESH FENCE
ER	EARTHING ROD	PM	PARKING METER	WPF	WOODEN POST
ETL	ELECTRICAL TRANSMISSION LINE	PP	PIPE	WPR	WOODEN POST & RAIL FENCE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	YG	YARD GULLY

(Abbreviations apply to EA survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E40730012	TR 0103 4107	35.975
E40730401	TR 0149 4253	35.287
E40730403	TR 0222 4027	35.489
E40731536	TR 0666 3814	51.806
E40730013	TR 0132 4202	36.469
E40730020	TR 0129 4061	36.314
E40730421	TR 0159 4291	36.337
E40730500	TR 0323 4026	36.456
E40731405	TR 0143 4070	37.864
E40731436	TR 0126 4199	37.717
E40731537	TR 0669 3791	52.147
E40731938	TR 0691 3842	62.022
E40731071	TR 0666 3811	50.076
E40733004	TR 0594 3900	43.712
E40733005	TR 1054 3751	62.647
E40731483	TR 0757 4070	36.916
E40731484	TR 0133 4200	37.463
E40731539	TR 0671 3828	52.251

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST006)
LONG SECTION & LOCATION PLAN
EST006_0036 TO EST006_0350

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332
SURVEY DATE: JANUARY 2018		
SCALE: AS SHOWN	DRN: RP	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: JAN 18	DATE: MAR 17
GRID: NATIONAL GRID	DRAWING NO.	REV.
CAD FILENAME: L-J01058-13.dwg	L-J01058-13	--

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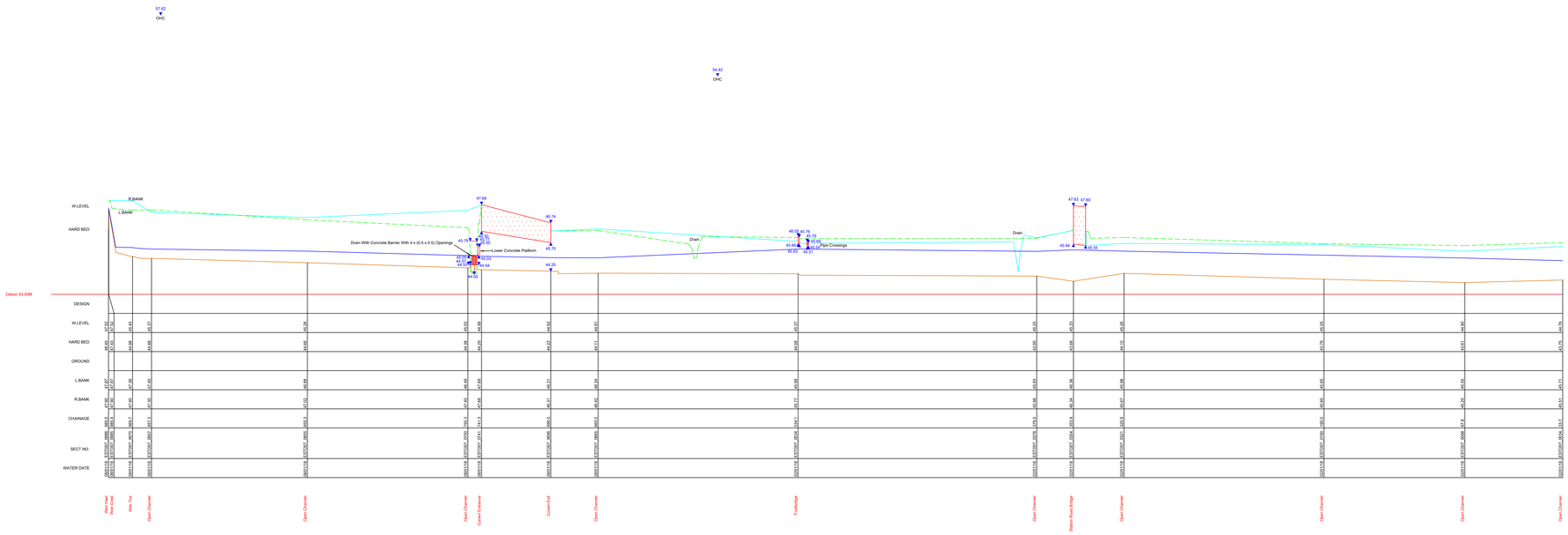

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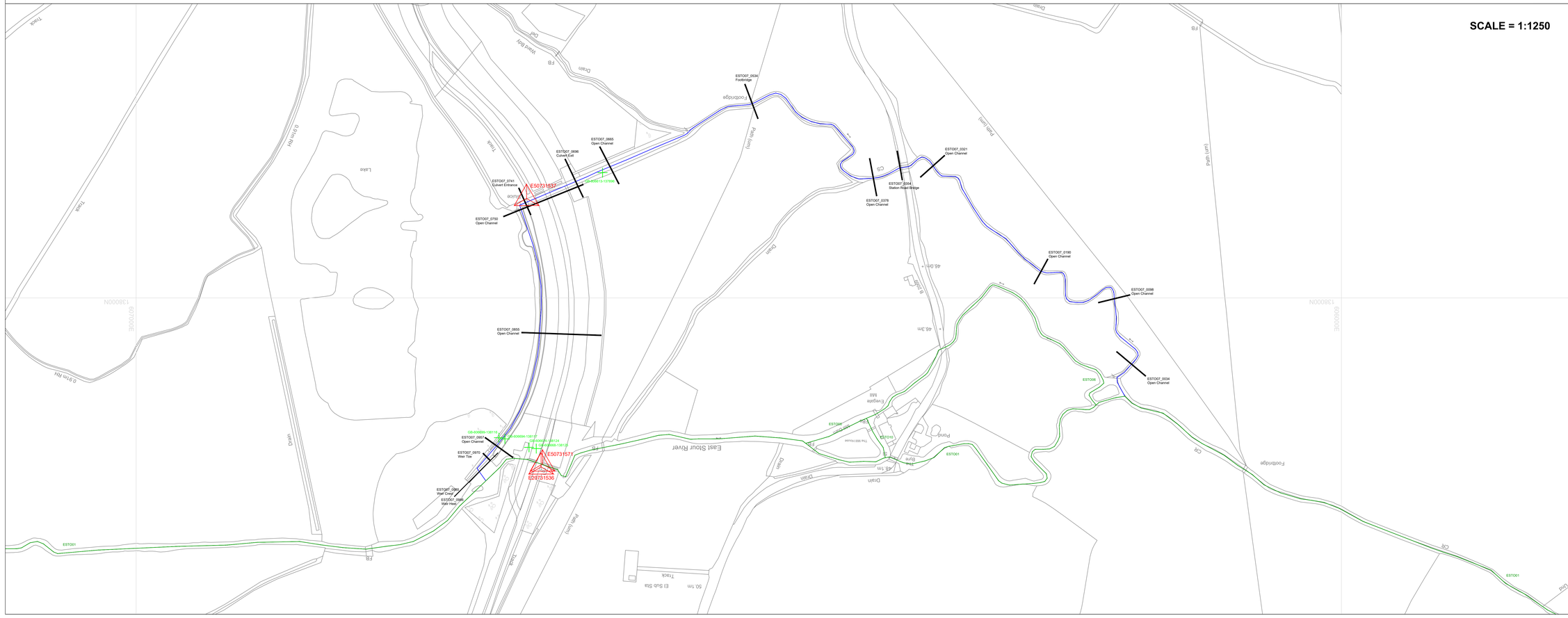

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST
  (VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS)
- GAUGE BOARD

LOCATION PLAN ORIENTATION

GRID N

NOTES:

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SURVEY LEGEND

AB	AIR BRDY	FH	FIRE HYDRANT	PM	PARAPET WALL
AV	AIR VALVE	FHW	FIRE HYDRANT MARKER	RP	RIGHT BANK
B	BOLLARD	FL	FLOOR (LVEL)	RL	REDUCE LEVEL
BA	BOUNDARY ANCHOR	FS	FLOOD SIGN	RJ	RIVET/JOINT, JOIST
BDY	BOUNDARY	FWV	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GATE	RW	RAINWATER PIPE
BL	BOLLARD	GB	GAUGEBOARD	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND (LEVEL)	SDP	SOAKAWAY PIPE
BS	BUS STOP	GM	GAS METER	SF	SOFFIT
BW	BLOCK WORK	GV	GAS MARKER	SGL	SOFFIT (LEVEL)
BWK	BRICK WALL	HW	HEAD WALL	SMH	SURVICE WATER MANHOLE
CAB	CABINET, BOX, TANKER	I	INVERT (LEVEL)	SP	SOIL PIPE, VENT PIPE
CHF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SPP	SOIL PIPE
CIF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION
CL	CHAIN LINK FENCE	JB	JUNCTION BOX	SV	SOIL VENT PIPE
CLF	CHAIN LINK FENCE	JE	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	L	LEVEL	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LE	LEFT BANK	TC/TW	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LV	LAMP POST	TC	TELLCOM CABINET
CS	CONC. STOP MANHOLE	LB	LOCKING BOLLARD	TCL	THREADED (LEVEL)
CUL	CULVERT	MF	MISCELLANEOUS FENCING	TFL	THREADED (LEVEL)
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MK	MARKER	TP	TELEPHONE BOX
D	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DW	DOWN WATER	NB	NOTICE BOARD	TS	TRAFFIC SIGN
DWB	DOG WASTE BIN	NS	NOTICE SIGNPOST	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	OAC	OUTSIDE ACCESS AUTHORITY	UTL	UPSTEAM TO LEVEL
EB	ELECTRIC BOX	OBC	OBSTRUCTIONS CLEAR	VL	VERTICAL LEVEL
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EGR	ELECTRICAL GUARD RAILS	PR	PALISADE RAILINGS	WM	WATER METER
EMH	ELECTRICITY MANHOLE	PT	PILE TEST	WMF	WIRE MESH FENCE
E	ELECTRICITY METER	PY	PUMPING STATION	WP	WOOD POST
LT	ELECTRICITY (LEVEL)	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIBRE BOX	PR	POST & RAIL FENCE	YG	YARD GULLY
FBH	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to OS survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E50730012	TR 0103 4107	35.975
E50730401	TR 0122 4023	32.757
E50730403	TR 0122 4022	38.489
E50731536	TR 0665 3814	51.808
E50730013	TR 0132 4202	38.489
E50730020	TR 0159 4081	36.314
E50730021	TR 0159 4291	38.337
E50730050	TR 0221 4026	38.486
E50730503	TR 0343 3935	40.259
E50731495	TR 0152 4070	37.864
E50731496	TR 0128 4199	37.732
E50731537	TR 0667 3791	47.711
E50731538	TR 0671 3842	63.022
E50731571	TR 0666 3813	50.976
E50733004	TR 0504 3900	43.712
E50733005	TR 1056 3751	60.587
E50731483	TR 0151 4070	35.916
E50731484	TR 0133 4200	37.463
E50731539	TR 0671 3828	52.251

Environment Agency

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST007)
LONG SECTION & LOCATION PLAN
EST007_0034 TO EST007_0986

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_132	
SURVEY DATE: JANUARY 2018			
SCALE: AS SHOWN	DRN: JB	CHKD: ITS	
DATUM: OS GPS ACTIVE	DATE: JAN 18	DATE: MAR 18	
GRID: NATIONAL GRID	DRAWING NO. L-J01058-14	REV. —	
CAD FILENAME: L-J01058-14.dwg			

Original Drawing Size: A0

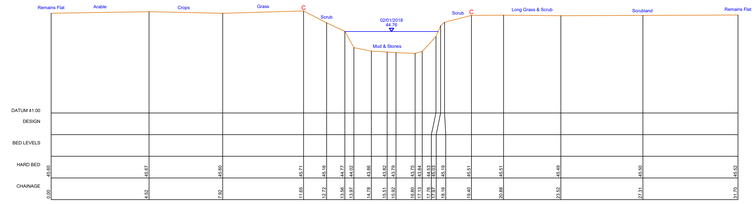
KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

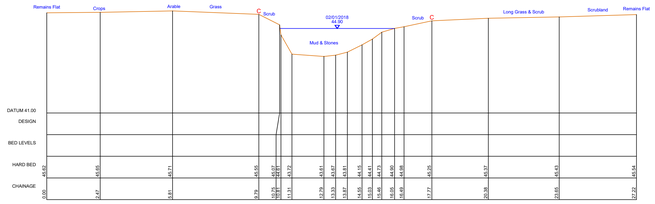
KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS



ESTO07_0034
606162.33mE 138064.92mN Brg 130
Open Channel



ESTO07_0098
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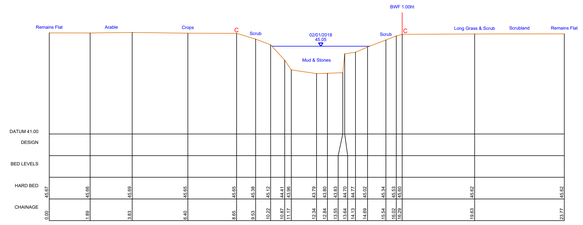
Open Channel



ESTO07_0190
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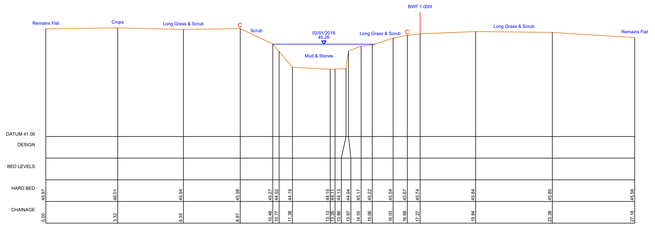
Open Channel



ESTO07_0321
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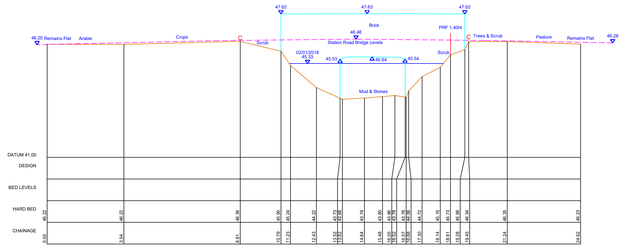
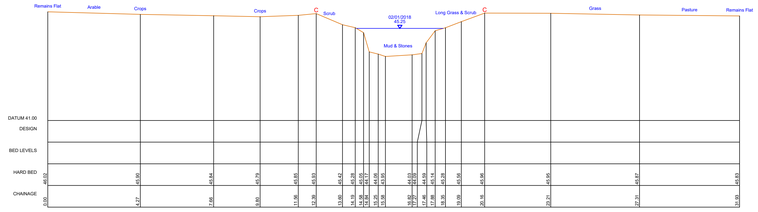
Open Channel



ESTO07_0354
606368.55mE 137877.88mN Brg 350
Station Road Bridge
Tunnel Length = 7.96m



ESTO07_0378
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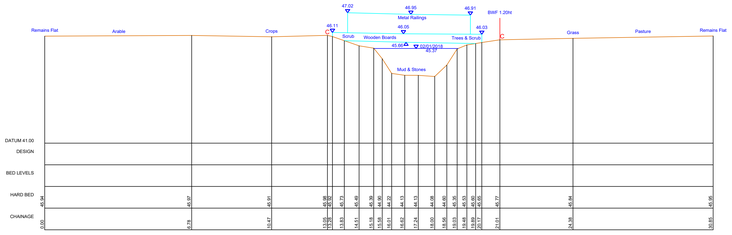
Open Channel



ESTO07_0534
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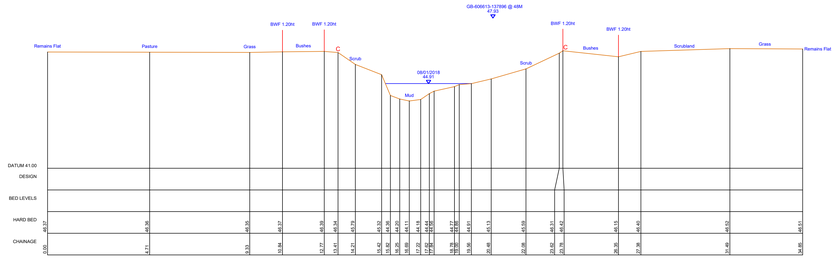
Footbridge
Tunnel Length = 0.81m



ESTO07_0665
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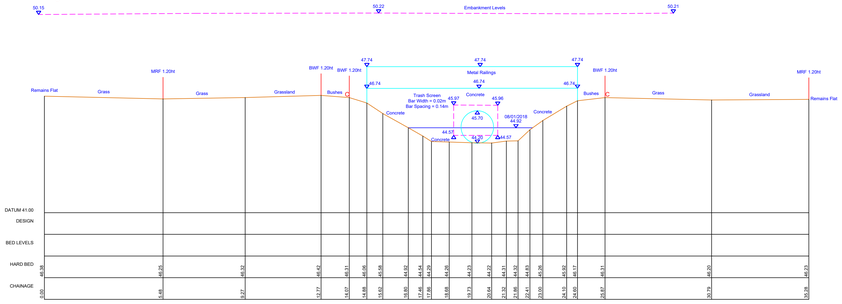
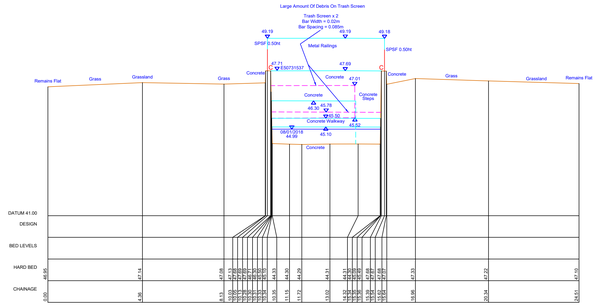
Open Channel



ESTO07_0696
606644.13mE 137884.64mN Brg 335
Culvert Exit
Tunnel Length = 45.33m



ESTO07_0741
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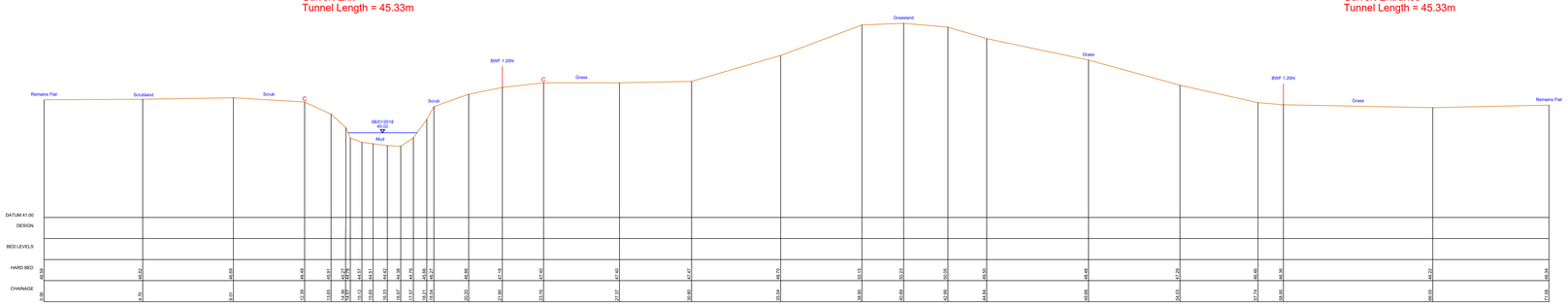
Culvert Entrance
Tunnel Length = 45.33m



ESTO07_0750
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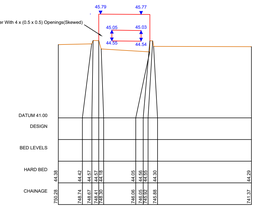
Open Channel



Through Section ESTO07_0750
Open Channel

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
BA	BALL ARMS	FL	FLOOD LEVEL	RC	RECTANGULAR
BB	BUSHY BEACON	FE	FENCE END	RSJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FMW	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	FP	FENCE POST	RW	RAINWATER PIPE
BL	BED LEVEL	GB	GRATEBOARD	SP	STOP VIEW
BRK	BRICKWORK	GL	GROUND LEVEL	SPP	STAND PIPE
BS	BOLT SHAFT	GM	GAS METER	SL	SOFFIT LEVEL
BW	BEACH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BW	BRICK WALL	HB	HEAD WALL	SMH	SURFACE WATER MANHOLE
CBF	CLOSE BOARDED FENCE	HC	HEAD WALL CHAMFER	SP	SIGN POST / PLINC
CBF	CLOSE BOARDED FENCE	HL	INVERT LEVEL	SP	SIGN POST
CF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION VALVE
CH	CHAIN LINK FENCE	JB	JUNCTION BOX	SW	SOIL VENT PIPE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LC	LEFT CREST	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LC	LEFT CREST	TELPOL	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CS	CLOSE SHEE MANHOLE	LV	LOCKABLE BOLLARD	TCB	TRAFFIC CONTROL BOX
CUL	CULVERT	MF	MISCELLANEOUS FENCING	TKL	THREADALE LEVEL
DH	DROP HEIGHT	MH	MANHOLE	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MKR	MARKER	TJB	TELEPHONE JOINT BOX
DP	DOWNPIPE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MPF	MOTOR PALING FENCE	TPS	TRAFFIC PEDESTRIAN STAMP
DR	DOMESTIC RACK	MS	MILE STONE	TS	TREE STUMP
DW	DOWNPIPE WALL	NB	NATIONAL BOUNDARY	TSR	TUBE STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NWA	NATIONAL WATERS AUTHORITY	UP	UPRIGHT POST
ED	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTL	UNABLE TO SURVEY
ELF	ELECTRICITY CHAIN FENCE	OP	OBSERVATION POINT	VL	VISIBLE LEVEL WATER LINE
ELF	ELECTRICITY CABLE RIT	OSR	OPEN STEEL RAILINGS	WA	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN PILE
E	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIRE BELL	PR	PADDOCK & RAIL FENCE	WW	WIRE WORK FENCE
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to GL survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.767
E20730403	TR 0222 4027	38.489
E20730511	TR 0666 3814	51.806
E20730013	TR 0139 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	38.337
E20730500	TR 0023 4025	38.486
E20730503	TR 0343 3936	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731571	TR 0666 3813	50.975
E20733004	TR 0504 3900	43.712
E20733005	TR 1056 3751	60.087
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency
KENT & SOUTH LONDON REGION
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PROJECT/WATERCOURSE
EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS
EAST STOUR (EST007)
CROSS SECTIONS
EST007_0034 TO EST007_0750

SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_152
SURVEY DATE: JANUARY 2018
SCALE: 1:100 — DRN: JB — CHKD: ITS
DATUM: OS GPS ACTIVE — DATE: JAN 18 — DATE: MAR 18
GRID: NATIONAL GRID — DRAWING NO. X-J01058-37 — REV. --
CAD FILENAME: X-J01058-37-38.dwg

Original Drawing Size: A0

KEY TO SECTIONS:

WATER LEVEL

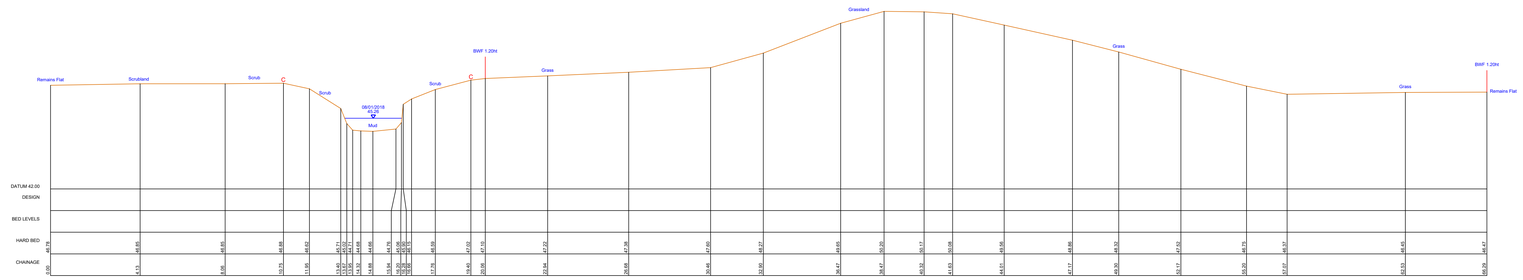
VISIBLE BED (TOP OF SILT) AND GROUND

HARD BED (DETERMINED BY PROBING)

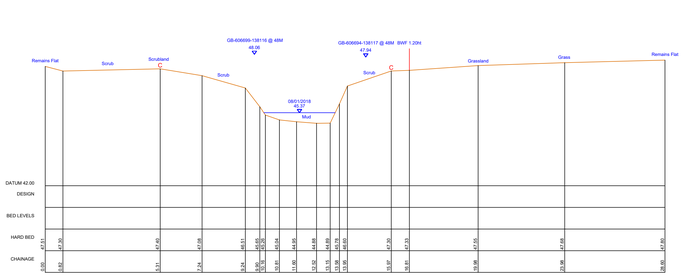
C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

LEFT BANK CREST / RIGHT BANK CREST — VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS



ESTO07_0855
606680.25mE 138028.69mN Brg 272
Open Channel



ESTO07_0957
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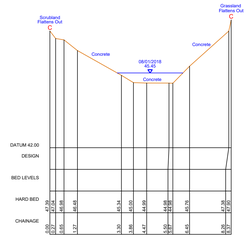
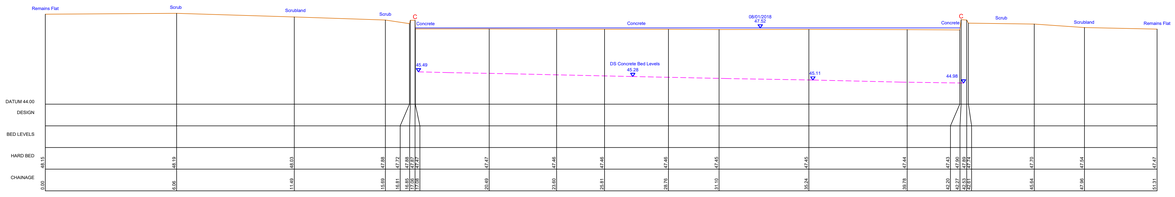
Open Channel



ESTO07_0970
606712.21mE 138128.89mN Brg 315
Weir Toe



ESTO07_0985
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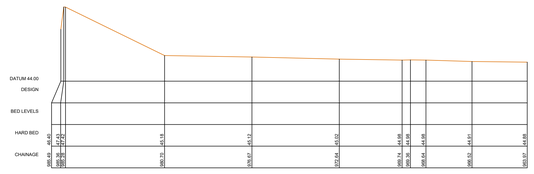
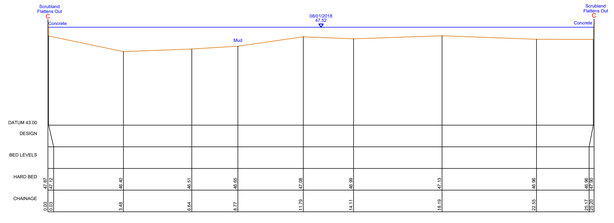
Weir Crest



Through Section ESTO07_0985
Weir Crest



ESTO07_0986
606723.67mE 138152.92mN Brg 225
Weir Heel

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
B	BOLLARD	FJ	FLOOR JOIST	RC	RIGHT CREST
BC	BT CABLE BEACON	FL	FLOOR LEVEL	RJ	RAILWAY TRACK JOINT
BCV	BOUNDARY	FMH	FTOL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	SMP	BANNISTER PIPE
BM	BENCH MARK	GB	GRAVEL BOARD	SP	SIGN POST
BMA	BRICKWORK	GL	GROUND LEVEL	TBM	TEMP BM
BS	BUS STOP	GP	GATE POST	TP	SOAKAWAY
BSM	BOUNDARY MARK	HW	HEADWALL	TR	TRAP DOOR
BW	BRICK WALL	HW	HOR WALL	SW	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SWP	SHEET METAL PILING
CF	CHAIN LINK FENCE	IL	INVERT LEVEL	TC	TOP OF CRIB
CF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	CN	CHOKEN
CL	COVER LEVEL	MF	MOTORMEN FENCE	SV	SLICE VALVE
CLF	CHAIN LINK FENCE	MG	MAGNET	SP	SHEET PILE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LE	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CONCRETE PANEL FENCE	LP	LAMP POST	TEL PO	TELEPHONE/TELEGRAPH POST
CR	CYCLE RACK	LV	LAMP POST	TC	TELECOM CABINET
CTV	CABLE TV MANHOLE	MB	MOORING BOLLARD	TMB	TELECOM MANHOLE
D	DRAIN	MF	MOTORMEN FENCING	TP	TRAP DOOR
DH	DROP KERB	MH	MANHOLE	TW	TRAFFIC LIGHT
DP	DOWN PIPE	MM	MILE MARKER	TL	TRAFFIC LIGHT BOX
DP	DUMPITY	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MPF	MOTORMEN PALING FENCE	TS	TRAFFIC SIGNALS STRIP
DPC	DOWNCOMER	MT	MILE TIMER	TW	TIMBER WALL
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
E	ELECTRICITY AGENCY	NRA	NATIONAL RIVERS AUTHORITY	UP	UNDER PIPE
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EF	ELECTRICITY FENCE	PSR	PICKET STEEL RAILINGS	WM	WATER METER
EMH	ELECTRICITY MANHOLE	P	PIPE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ET	ELECTRIC TOWER	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to OS survey data only)	

	AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730013	TR 0149 4223	36.267
E20730418	TR 0222 4071	38.408
E20731219	TR 0169 2504	34.806
E20730020	TR 0129 4202	36.484
E20730051	TR 0159 4091	38.317
E20730000	TR 0221 4025	38.486
E20730003	TR 0341 3910	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0126 4199	37.732
E20731497	TR 0687 3131	47.171
E20731536	TR 0671 3842	53.022
E20731521	TR 0666 3813	50.976
E20733004	TR 0504 3900	43.712
E20733005	TR 1056 3751	60.587
E20731483	TR 0151 4070	35.916
E20731484	TR 0133 4200	37.463
E20731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

Orchard House, Endeavour Park, London Road, Addington, West Malling, Kent, ME19 5SH

OPTIMISE REGIONS

PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (ESTO07)
CROSS SECTIONS
EST007_0855 TO EST007_0986

SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 12_152

SURVEY DATE: DECEMBER 2017

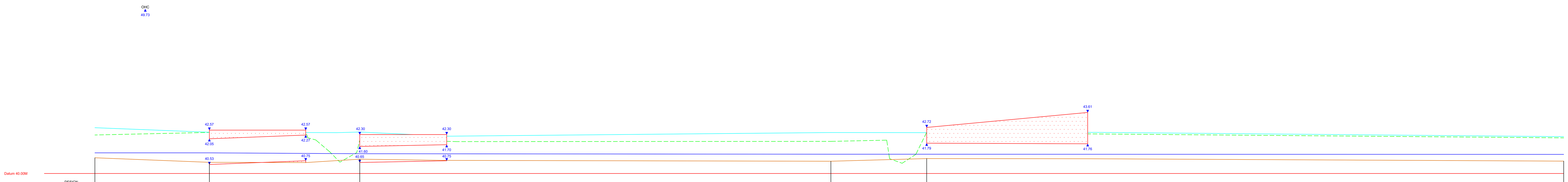
SCALE: 1:100 | DRN: JB | CHKD: ITS

DATUM: OS GPS ACTIVE | DATE: JAN 18 | DATE: MAR 18

GRID: NATIONAL GRID | DRAWING NO. X-J01058-38 | REV. —

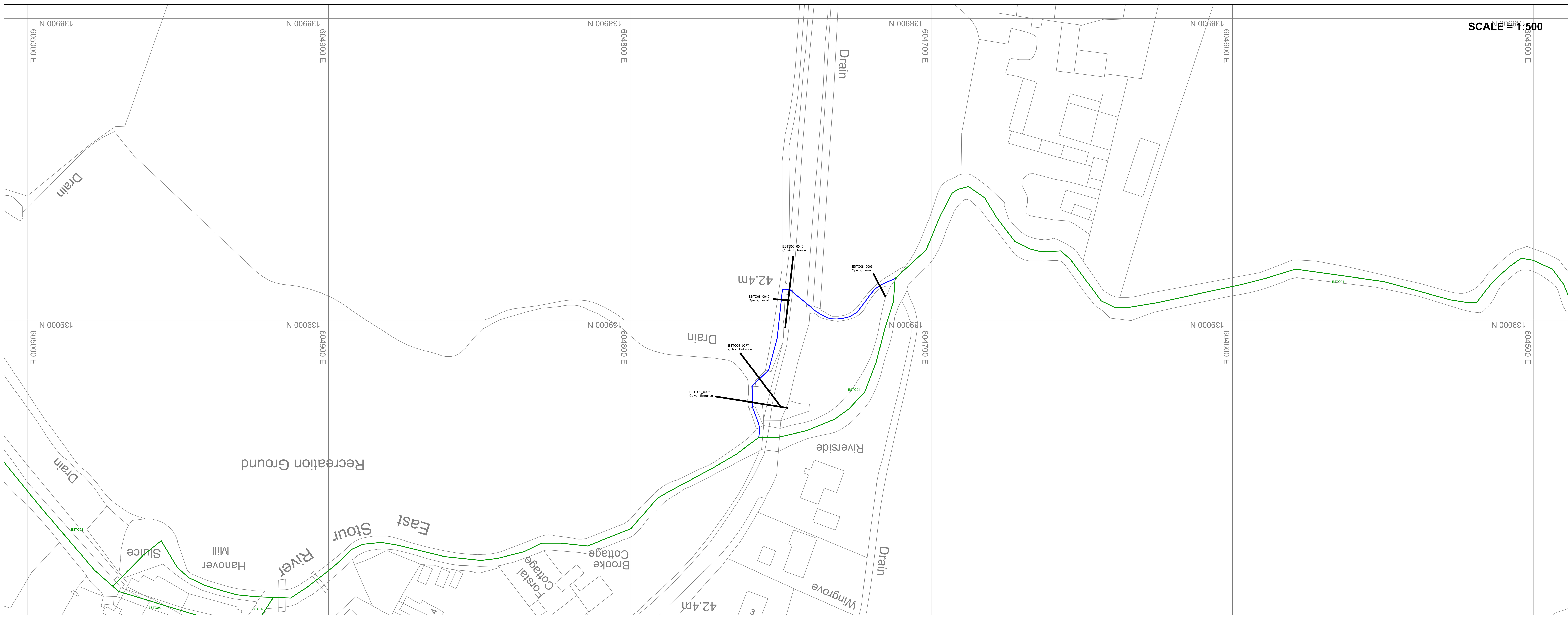
CAD FILENAME: X-J01058-37-38.dwg

SCALE = 1:100 H, 1:100 V



		ESTO08_0086	ESTO08_0077	ESTO08_0049	ESTO08_0043	ESTO08_0006
DESIGN						
W.LEVEL	41.22	41.22	41.17	41.14	41.14	41.13
HARD BED	40.93	40.66	40.85	40.73	40.88	40.73
GROUND						
L.BANK	42.28	42.43	41.98	41.90	42.44	42.11
R.BANK	42.71	42.44	42.45	42.42	42.42	42.18
CHAINAGE	92.84	86.0	77.1	49.2	43.5	5.7
SECT NO.		ESTO08_0086	ESTO08_0077	ESTO08_0049	ESTO08_0043	ESTO08_0006
WATER DATE		16/01/18	16/01/18	16/01/18	16/01/18	16/01/18
		Culvert Entrance	Culvert Entrance	Open Channel	Culvert Entrance	Open Channel

SCALE = 1:500



Original Drawing Size: A0

KEY TO SECTIONS:
- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:
- LEFT BANK CREST
- RIGHT BANK CREST

(VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS)
- GAUGE BOARD

LOCATION PLAN ORIENTATION

GRID

NOTES:
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BB	BELISHA BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GAUGEBOARD	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BUS STOP	GP	GATE POST	SK	SOAKAWAY
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BW	BRICK WALL	HW	HEAD WALL	SMH	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SMP	SHEET METAL PILING
CBF	CLOSE BOARDED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CIF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	STN	STATION
CL	COVER LEVEL	IWF	INTERWOVEN FENCE	SV	SLUICE VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KIG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LB	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LC	LEFT CREST	TCB/TCP	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DROP KERB	MH	MANHOLE	TL	TRAFFIC LIGHT
DL	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DP	DOWNPIPE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
DWB	DOG WASTE BIN	NB	NOTICE BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UTS	UNABLE TO SURVEY
ECF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WM	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
ER	EARTHING ROD	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		

(Abbreviations apply to EA survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E50730013	TR 0132 4202	38.489
E50730020	TR 0159 4061	36.314
E50730021	TR 0159 4291	36.337
E50730500	TR 0223 4025	38.486
E50730503	TR 0343 3935	40.259
E50731495	TR 0152 4070	37.864
E50731496	TR 0128 4199	37.732
E50731537	TR 0667 3791	47.711
E50731538	TR 0671 3842	63.022
E50731571	TR 0666 3813	50.976
E50733004	TR 0504 3900	43.712
E50733005	TR 1056 3751	60.587
E60731483	TR 0151 4070	35.916
E60731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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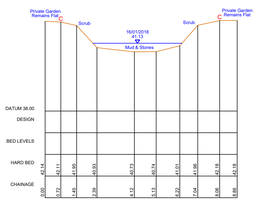
PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

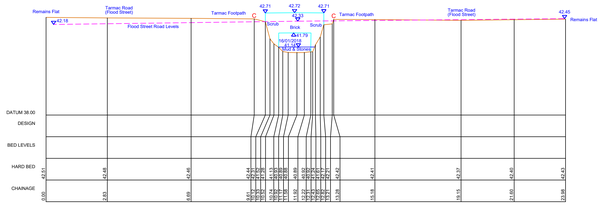
SITE/LIMITS

EAST STOUR (ESTO08)
LONG SECTION & LOCATION PLAN
ESTO08_0006 TO ESTO08_0086

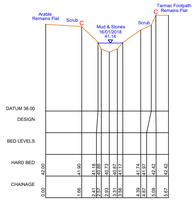
SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332
SURVEY DATE: JANUARY 2018		
SCALE: AS SHOWN	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: JAN 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. L-J01058-15	REV. —
CAD FILENAME: L-J01058-15.dwg		



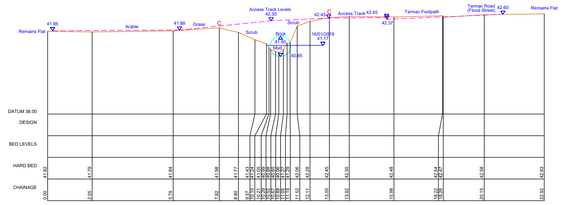
ESTO08_0006
604719.21mE 138984.56mN Brg 332
Open Channel



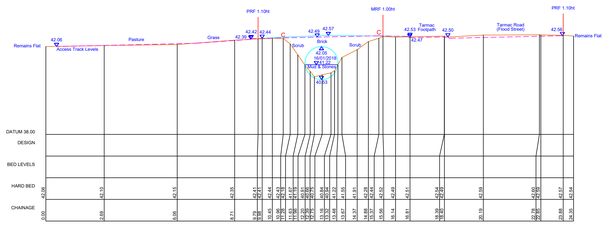
ESTO08_0043
604745.77mE 138978.73mN Brg 6
Culvert Entrance
Tunnel Length = 9.55m



ESTO08_0049
604752.47mE 138993.05mN Brg 275
Open Channel



ESTO08_0077
604763.41mE 139010.95mN Brg 323
Culvert Entrance
Tunnel Length = 5.16m



ESTO08_0086
604771.63mE 139025.41mN Brg 279
Culvert Entrance
Tunnel Length = 5.72m

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

NOTES:

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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RB	RIGHT BANK
BB	BUS BOARD	FL	FLOOD LEVEL	RC	RECTANGULAR
BS	BOLLARD BEACON	FS	FENCE POST	RSJ	ROLLED STEEL JOIST
BDY	BOUNDARY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BORE HOLE	G	GATE	RWP	RAINWATER PIPE
BL	BED LEVEL	GB	GRIDBOARD	SC	STOP COCK
BRK	BRICKWORK	GL	GROUND LEVEL	SDP	STAND PIPE
BS	BUS STOP	GM	GAS METER	SF	SOFFIT LEVEL
BM	BENCH MARK	GM	GAS MARKER	SL	SOFFIT LEVEL
BW	BRICK WALL	HB	HEAD WALL	SMH	SURFACE WATER MANHOLE
CBF	CLOSE BOARDED FENCE	HC	HOT FOOD CHANNEL	SP	SIGN POST / PLINTH
CHF	CLOSE BARBED FENCE	IL	INVERT LEVEL	SP	SIGN POST
CF	CORRUGATED IRON FENCE	RF	IRON RAILING FENCE	STN	STATION
CH	CHAINAGE	JB	JUNCTION BOX FENCE	SV	STOP VALVE
CLF	CHAIN LINK FENCE	JB	JUNCTION BOX	SVP	SOIL VENT PIPE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LC	LEFT CREST	TBM	TEMPORARY BENCH MARK
CPF	CHESTNUT PALING FENCE	LI	LEFT INVERT	TCP/CP	TELEPHONE CALL BOX/POST
CR	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CS	CATTLE SALT BLOCK	LB	LOCKABLE BOLLARD	TF	TRANSFORMER
CUL	CULVERT	MF	MISCELLANEOUS FENCING	THL	THRESHOLD LEVEL
DK	DECK LEVEL	MH	MANHOLE	TL	TRAFFIC LIGHT
DP	DOWN PIPE	MKB	MARKER BOX	TJB	TELEPHONE JUNCTION BOX
DP	DOMESTIC	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MPF	MOORING PALING FENCE	TRP	TRAFFIC LIGHT PLINTH/CAMP
DR	DOWNSTREAM	MS	MILE STONE	TS	TREE STUMP
EB	ELECTRIC BOX	NB	NATIONAL BUS	TSR	TRIPLE STEEL RAILINGS
EHA	ENVIRONMENT AGENCY	NWA	NATIONAL WATERS AUTHORITY	TUR	TURBINE
ER	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UFO	UNABLE TO SURVEY
ERF	ELECTRICITY BOX FENCE	OHL	OVERHEAD LINE/CABLE	UL	UNDER LEVEL/ WATER LINE
ELF	ELECTRICITY CABLE PF	OSR	OPEN STEEL RAILINGS	WA	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
EP	ELECTRIC POST	PB	PUMP BOX	WP	WOODEN PILE
E	ELECTRIC BOX	PM	PARKING METER	WR	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FIBRE BOX	PR	POST & RAIL FENCE	WW	WIRE WORK FENCE
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to OS survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	32.757
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.808
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0159 4291	38.337
E20730500	TR 0223 4025	38.486
E20730503	TR 0343 3936	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731537	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731571	TR 0666 3813	50.975
E20733004	TR 0504 3900	43.712
E20733005	TR 1056 3751	60.087
E20731483	TR 0151 4070	35.916
E20731484	TR 0133 4200	37.463
E20731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (ESTO08)
CROSS SECTIONS
ESTO08_0006 TO ESTO08_0086

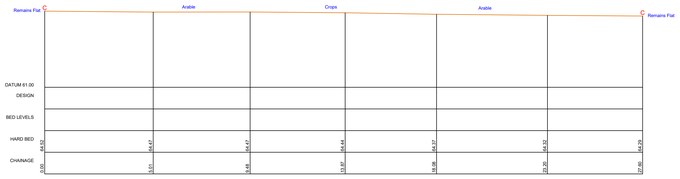
SURVEYED BY: MALTBY LAND SURVEYS LTD — Ref: 17_332

SURVEY DATE: JANUARY 2018

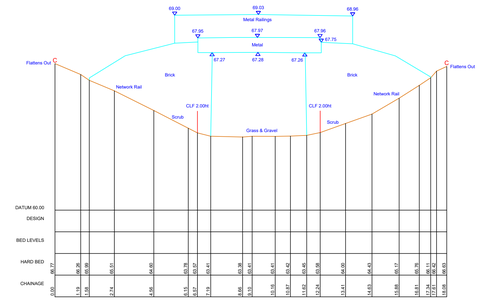
SCALE: 1:100	DRN: RC	CHKD: ITS	
DATUM: OS GPS ACTIVE	DATE: JAN 18	DATE: MAR 18	
GRID: NATIONAL GRID	DRAWING NO. X-J01058-39		REV. —

CAD FILENAME: X-J01058-39.dwg

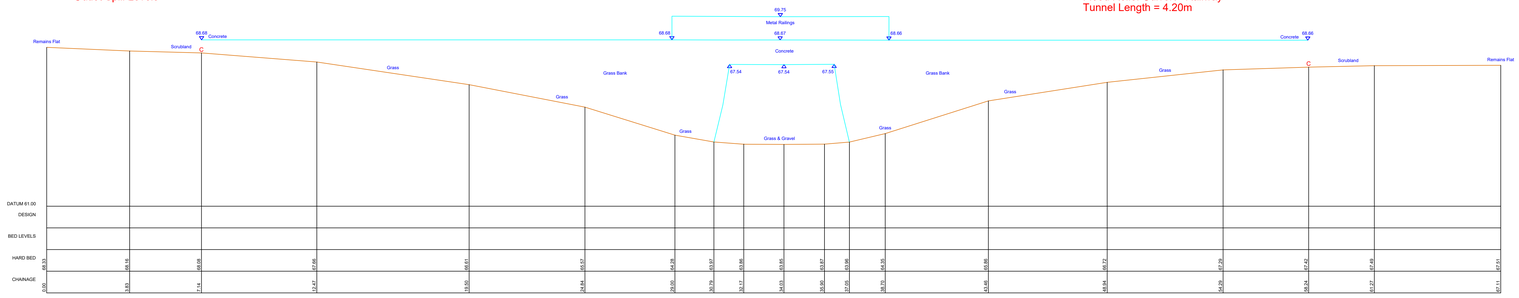
SCALE = 1:100



ESTO09_0024
611168.34mE 137562.38mN Brg 279
Outlet Spill Levels

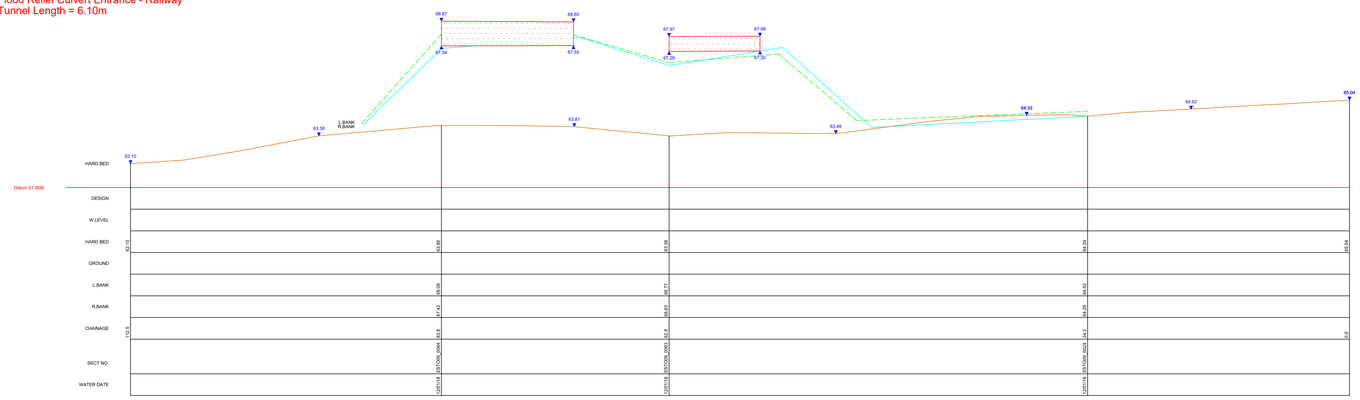


ESTO09_0063
611170.11mE 137600.83mN Brg 281
Flood Relief Culvert - Railway
Tunnel Length = 4.20m

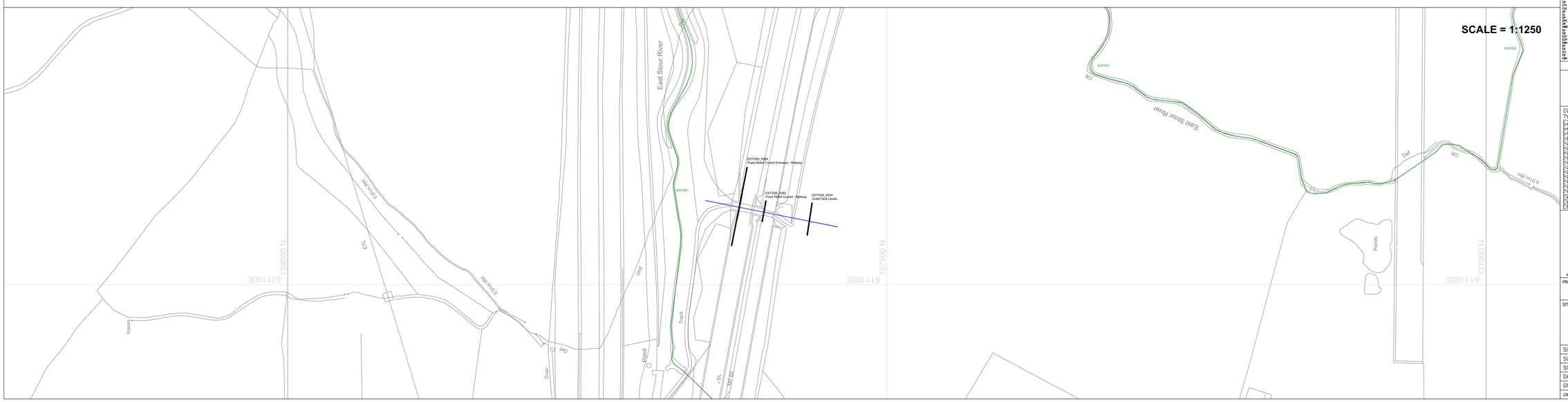


ESTO09_0084
611198.11mE 137616.55mN Brg 281
Flood Relief Culvert Entrance - Railway
Tunnel Length = 6.10m

SCALE = 1:200 H, 1:100 V



SCALE = 1:1250



Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

LOCATION PLAN ORIENTATION

GRID

NOTES:
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3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PB	PARAPET WALL
AV	AIR VALVE	FM	FLOOD MONITORING MARKER	RB	RIGHT BANK
B	BOLLARD	FL	FLOOR LEVEL	RC	RIGHT CREST
BC	BT CABLE BEACON	FP	FLOOR PLATE	RJ	RIGHT BANK JOIST
BH	BOUGHROOD	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BH	BOREHOLE	G	GULLY	RWP	RAINWATER PIPE
BL	BT LINE BOX	GB	GRAVEGARD	SA	SAMPLE POINT
BN	BRICKWORK	GL	GROUND LEVEL	SCP	CHAIN PIPE
BS	BUS STOP	GP	GATE POST	SK	SOAKAWAY
BT	BT LINE MARK	GR	GRATED GULLY	SL	SLUICE GATE
BW	BRICK WALL	HM	HUGE MALL	SMW	SURFACE WATER MANHOLE
BWF	BARBED WIRE FENCE	IC	INSPECTION CHAMBER	SWP	SHEET METAL PILING
CF	CHAIN LINK FENCE	IG	INSPECTION GULLY	TB	TIMBER BEAM
CF	CORRUGATED IRON FENCE	IRF	IRON RAILING FENCE	CVN	COVERN
CL	COVER LEVEL	MF	INTERMEDIN FENCE	SV	SLUICE VALVE
CMF	CHAIN LINK FENCE	MG	MAGNETIC GULLY	TBP	TIMBER PILE
CONC	CONCRETE	KG	KERB INLET GULLY	SWF	SHEEP WIRE FENCE
CP	CONCRETE POST	LG	LEFT BANK	TEMP	TEMPORARY BENCH MARK
CPF	CONCRETE PANEL FENCE	LJ	LEFT BANK JOIST	TP	TEMPORARY TEST PIT/POST
CX	CYCLE RACK	LP	LAMP POST	TC	TELECOM CABINET
CTX	CABLE TV. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
D	DRAIN	MCF	MESH COATED FENCING	TL	TRAFFIC LIGHT
DK	DROP KERB	MF	MARKER	TL	TRAFFIC LIGHT
DL	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DP	DOWN PIPE	MP	METAL PILE	TP	TIMBER PILING
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DW	DOG WASTE BIN	MS	MILE STONE	TS	TRAFFIC SIGNAL
DWB	DOG WASTE BIN	MS	MUSCLE SHAFT	TSR	TUBULAR STEEL RAILINGS
E	ENVIRONMENT AGENCY	NR	NATIONAL RIVERS AUTHORITY	US	UPSTREAM
EL	ELECTRIC LINE	NG	NATURAL GRASS	VS	VERTICAL SURVEY
EOF	ELECTRIC CABLE FENCE	OS	ORDNANCE SURVEY	WL	WATER LEVEL/WATER LINE
EOP	ELECTRICITY CABLE PT	PSR	OPEN STEEL RAILING	WM	WATER METER
EP	ELECTRICITY POLE/CABLE	P	PIPE	WMB	WATER MAIN BOX
EV	ELECTRICITY POLE	PB	PILLAR BOX	WP	WOODEN POST
EW	ELECTRIC WIRE	PM	PARKING METER	WPR	WOODEN POST & RAIL FENCE
EX	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FLOWER BED	PRF	POST & RAIL FENCE	YG	YARD GULLY
FBI	FOOTBRIDGE	PTM	PARKING TICKET MACHINE		(Abbreviations apply to EA survey data only)

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.267
E20730403	TR 0222 4027	38.489
E20731036	TR 0666 3814	51.605
E20730013	TR 0132 4202	38.489
E20730021	TR 0129 4061	38.413
E20730022	TR 0129 4291	38.337
E20730000	TR 0051 4050	36.886
E20731493	TR 0152 4070	37.884
E20731496	TR 0128 4199	37.732
E20731495	TR 0129 4141	37.717
E20731034	TR 0691 3841	51.011
E20731035	TR 0666 3814	50.956
E20731004	TR 0604 3902	43.919
E20730005	TR 1056 3751	60.587
E20731483	TR 0151 4070	36.916
E20731484	TR 0133 4200	37.463
E20731539	TR 0671 3828	52.251

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR FLOOD RELIEF CULVERTS (EST009)
CROSS SECTIONS, LONG SECTION
& LOCATION PLAN
EST009_0024 TO EST009_0084

SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332	
SURVEY DATE: JANUARY 2018			
SCALE: AS SHOWN	DRN: RC	CHKD: ITS	
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18	
GRID: NATIONAL GRID	DRAWING NO. X-J01058-40		REV. —
CAD FILENAME: X-J01058-40.dwg			

Original Drawing Size: A0

KEY TO SECTIONS:

- WATER LEVEL
- VISIBLE BED (TOP OF SILT) AND GROUND
- HARD BED (DETERMINED BY PROBING)
- C — BANK CREST

KEY TO LONGITUDINAL SECTION ONLY:

- LEFT BANK CREST
- RIGHT BANK CREST

} VIEWED LOOKING DOWNSTREAM. POINTS INDICATED BY 'C' ON CROSS SECTIONS AND ADDITIONAL POINTS BETWEEN SECTIONS

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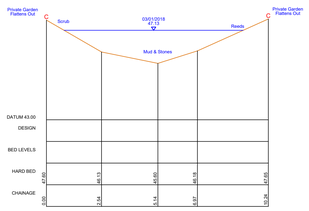

ESTO10_0005
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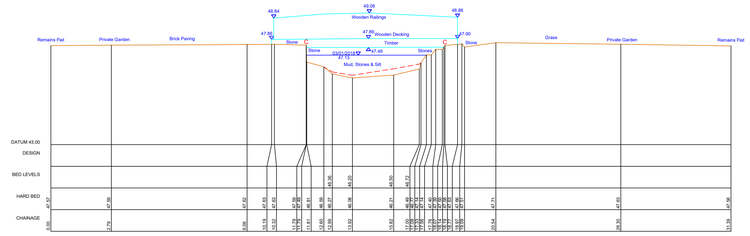
Open Channel



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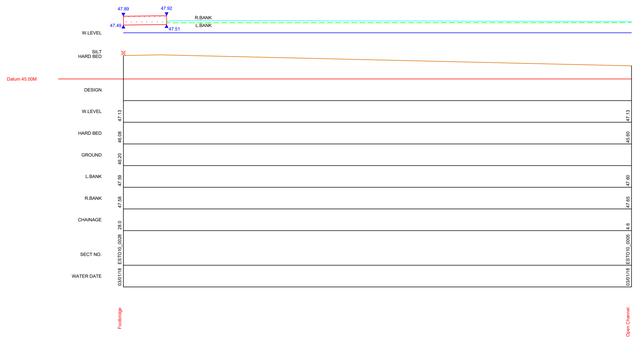
Footbridge
Tunnel Length = 1.99m

SCALE = 1:100 H, 1:100 V



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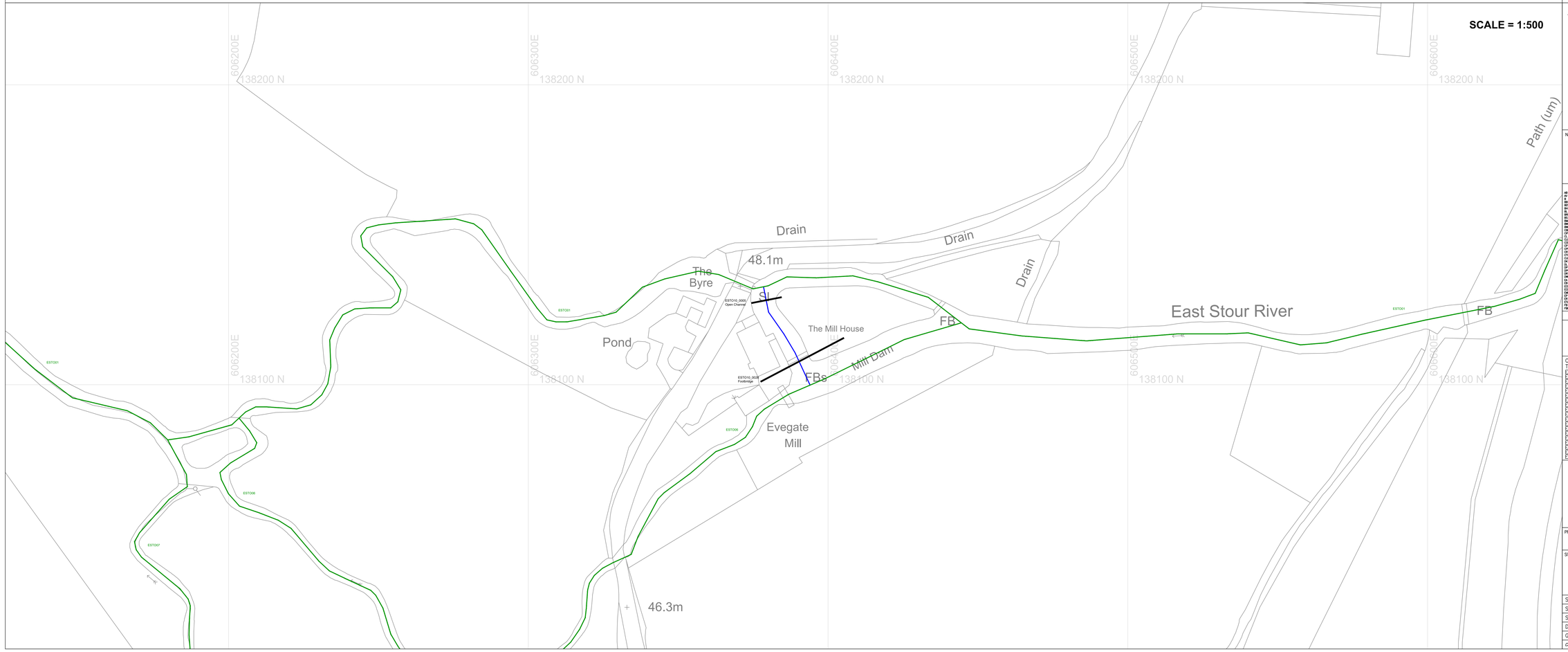

LOCATION PLAN ORIENTATION

GRID N

NOTES:

1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.
2. THIS MAP IS REPRODUCED FROM THE OS MAP BY THE ENVIRONMENT AGENCY WITH PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE. © CROWN COPYRIGHT LICENCE. ALL RIGHTS RESERVED. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. LICENCE NO. 100026380.
3. UNLESS OTHERWISE STATED ALL SECTIONS ARE VIEWED DOWNSTREAM.

SURVEY LEGEND

AB	AIR BRICK	FH	FIRE HYDRANT	PW	PARAPET WALL
AV	AIR VALVE	FHM	FIRE HYDRANT MARKER	RD	RIGHT DARD
BH	BOREHOLE	FL	FLAGPOLE	RJ	RODDING JOINT
BR	BOLLARD BEACON	FP	FENCE POST	RSJ	ROLLED STEEL JOIST
BRY	BOONGARTY	FWM	FOUL WATER MANHOLE	RTW	RETAINING WALL
BS	BUS STOP	G	GULLY	RWP	RAINWATER PIPE
BL	BEO LEVEL	GA	GARAGEARD	SC	STOP COCK
BRK	BRICWORK	GL	GROUND LEVEL	SCP	STAND PIPE
BT	BT BOX/PILLAR	GO	GAS OUTLET	SF	SEWER FLOW
BM	BEACH MARK	GM	GAS MARKER	SL	SUPPLY LEVEL
BWP	BARBED WIRE	GP	GUIDE POST	SMH	SEWER MANHOLE MANHOLE
BWF	BARBED WIRE FENCE	H	HEADWALL	SMP	SUPPLY METRE PILINGS
CBF	CLOSE BOARDED FENCE	HC	HEADWALL CHAMBER	SP	SIGN POST
CF	CHAIN LINK FENCE	HF	HAWRT LEVEL	SR	SIGN ROD
CT	CONCRETE POST FENCE	IF	INTERMEDIATE FENCE	SV	SLUICE VALVE
CL	CHAIN LINK FENCE	IM	INTERMEDIATE MARK	TBM	TEMPORARY BENCH MARK
CLM	CLAMP	JG	JUDGE GAUGE	TBF	TRELLIS BRICE FENCE
CP	CONCRETE POST	LE	LEFT BANK	TBM	TEMPORARY BENCH MARK
CPF	CONCRETE PALING FENCE	LG	LEFT GARD	TCP	TELEGRAPH POLE/TELEPHONE/POST
CV	CYCLE RACK	LP	LAMP POST	TF	TELECOM FARMS
CTV	CABLE T.V. MANHOLE	MB	MOORING BOLLARD	TMH	TELECOM MANHOLE
DA	DRAIN ARCH	MF	MOORING/FENCING FENCING	TL	TELEGRAPH LEVEL
DK	DROP KERB	MH	MANHOLE	TL	TRAFFICO LIGHT
DL	DECK LEVEL	MKR	MARKER	TLB	TRAFFIC LIGHT BOX
DP	DOWNPIPE	MP	MOORING PILE	TP	TELEGRAPH POLE
DPC	DAMP PROOF COURSE	MRF	METAL RAILING FENCE	TRS	TIMBER RUBBING STRIP
DR	DORMETERM	MS	MILE STONE	TS	TREE STUMP
DS	DOWN SPOUT	NB	NATIONAL BOARD	TSR	TUBULAR STEEL RAILINGS
EA	ENVIRONMENT AGENCY	NRA	NATIONAL RIVERS AUTHORITY	UC	UPSTREAM
EB	ELECTRICITY BOX	OHC	OVERHEAD CABLE	UFS	UNABLE TO SURVEY
EF	ELECTRICITY FENCE FENCE	OP	OPEN PIPE/PIPE	UP	UNDER PIPE/UNDER WATER LINE
ECP	ELECTRICITY CABLE PIT	OSR	OPEN STEEL RAILINGS	WA	WATER METER
EMH	ELECTRICITY MANHOLE	P	PILE	WMF	WIRE MESH FENCE
ES	ELECTRICITY SUB STATION	PB	PARKING BOX	WP	WOODEN POST
EV	EVERTHING VLVO	PM	PARKING METER	WPF	WOODEN POST & RAIL FENCE
ETL	ELECTRICITY TRANSMISSION LINE	PO	POST	WV	WATER VALVE
FB	FOOTBRIDGE	PRF	POST & RAIL FENCE	WW	WOODEN WALL
FBR	FOOTBRIDGE	PTM	PARKING TICKET MACHINE	(Abbreviations apply to the survey data only)	

AMENDMENT	DRN	CHKD	DATE

CONTROL USED:

TYPE	DESCRIPTION	LEVEL
E20730012	TR 0103 4107	35.975
E20730401	TR 0149 4253	35.767
E20730403	TR 0222 4027	38.489
E20731536	TR 0666 3814	51.806
E20730013	TR 0132 4202	38.489
E20730020	TR 0159 4061	36.314
E20730021	TR 0158 4291	36.337
E20730500	TR 0223 4026	38.486
E20730503	TR 0343 3936	40.259
E20731495	TR 0152 4070	37.864
E20731496	TR 0128 4199	37.732
E20731532	TR 0687 3791	47.711
E20731538	TR 0671 3842	63.022
E20731571	TR 0666 3813	50.978
E20733004	TR 0504 3900	43.347
E20733005	TR 1098 3731	60.587
E20731483	TR 0151 4070	35.916
E20731484	TR 0133 4200	37.463
E60731539	TR 0671 3828	52.251

Environment Agency

KENT & SOUTH LONDON REGION

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PROJECT/WATERCOURSE

EAST STOUR, ASHFORD TO STANFORD

SITE/LIMITS

EAST STOUR (EST010)
CROSS SECTIONS, LONG SECTION
& LOCATION PLAN
EST010_0005 TO EST010_0028

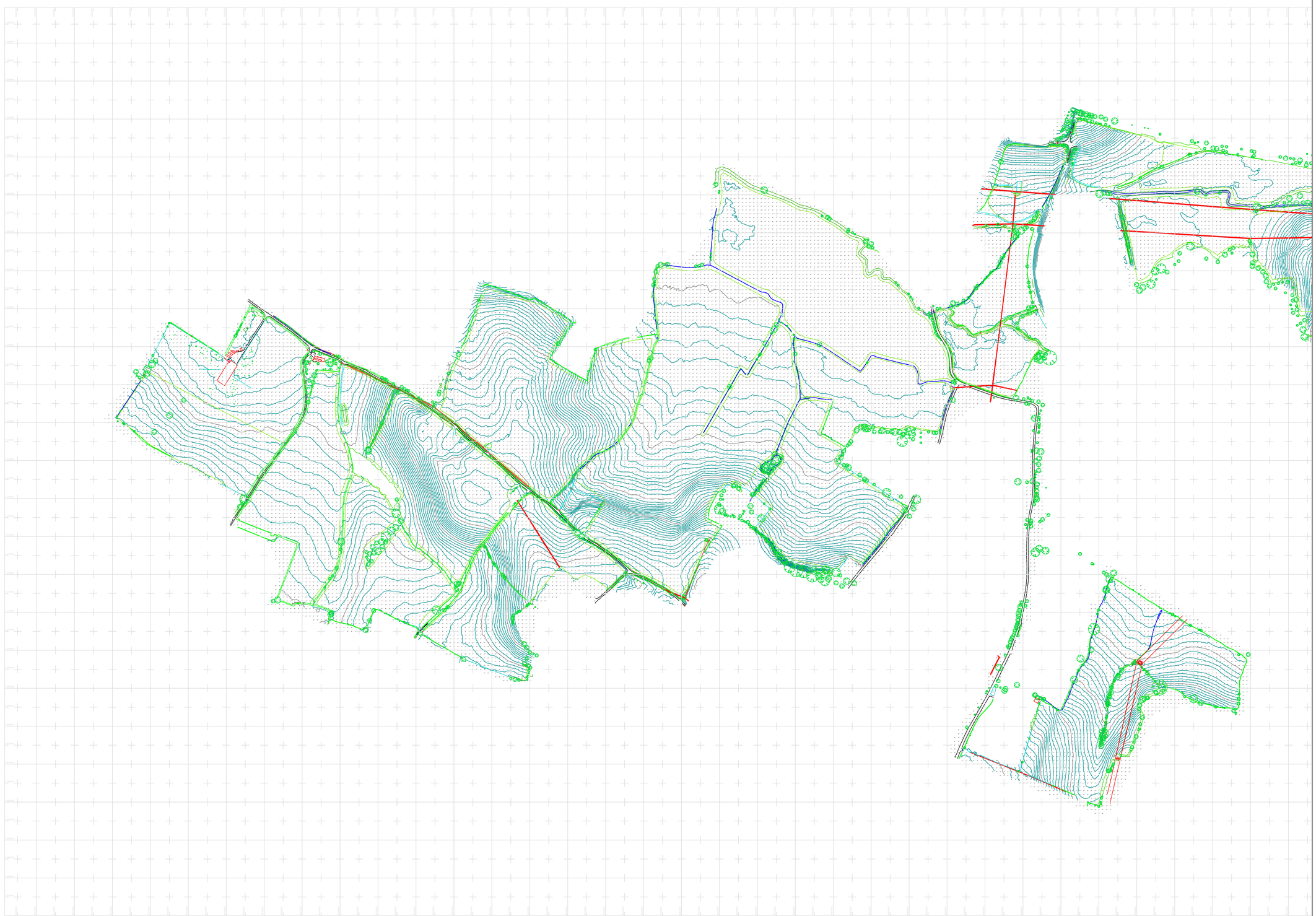
SURVEYED BY: MALTBY LAND SURVEYS LTD		Ref: 17_332
SURVEY DATE: JANUARY 2018		
SCALE: AS SHOWN	DRN: RC	CHKD: ITS
DATUM: OS GPS ACTIVE	DATE: MAR 18	DATE: MAR 18
GRID: NATIONAL GRID	DRAWING NO. X-J01058-41	REV. —
CAD FILENAME: X-J01058-41.dwg		

Annex C Sensat Topographic Survey

Annex B: East Stour Hydraulic Modelling Report

Stonestreet Green Solar Farm

EPL 001 Limited



Legend

- Building
- Bottom of Bank
- Concrete
- Drainage Ditch
- Fence
- Foot Path
- Grass Edge
- Hedge (Edge)
- Hedge Polyline
- KerbChannel
- KerbTop
- Overhead Wires
- Tarmac
- Top of Bank
- Edge of Tree Canopy Left
- Edge of Tree Canopy Right
- Verge
- Wall
- Waters Edge
- White Line
- Gate
- Tree 2Pt Canopy
- EP Electricity Pole

Issue	Date	By	Chkd	Appd
01	28/01/22	CW	BC	CW

sensat®

Sensat, 160 Old St, London EC1V 9BP
www.sensat.co.uk
contact@sensat.co.uk
+44 (0) 20 3488 2645

Client
EPL 001 Ltd

Job Title
Stonestreet Solar Farm

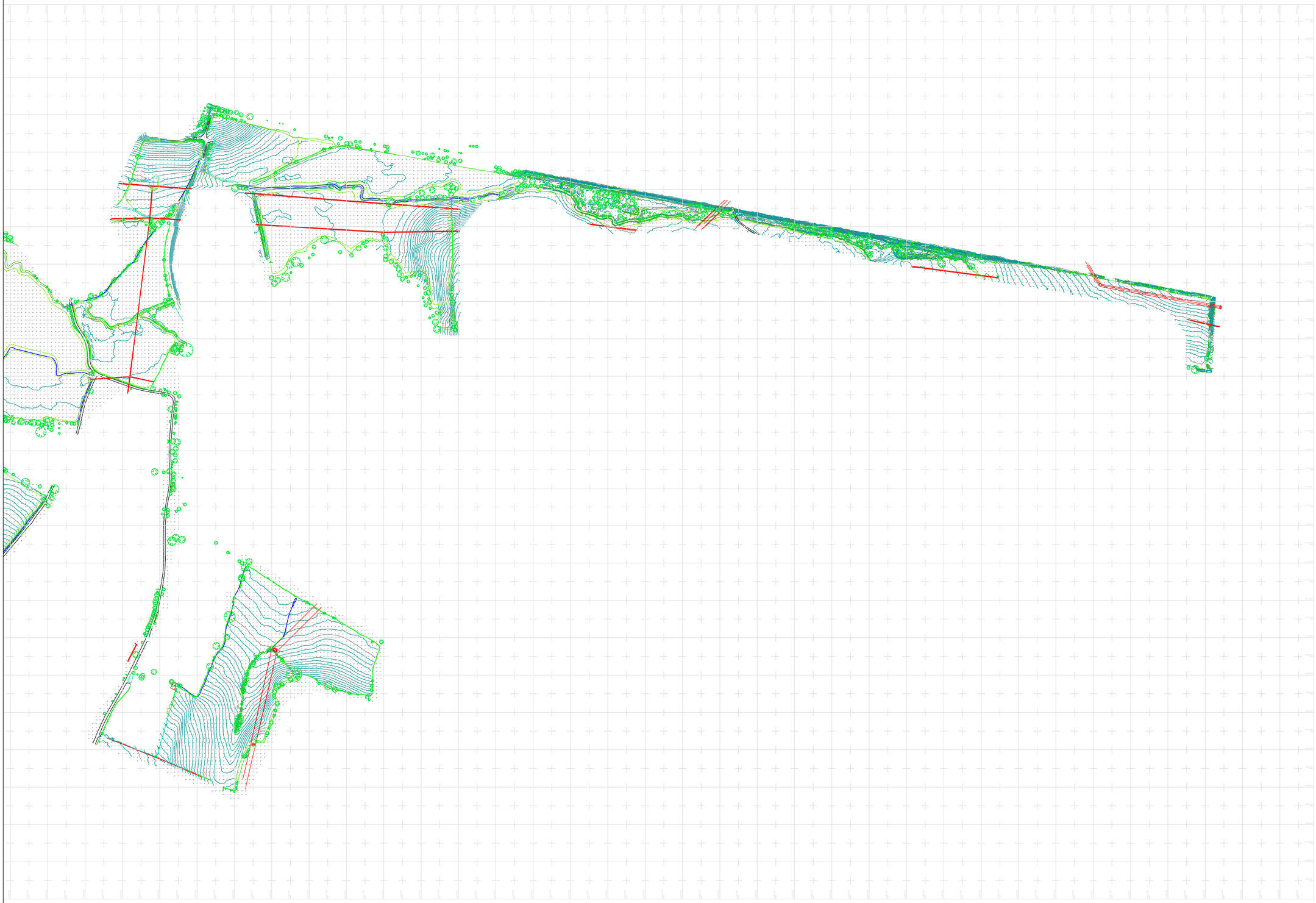
Drawing Title
Topographic Survey derived from UAV Photogrammetry & Lidar Point Clouds
Grid: OSGB36NG & OSGM15

Scale at A1 1:5000

Plot ID

Drawing Status
For Information

Job No	Drawing No	Issue
S22213-00	**Sheet 1 of 2**	**01**



Legend

- Building
- Bottom of Bank
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- Drainage Ditch
- Fence
- Foot Path
- Grass Edge
- Hedge (Edge)
- Hedge Polyline
- KerbChannel
- KerbTop
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- White Line
- Gate
- Tree 2Pt Canopy
- EP Electricity Pole

Issue	Date	By	Chkd	Appd
01	28/01/22	CW	BC	CW

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Grid: OSGB36NG & OSGM15

Scale at A1 1:5000

Plot ID

Drawing Status
For Information

Job No	Drawing No	Issue
S22213-00	**Sheet 2 of 2**	**01**

Annex D Hydrology Report

(provided as standalone report)

Annex B: East Stour Hydraulic Modelling Report

Stonestreet Green Solar Farm

EPL 001 Limited

Hydrology Report

Stonestreet Green Solar Farm

EPL 001 Limited

2nd Floor, Regis House, 45 King William Street, London, United Kingdom, EC4R 9AN

Prepared by:

SLR Consulting Limited

Ground Floor Helmont House , Churchill Way, Cardiff,
CF10 2HE

SLR Project No.: 425.064837.00001

24 January 2024

Revision: 00

Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
Method Statement	24 August 2023	Clement Ehall	George Frisby	Ian Walton
Calculations Revision 1	25 January 2024	Clement Ehall	George Frisby	Ian Walton

Basis of Report

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HR2 Catchment and Gauging Stations
HR3 Aldington Flood Storage Area Extent
HR4 Catchments and Sub catchments

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Digital Files – Input Data

FEH_Catchment_Descriptors_609400_137700_v5_0_1.xml

FEH_Catchment_Descriptors_608350_138850_v5_0_1.xml

FEH_Catchment_Descriptors_608900_138550_v5_0_1.xml

FEH_Catchment_Descriptors_607250_137150_v5_0_1.xml

FEH_Catchment_Descriptors_605300_138600_v5_0_1.xml

FEH_Point_Descriptors_605897_137543_v5_0_1.xml

Digital File – Project or Calculation Files

ReFH2_and_WINFAP_Design_Flow_Estimation_Summary_Sheet_v2.xlsx

Stat – WINFAP Projects and Non Flood Years Adjustment Spreedsheets

ReFH – ReFH Projects and CSV ouputs

Digital Files – Output Data

ESUS Scaled Hydrographs.xlsx

ICHL Scaled Hydrographs.xlsx

ICULV1 Scaled Hydrographs.xlsx

ICULV2 Scaled Hydrographs.xlsx

IES1 Scaled Hydrographs.xlsx

IES2 Scaled Hydrographs.xlsx

ITRIB1a Scaled Hydrographs.xlsx

ITRIB1b Scaled Hydrographs.xlsx

ITRIB2a Scaled Hydrographs.xlsx

ITRIB2b Scaled Hydrographs.xlsx

ITRIB3 Scaled Hydrographs.xlsx

TRIB1 Scaled Hydrographs.xlsx

TRIB2 Scaled Hydrographs.xlsx

TRIB3 Scaled Hydrographs.xlsx

Other Supporting Information

Upper Stour hydrological assessment by continuous simulation. Draft V3. JBA, May 2023

RPs_DesignFlows20230512.xlsx (JBA, 2023)

Autumn 2000 Great Stour flood rarity. JBA, July 2014.

2013-2014 Post Flood Analysis: Kent & South London Area. JBA, December 2014.

Acronyms and Abbreviations

AEP	Annual exceedance probability
AMAX	Annual Maximum
AREA	Catchment area (km2)
BFI	Base Flow Index
BFIHOST19	Base Flow Index derived using the HOST soil classification, revised in 2019
CSM	Continuous Simulation Modelling
FARL	FEH index of flood attenuation due to reservoirs and lakes
FEH	Flood Estimation Handbook
FSA	Flood Storage Area
GEV	Generalised Extreme Value
GLO	Generalised Logistic
HOST	Hydrology of Soil Types
IF	Impervious Fraction
IRF	Impervious Runoff Factor
LF	Low flow statistics (flow duration curve)
LiDAR	Light Detecting and Ranging
NRFA	National River Flow Archive
POT	Peaks Over a Threshold
QMED	Median Annual Flood (with return period 2 years)
ReFH	Revitalised Flood Hydrograph method
ReFH2	Revitalised Flood Hydrograph 2 method
SAAR	Standard Average Annual Rainfall (mm)
Tp	Time to peak of the instantaneous unit hydrograph
URBAN	Flood Studies Report index of fractional urban extent
URBEXT1990	FEH index of fractional urban extent
URBEXT2000	Revised index of urban extent, measured differently from URBEXT1990
WINFAP	Windows Frequency Analysis Package (software that can be used for FEH statistical method)

1.0 Summary of Assessment

1.1 Introduction

This report has been prepared inline with the Environment Agency's Flood Estimation Guidelines (LIT 11832) and follows the format of the Environment Agency's Flood Estimation Report Template (LIT 65087). It provides a record of the hydrological context, the method statement, the calculations, the decisions made, and the results of flood estimation.

1.1.1 Catchment location

East Stour River and Tributaries.

Stonestreet Green, Ashford, Kent E 605285 N 138611.

1.1.2 Purpose of study and complexity

Inflows for hydraulic model of the East Stour River in Stonestreet Green, Kent in relation to the Development Consent Order (DCO) application for Stonestreet Green Solar ("the Project"). The land within the Order limits is known as the 'Site'. The Main Rivers and Ordinary Watercourses in the vicinity of the Site are shown in the accompanying **HR Figure 1**. Hydrologic estimation consists of;

- Downstream lumped catchment - East Stour River E 605300 N 138600;
- Four upstream lumped catchments - East Stour River E 609400 N 137700, Unnamed Tributary 1 E 608350 N 138850, Unnamed Tributary 2 E 608900 N 138550 and Unnamed Tributary 3 E 607250 N 137150;
- Ten intervening sub-catchments.

1.1.3 Key catchment features

Geology: Headwaters to the north at the border of the Gault and Lower Chalk formations, middle catchment underlain by intergranually permeable sedimentary bedrocks consisting of Mudstone, Sandstone, Limestone and Siltstone. Lower catchment underlain by Weald Clay formation. Hydraulic model includes the Aldington Flood Storage Area (FSA).

1.1.4 Flooding mechanisms

Risk of fluvial flooding from the East Stour River.

1.1.5 Gauged / ungauged

Ungauged catchment. East Stour at South Willesborough is present downstream, however due to presence of FSA upstream not suitable for QMED or Pooling. The following local gauges have been reviewed:

- **East Stour at South Willesborough (NRFA - 40023)** 15-min flow data available. Upstream flood alleviation scheme truncates peaks.
- **Stage Gauge - Aldington Upstream (EA Gauge - E4351)** 15-min stage data available.
- **Old Mill Stream at Alyesford (NRFA - 40035)** Suitable for QMED, local catchment to the north of the East Stour River.
- **Great Stour at Chart Leacon (NRFA – 40022)** Suitable for QMED, local catchment to the west of Ashford with similar geology to the East Stour River.

- **Great Stour at Horton (NRFA – 40011)** Suitable for QMED and Pooling, catchment is downstream of site.
- **Hexden Channel at Hopemill (NRFA – 40021)** Suitable for QMED, local catchment with similar geology to Unnamed Tribuatary 3.
- **Rainfall Gauge – Sellindge (EA Gauge – E4510)** 15-min rainfall data. Within East Stour River catchment to the northeast of Aldington FSA.

1.1.6 Final choice of method

Hybrid method, Rainfall Runoff scaled to peak flow from Statistical method for lumped catchments up to and including the 1 in 100 year event. 1 in 1000 year peak flows scaled from Statistical 1 in 100 year peak flow using Rainfall Runoff 1 in 100 year to 1 in 1000 year peak flow uplift.

1.1.7 Key limitations / uncertainties in results

Lack of gauge data suitable for peak flow estimates for the East Stour.

1.2 Flood Frequencies

- The frequency of a flood can be quoted in terms of a return period, which is defined as the average time between years with at least one larger flood, or as an annual exceedance probability (AEP), which is the inverse of the return period.
- Return periods are output by the Flood Estimation Handbook (FEH) software and can be expressed more succinctly than AEP. However, AEP can be helpful when presenting results to members of the public who may associate the concept of return period with a regular occurrence rather than an average recurrence interval.
- Results tables in this document contain both return period and AEP titles.
- The table below is provided to enable quick conversion between return periods and annual exceedance probabilities.

AEP	50	20	10	5	3.33	2	1.33	1	0.5	01
AEP	0.5	0.2	0.1	0.05	0.033	0.02	0.013	0.01	0.005	0.001
Return period (yrs)	2	5	10	20	30	50	75	100	200	1,000

2.0 Method Statement

2.1 Requirements for Flood Estimates

2.1.1 Overview and Project Scope

The purpose of the study is to provide inflows to the hydraulic model of the reaches of the East Stour River and associated tributaries shown in the accompanying **HR Figure 2**. Both peak flow and hydrographs are required.

Design flows of the 5.0%, 3.3%, 1.0% and 0.1% annual exceedance probability (AEP) have been estimated to reflect Environment Agency (EA) Flood Zones[1]. The 30% uplift for the higher central and 55% uplift for the upper end 2050s epoch climate change allowances[2] have been applied to the 1% AEP event to account for the impact of climate change during the 40 year lifetime of development (starting in 2026).

Five catchments have been analysed as part of this hydrological study:

- East Stour River at E 609400 N 137700 – Upstream lumped catchment.
- Unnamed Tributary 1 at E 608350 N 138850 – Upstream lumped catchment.
- Unnamed Tributary 2 at E 608900 N 138550 – Upstream lumped catchment.
- Unnamed Tributary 3 at E 607250 N 137150 – Upstream lumped catchment.
- East Stour at E 605300 N 138600 – Downstream lumped catchment.

The overall project aim is to provide an updated assessment of flood risk to the Site. Part of the Site is within the 2016 South Ashford flood study however new hydrological estimates are required to improve the understanding of flood risk to the Site.

2.2 The Catchment

2.2.1 Maps:

The catchment and gauging stations are shown in **HR Figure 2**.

2.2.2 Catchment Description

2.2.2.1 East Stour

Catchment geology consists of Lower Chalk (high permeability) formations and Gault (low permeability) formation consisting of Clay, Mudstone and Siltstone in the headwaters, Sedimentary bedrocks consisting of Mudstone, Sandstone, Limestone and Siltstone (mixed permeability) in the middle catchment and Weald Clay (low permeability) formation in the lower catchment. Includes the Aldington FSA, with two unnamed tributaries flowing in from the north, the East Stour headwaters are steep peaking in the north of unnamed Tributary 2 at approximately 180mAOD. The middle and lower catchment have a shallow gradient with the downstream extent of the catchment at approximately 40mAOD. The catchment is essentially rural with limited small areas of urbanisation.

[1] GOV.UK, https://www.gov.uk/guidance/flood-risk-and-coastal-change accessed 4th August 2023

[2] GOV.UK https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances accessed 4th August 2023

2.2.2.2 Unnamed Tributary 1

Catchment geology consists of Lower Chalk formations and Gault formation consisting of Clay, Mudstone and Siltstone in the upper catchment and Sedimentary bedrocks consisting of Sandstone, Siltstone and Mudstone in the lower catchment. The headwaters are steep peaking in the north at approximately 180mAOD. The downstream extent of the catchment is at approximately 50mAOD. The catchment is slightly urbanised containing the villages of Bradbourne, East Bradbourne, Bradbourne Lees and Lily Vale.

2.2.2.3 Unnamed Tributary 2

Catchment geology consists of Lower Chalk formations and Gault formation consisting of Clay, Mudstone and Siltstone in the upper catchment and Sedimentary bedrocks consisting of Sandstone, Siltstone and Mudstone in the lower catchment. The headwaters are steep peaking in the north at approximately 180mAOD. The catchment is essentially rural.

2.2.2.4 Unnamed Tributary 3

Catchment geology consists of the Hythe Formation interbedded Sandstone and Limestone in the upper catchment and Weald Clay formation in the lower catchment. The catchment is gently sloping, reaching approximately 100mAOD to the south east with the downstream extent of the catchment at approximately 50mAOD. The catchment is essentially rural.

2.3 Hydrometric Data

2.3.1 Source of flood peak data

NRFA peak flows dataset, Version 11.1, released March 2023. This contains data up to water year 2021.

2.3.2 Gauging stations (flow and level)

Table 2-1: Gauging stations (flow and level)

Watercourse	Station Name	Gauging Authority Number	NRFA Number	Catchment area (km^2)	Type (Rated/ ultrasonic/ level)	Start of Record and end (if station closed)
East Stour	South Willesborough	654210001	40023	58.8	Flat V	01/1979
Old Mill Stream	Aylesford	654220001	40035	18.0	Velocity-area	12/2003
Great Stour	Chart Leacon	654110001	40022	72.5	Flat V	01/1967
Great Stour	Horton	654400001	40011	345	Broad-crested weir/Velocity-area	01/1964
Hexden Channel	Hopemill	556710001	40021	32.4	Flume	01/1973

2.3.3 Data available at each flow gauging station

Table 2-2: Data available at each flow gauging station

Station Name	Start and end of flood peak record	Update for this study?	OK for QMED?	OK for pooling?	Data quality check needed?	Station and flow data quality summary
South Willesborough	1975 – 2022	No	No	No	No	Upstream flood alleviation scheme truncates peak flows therefore not suitable for QMED or Pooling estimate.
Aylesford	2003 – Present	No	Yes	No	No	Peak flow gauging's are good. Water year 2005/2006 and 2012/2012 rejected as AMAX likely occurred during period of missing data.
Chart Leacon	1980 – 2021	No	Yes	No	No	Theoretical rating at high flows. Rating extended to 1.8m using hydraulic modelling but low confidence beyond 1.13m as flow is out of bank.
Horton	1964 – 2021	No	Yes	Yes	No	Gauged beyond AMAX3. Rating is reliable.

2.3.4 Rating Equations

Table 2-3: Rating Equations

Station name	Type of rating e.g., theoretical, empirical; degree of extrapolation	Rating review needed?	Comments and link to any rating reviews
South Willesborough	Theoretical rating to 5.3 cumecs (under review)	No	Station not suitable for QMED or Pooling estimates. Almost all flows contained.
Aylesford	Rating derived from ultrasonic gauge data.	No	Peak flow data appears to be good.
Chart Leacon	Theoretical rating, velocity-area calibration for high flows.	No	Rating validated to QMED.
Horton	Theoretical rating from weir equation.	No	All flows within weir range. Rating is thought to be reliable.
Hopemill	Power law rating in three sections.	No	Gauged within 30% of QMED. Flows observed to be within bank.

2.3.5 Other data available and how it has been obtained

Table 2-4: Other data available and how it has been obtained

Type of data	Data relevant to this study?	Data available?	Source of data	Details
Check flow gaugings	No	Yes	NRFA	Ratings suitable for proposed uses.
Historical flood data	Yes	Yes	Autumn 2000 Great Stour flood rarity report, July 2014 and 2013-2014 Post Flood Analysis: Kent & South London Area, December 2014.	Analysis includes events where the Aldington FSA reached full capacity.
Flow or river level data for events	Yes	Yes	NRFA/EA Hydrology Data API	**South Willesborough:** 15 minute flow data for 29th December 1979 and 6th February 2001 events. **Horton:** 15 minute flow data for 18th January 1969, March 1975 and 9th February 2001 events. **Aylesford:** Full 15 minute flow dataset has been requested from the EA. **Chart Leacon:** Full 15 minute flow dataset has been requested from the EA. **Hopemill:** Full 15 minute flow dataset has been requested from the EA.

Type of data	Data relevant to this study?	Data available?	Source of data	Details
Rainfall data for events	Yes	Yes	NRFA/EA Hydrology Data API	**South Willesborough:** Catchment daily rainfall data. **Aylesford:** Catchment daily rainfall data. **Chart Leacon:** Catchment daily rainfall data. **Horton:** Catchment daily rainfall data. **Hopemill:** Catchment daily rainfall data. **Sellindge:** 15 minute rainfall data for December 2003, February 2014, April/May 2018 and March 2020 events.
Potential evaporation data	No	No		Evaporation data not thought to have a large impact on flooding at The Site due to peaks occurring during large winter storms.
Results from previous studies	Yes	Yes		South Ashford 2016 flood risk mapping study. Upper Stour hydrological assessment by continuous simulation (JBA, 2023)
Other data or information	No	No		

2.3.6 Conclusions of hydrometric data review

Table 2-5: Conclusions of hydrometric data review

Station name	Rating suitability	Suitability for flood estimation calculations
South Willesborough	Suitable	Not suitable

Station name	Rating suitability	Suitability for flood estimation calculations
Aylesford	Suitable	QMED only
Chart Leacon	Suitable	QMED only
Horton	Suitable	QMED and Pooling
Hopemill	Suitable	QMED only

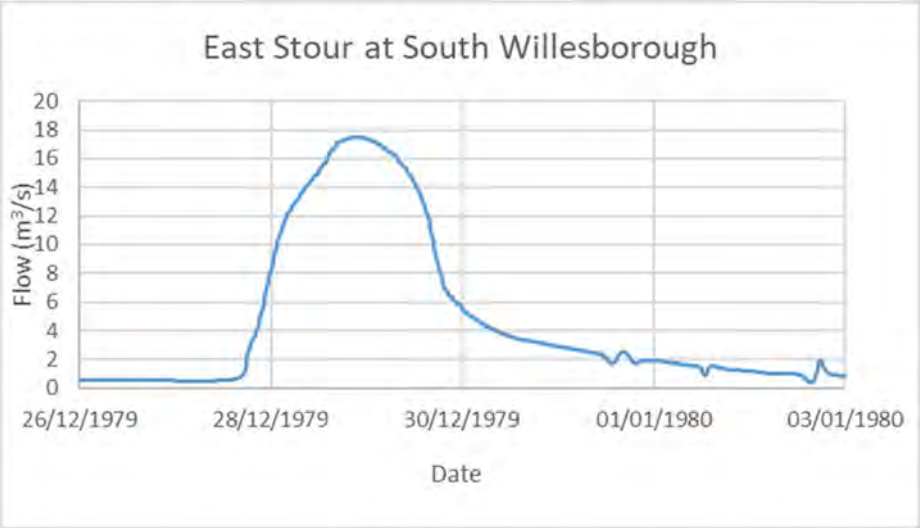
2.4 Hydrological Understanding of the Catchment

2.4.1 Plots of flood peak data and interpretation

2.4.1.1 East Stour at South Willesborough

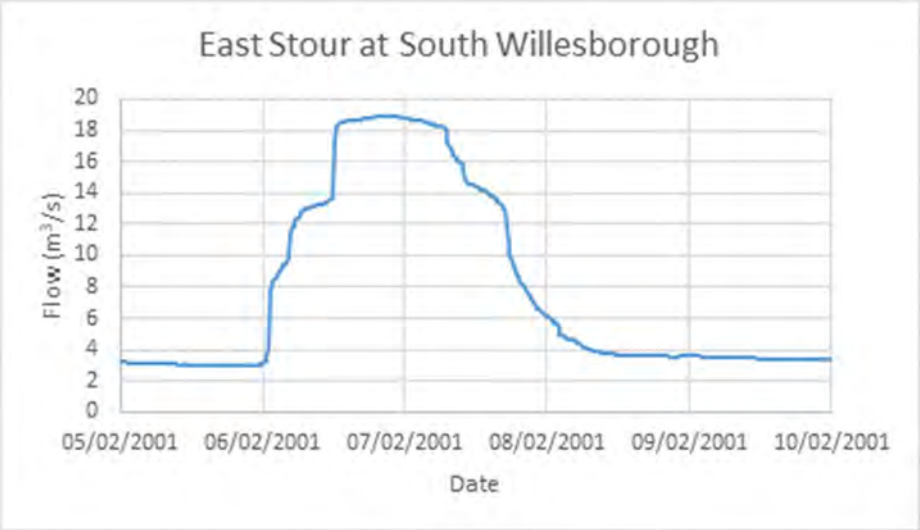
Seasonality of peak flow events is skewed to winter floods.

Figure 2-1: South Willesborough plots of flow data and interpretation (Dec 1979-Jan 1980)



Event starts at approximately 17:00 27/12/1979 reaching a peak flow of 17.5 m^3/s at 20:00 28/12/1979. Data is from prior to construction of the Aldington FSA in 1989.

Figure 2-2: South Willesborough plots of flow data and interpretation (Feb 2001)



Event starts at approximately 00:00 06/02/2001 reaching a peak flow of 18.9 m^3/s at 19:00 06/02/2001. Data is after the completion of the Aldington FSA. Note peak flow is beyond upper limit of rating.

2.4.1.2 Old Mill Stream at Aylesford

Max gauged flow of 7.189 m^3/s. All AMAX events occur during winter.

Figure 2-3: Aylesford plots of flood peak data and interpretation (Chart)

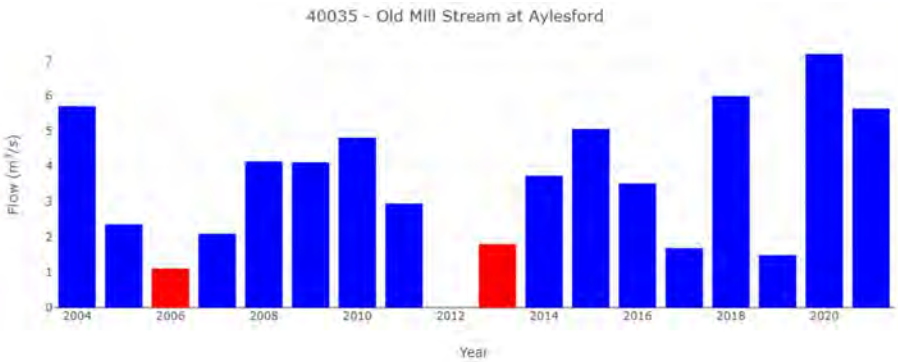
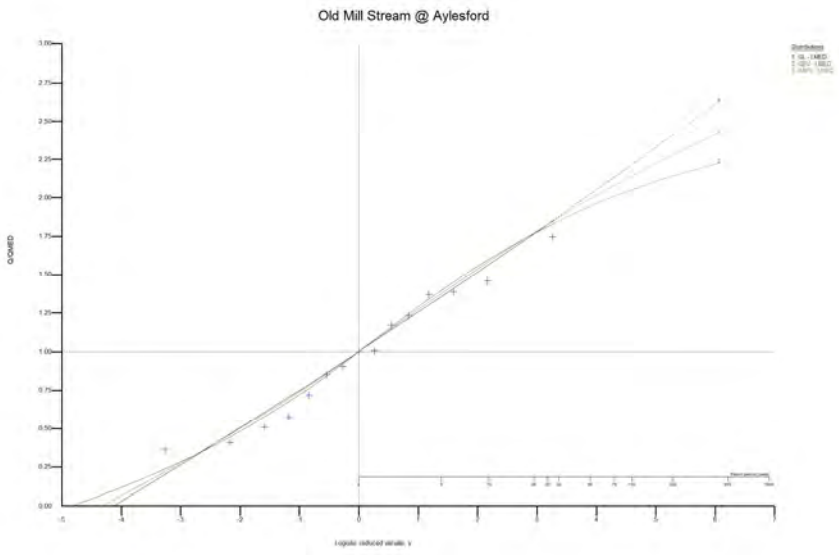


Figure 2-4: Aylesford plots of flood peak data and interpretation (Graph)



2.4.1.3 Great Stour at Chart Leacon

Max gauged flow of 20.316 m^3/s. AMAX events are heavily skewed to winter events.

Figure 2-5: Chart Leacon plots of flood peak data and interpretation (Chart)

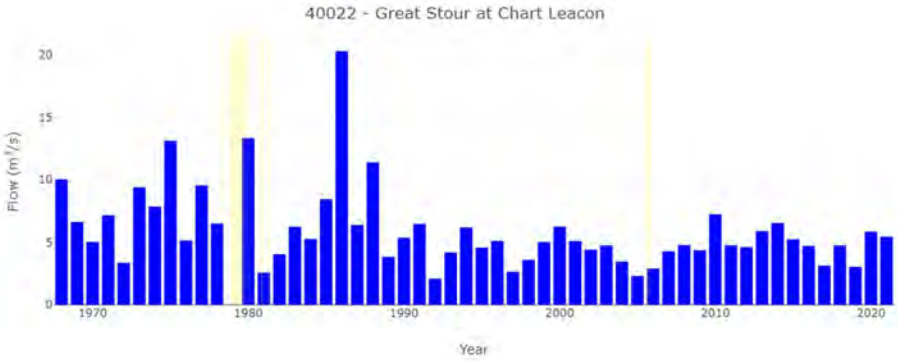
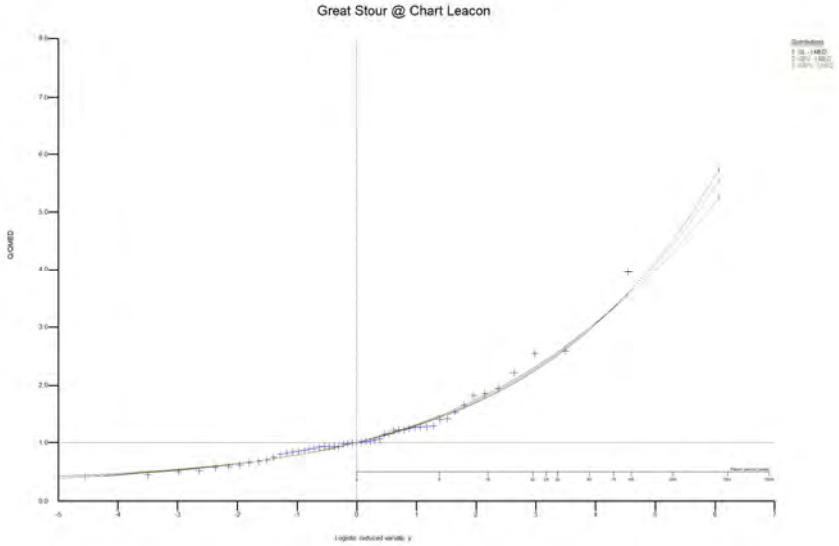


Figure 2-6: Chart Leacon plots of flood peak data and interpretation (Graph)



2.4.1.4 Great Stour at Horton

Max gauged flow of 33.658 m^3/s. AMAX events are heavily skewed to winter events.

Figure 2-7: Horton plots of flood peak and flow data and interpretation (Chart)

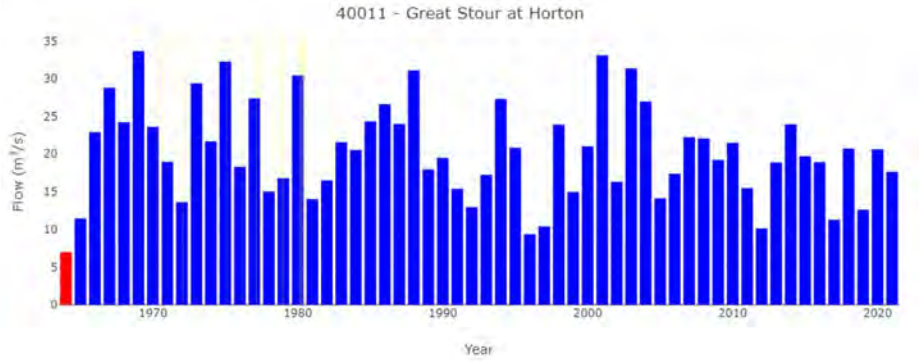


Figure 2-8: Horton plots of flood peak and flow data and interpretation (Graph)

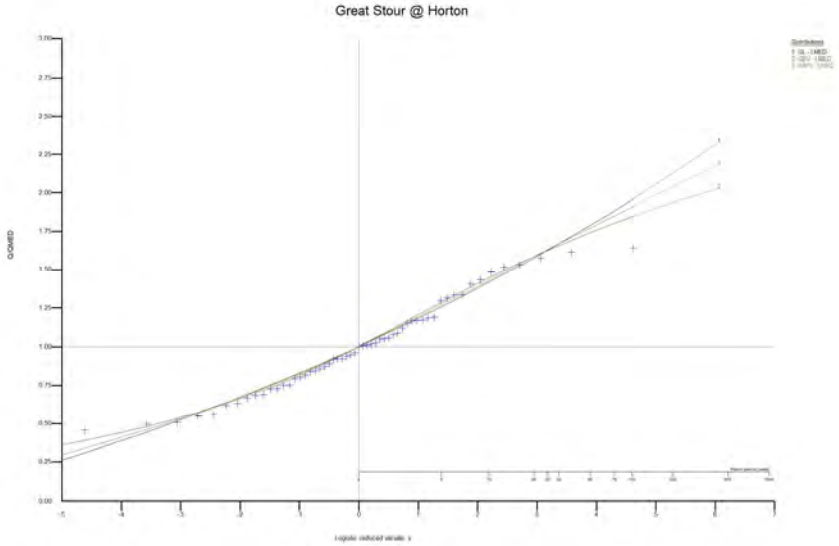


Figure 2-9: Horton plots of flood peak and flow data and interpretation (Jan 1969)

Event starts at approximately 00:00 18/01/1969 reaching a peak flow of 17.5 m^3/s at 12:45 18/01/1969.

Figure 2-10: Horton plots of flood peak and flow data and interpretation (March 1975)

Peak flows appear to be truncated at 12.9 m^3/s.

Figure 2-11: Horton plots of flood peak and flow data and interpretation (Feb 2001)

Event starts at approximately 00:00 08/02/2001 reaching a peak flow of 33.1 m^3/s at 03:00 09/02/2001.

2.4.1.5 Hexden Channel at Hopemill

Max gauged flow of 28.88 m^3/s. AMAX events are heavily skewed to winter events.

Figure 2-12: Hopemill plots of flood peak data and interpretation (Chart)

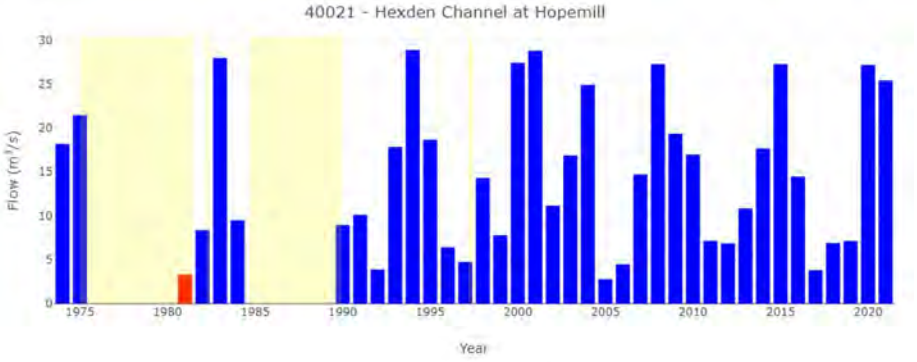
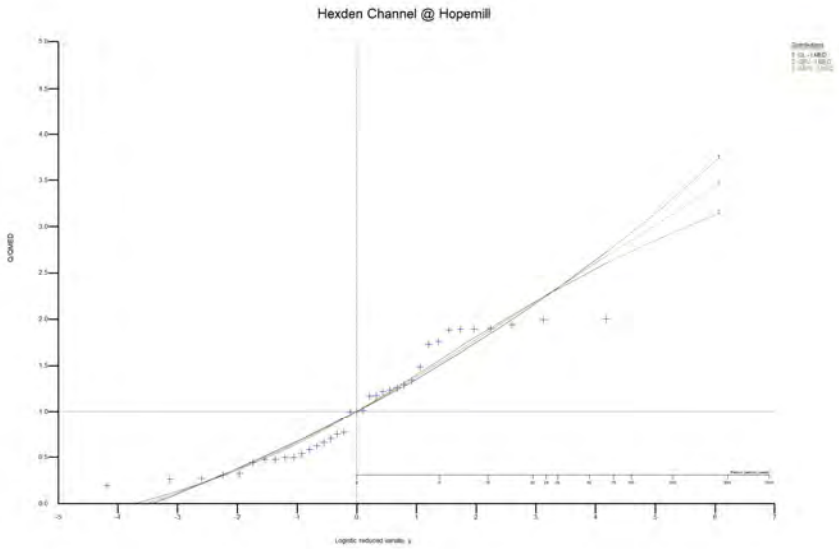


Figure 2-13: Hopemill plots of flood peak data and interpretation (Graph)



2.4.2 Conceptual model

The hydraulic model is volume driven model, particularly when considering the defended scenario due to the presence of the Aldington FSA. The East Stour River is most susceptible from winter rainfall events, due to the groundwater influence on flows and the attenuating affect of the Aldington FSA on peak flows during flashier summer rainfall events.

The Site is at risk of flooding from the East Stour River.

Blockages may be possible in the culverts through the railway embankment upstream of the Site, and at the inlet of to the control structures in the Aldington FSA embankment. Downstream of the site blockages are highly unlikely due the large opening of the bridges, and lack of potential debris sources.

2.4.3 Unusual catchment features

The Aldington FSA is within the catchment the approximate extent of which is shown by **HR Figure 3**.

The headwaters of the catchment are underlain by highly permeable Chalk bedrock, with the sources of the East Stour River and Unnamed Tributaries 1 and 2 to the north of the Site arising from where the Lower Chalk formations meet the Gault Formation outcrop and as such flows through the East Stour River are expected to be groundwater influenced.

2.5 Initial Choice of Approach

2.5.1 Are FEH methods appropriate?

Yes

2.5.2 Initial choice of method(s) and reasons

Due to the available local gauges suitable for QMED adjustment, the statistical method is deemed the most appropriate estimate of peak flows. The growth in flow rates up to and including the 1% AEP event is best estimated from a pooling group of hydrologically similar catchments. As the flow gauges on the East Stour River are not suitable for QMED or pooling estimates, a single site analysis would not be suitable. Therefore ungauged statistical methods will be used up to and including the 1% AEP event.

Due to the greater availability of long rainfall record and spatial consistency of extreme rainfall events and therefore greater confidence in rainfall frequency curves for large return periods. A hybrid approach will be used for the 0.1% AEP event, with the ReFH2 1% to 0.1% AEP event ratio applied to the statistical 1% AEP peak flow.

2.5.3 How will hydrograph shapes be derived if needed?

Hydrograph profiles will be derived from ReFH2, and scaled so that the critical duration winter peak flow matches peak flow estimates from the statistical (hybrid for 0.1% AEP) method. This is as the local AMAX events are shown to heavily skewed to winter events and the lack of suitable gauge data for a study of average hydrograph shapes. Duration sensitivity testing will be completed as part of the accompanying hydraulic modelling study.

2.5.4 Will the catchment be split into sub-catchments? If so, how?

The East Stour River downstream lumped catchment has been defined using the FEH webservice boundary and has been split into four upstream lumped catchments, the East Stour River, Unnamed Tributaries 1, 2 and 3, also defined using the FEH webservice boundaries. The remaining intervening area has been split into ten sub-catchments defined using interpretation of 1m resolution LiDAR data.

2.5.5 Software to be used

FEH Web Service[3], WINFAP 5[4] and ReFH2.3

[3] CEH 2015. The Flood Estimation Handbook (FEH) Online Service, Centre for Ecology & Hydrology, Wallingford, UK.

[4] WINFAP 5 © Wallingford HydroSolutions Limited 2023.

3.0 Locations Where Flood Estimates are Required

3.1 Summary of Subject Sites

The table below lists the locations of the subject sites. The site codes listed below are used in all subsequent tables to save space. The locations of the catchments are shown by **HR Figure 4**.

Table 3-1: Flood Estimate Subject Sites

Site code	Type of estimate: lumped (L) or sub-catchment (S)	Water-course	Site name / description	Easting	Northing	AREA on FEH Web Service (km2)	Revised AREA (if altered) (km2)
ESUS	L	East Stour	East Stour Upstream	609400	137700	19.49	N/A
TRIB1	L	Unnamed Tributary 1	Unnamed tributary of the East Stour A20 crossing near Water Farm.	608350	138850	7.16	N/A
TRIB2	L	Unnamed Tributary 2	Unnamed tributary of the East Stour at A20 crossing near Brindles.	608900	138550	12.85	N/A
TRIB3	L	Unnamed Tributary 3	Unnamed tributary of the East Stour at Harringe Bridge	609400	137700	3.72	N/A
ESDS	L	East Stour	East Stour Downstream	605300	138600	51.91	N/A
IES1	S	East Stour	Intervening area of the East Stour upstream of the FSA	606667	138139	3.72 (TRIB3 used as donor)	2.116
IES2	S	East Stour	Intervening area of East Stour downstream of FSA	605300	138600	3.72 (TRIB3 used as donor)	2.543
ITRIB3	S	Unnamed Tributary 3	Intervening area of Unnamed tributary 3	606659	137912	3.72 (TRIB3 used as donor)	1.206
ICULV1	S	Contributing area	Contributing area into western most culvert upstream of FSA	607105	138375	N/A (point descriptor used)	0.521
ICULV2	S	Contributing area	Contributing area into next culvert east of ICULV1	607425	138315	N/A (point descriptor used)	0.827

Site code	Type of estimate: lumped (L) or sub-catchment (S)	Water-course	Site name / description	Easting	Northing	AREA on FEH Web Service (km2)	Revised AREA (if altered) (km2)
ITRIB1a	S	Unnamed Tributary 1	Contributing area flowing into Unnamed tributary 1 between the A20 and M20 roads	608154	138697	N/A (point descriptor used)	0.532
ITRIB1b	S	Unnamed Tributary 1	Contributing area flowing into Unnamed tributary 1 between the M20 and railway embankment	607685	138266	N/A (point descriptor used)	0.290
ICHL	S	Contributing area	Contributing area flowing into Church Lane railway embankment underpass.	608121	138185	N/A (point descriptor used)	0.279
ITRIB2a	S	Unnamed Tributary 2	Contributing area flowing into Unnamed tributary 2 between the A20 and M20 roads	608661	138378	N/A (point descriptor used)	0.217
ITRIB2b	S	Unnamed Tributary 2	Contributing area flowing into Unnamed tributary 2 between the M20 and railway embankment	608579	138101	N/A (point descriptor used)	0.167

3.2 Catchment Descriptors

3.2.1 Final catchment descriptors at each subject site

Any catchment descriptor values that have been manually adjusted are shown in Red. Note for some catchments FARL, DPLBAR, DPSBAR, URBEX2000 and FPEXT are not applicable as point descriptors and plot scale equations have been used.

Site code	FARL	PROPWET	BFIHOST19	DPLBAR (km)	DPSBAR (m/km)	SAAR (mm)	URBEXT 2000	FPEXT
ESUS	0.992	0.34	0.688	5.33	43.3	775	0.0159	0.0904
TRIB1	1	0.34	0.600	2.95	50.5	769	0.0328	0.0473
TRIB2	0.996	0.34	0.749	4.72	61.8	793	0.0149	0.0528
TRIB3	1	0.34	0.427	1.88	44.1	745	0	0.0645
ESDS	0.996	0.34	0.625	8.22	46.7	771	0.0153	0.0938

Site code	FARL	PROPWET	BFIHOST19	DPLBAR (km)	DPSBAR (m/km)	SAAR (mm)	URBEXT 2000	FPEXT
IES1	1	0.34	0.427	**1.43**	44.1	745	0	0.0645
IES2	1	0.34	0.427	**1.57**	44.1	745	0	0.0645
ITRIB3	1	0.34	0.427	**1.09**	44.1	745	0	0.0645
ICUVL1	N/A	0.34	0.509	N/A	N/A	747	N/A	N/A
ICULV2	N/A	0.34	0.509	N/A	N/A	747	N/A	N/A
ITRIB1a	N/A	0.34	0.509	N/A	N/A	747	N/A	N/A
ITRIB1b	N/A	0.34	0.509	N/A	N/A	747	N/A	N/A
ICHL	N/A	0.34	0.509	N/A	N/A	747	N/A	N/A
ITRIB2a	N/A	0.34	0.509	N/A	N/A	747	N/A	N/A
ITRIB2b	N/A	0.34	0.509	N/A	N/A	747	N/A	N/A

3.2.2 Catchment boundary checks and revisions

FEH Webservice boundaries were compared to OpenTopoMap contours for the lumped catchments. FEH derived boundaries show good agreement with mapped contours. The subcatchments have been defined using 1m resolution LiDAR data.

3.2.3 URBEXT source and method for updating

URBEXT2000 was used and checked against aerial imagery and shown to be representative.

3.2.4 BFIHOST source, checks and updates

BFIHOST19 values were checked against BGS geology mapping, it is noted that the BFIHOST19 values are relatively high given the small extent of the catchments that are highly permeable. However, the relative difference in BFIHOST19 values match the underlying geology, and any underestimation of peak flows due to the unrealistically high BFIHOST19 values can be accounted for in the statistical analysis.

3.2.5 Checks and revisions to other catchment descriptors

FARL, DPSBAR and DPLBAR were checked against aerial imagery and shown to be representative.

4.0 Stationary Statistical Methods

4.1 Method Overview

4.1.1 What is the purpose of applying these methods?

Estimate of peak flows for the five study lumped catchments via the ungauged statistical FEH methods.

There are suitable gauges in the local vicinity with similar catchment descriptors and underlying geology.

4.1.2 What methods will be used to estimate QMED and growth curves?

Site code	Methods used for QMED	Methods used for growth curves
ESUS	Data transfer	Pooled
TRIB1	Data transfer	Pooled
TRIB2	Data transfer	Pooled
TRIB3	Data transfer	Pooled
ESDS	Data transfer	Pooled

4.2 Estimating QMED

4.2.1 QMED at ungauged subject sites

Generally QMED increases with catchment size. While TRIB2 is a larger catchment than TRIB1, it also has a higher BFIHOST19 value, and higher level of attenuation and therefore a lower QMED peak flow is plausible.

Site code	Method (CD/ DT/BCW)	Initial QMED (rural) from CDs (m^3/s)	Donors used (NRFA numbers)	Donor distances from subject centroid (km)	Individual donor weights	Combined and weighted donor adjustment factor	Urban adjustment factor	Final QMED (m^3/s)
ESUS	DT	2.100	40035	7.15	1.22		1.028	2.561
TRIB1	DT	1.280	40035	3.08	1.30		1.047	1.669
TRIB2	DT	1.205	40035	5.27	1.24		1.032	1.499
TRIB3	DT	1.171	40021	31.44	1.11		1.000	1.297
ESDS	DT	6.006	40035	5.05	1.25	1.19	1.024	7.166
			40011	9.32	1.02			
			40022	18.57	1.02			

Methods: CD - Catchment descriptors alone; DT - catchment descriptors with donor transfer; BCW - catchment descriptors with bankfull channel width.

4.2.2 Urban adjustment of QMED

Urban adjustment was undertaken based on the methodology developed by Kjeldsen (2014)[5] as part of WINFAP v5[6]. Urban adjustment was undertaken using the default parameters of:

- Impervious fraction for built-up areas, IF – 0.3
- Percentage runoff for impervious surfaces, PR_{imp} – 70%
- Urban cover taken from URBEXT2000.

4.2.3 Search for donor sites

4.2.3.1 Old Mill Stream at Aylesford – 40035

Is marked by NRFA as suitable for QMED but not pooling. The Aylesford gauge is the closest local gauge to the Site. The Old Mill Stream catchment at the location of the gauge is highly similar to the ESUS, TRIB1, TRIB2 and ESDS catchments. The catchment area is 17.96 km2, with similar geology (Lower Chalk and Gault formation in the headwaters, Sedimentary bedrocks consisting of Sandstone, Siltstone and Mudstone in the lower catchment). Highly similar SAAR, BFIHOST19 and FARL values. The AMAX data suggests catchment descriptors underestimate QMED significantly, this maybe due to the BFIHOST19 value being high for a catchment predominantly underlain by intergranuarly permeable bedrock. Given the similarities of the catchment and descriptors to ESUS, TRIB1, TRIB2 and ESDS it is expected that catchment descriptors underestimate QMED by a similar ratio.

4.2.3.2 Great Stour at Horton – 40011

Is marked by NRFA as suitable for QMED and pooling. Less similar to ESUS, TRIB1, TRIB2 and ESDS than 40035 due to a greater proportion and lower extent of the catchment being underlain by Chalk. However, suitable for use in a multiple donor approach.

4.2.3.3 Dour at Crabble Mill – 40033

Is marked by NRFA as suitable for QMED but not pooling. Catchment is a chalk stream with significantly higher SAAR and BFIHOST19 values and therefore is not considered suitable for donor transfer to the target catchments.

4.2.3.4 Great Stour at Chart Leacon – 40022

Is marked by NRFA as suitable for QMED but not pooling. Less similar to ESUS, TRIB1, TRIB2 and ESDS than 40035 as the catchment is expected to be more groundwater influenced. Similar geology although higher proportion underlain by highly permeable bedrocks. Similar catchment descriptors. Considered suitable for multiple donor approach.

4.2.3.5 Beult at Stilebridge – 40005

Is marked by NRFA as suitable for QMED and pooling. Catchment is underlain by clay and has a significantly lower BFIHOST19 value to the target catchments and therefore is not considered suitable for donor transfer.

[5] Kjeldsen, T.R, Jones. D. A., and Morris, D. G. (2014). Using multiple donor sites for enhanced flood estimation in ungauged catchments, Water Resour. Res., 50, 6646–6657, doi:10.1002/ 2013WR015203.

[6] Wallingford HydroSolutions (2023). WINFAP 5 Urban adjustment procedures.

4.2.3.6 Hexden Channel at Hopemill – 40021

Is marked by NRFA as suitable for QMED but not pooling. Good match for SAAR and FARL to TRIB3 and ok match for BFIHOST19. Catchment is underlain by similar geology to TRIB3 consisting of predominantly clay bedrock with intergranualarly permeable sedimentary bedrocks. Considered suitable for donor adjustment for TRIB3 only.

4.2.3.7 Teise at Stonebridge – 40009

Is marked by NRFA as suitable for QMED and pooling. Significant difference in FARL value to target catchments. Not considered suitable for donor transfer due to high level of attenuation compared to target catchments.

4.2.3.8 Rother at Udiam – 40004

Is marked by NRFA as suitable for QMED but not pooling. Significantly higher SAAR value to target catchments. Not considered suitable for donor transfer due to higher amount of rainfall in catchment.

4.2.3.9 Medway at Teaston/East Farleigh – 40003

Is marked by NRFA as suitable for QMED and pooling. Similar catchment to TRIB3 however less suitable than 40021, as the 'small catchment[7]' methodology will be applied to TRIB3 only one donor station will be used. Therefore not considered suitable for donor adjustment.

4.2.3.10 Cuckmere at Cowbeech – 41016

Is marked by NRFA as suitable for QMED but not pooling. Significantly higher SAAR value to target catchments. Not considered suitable for donor transfer due to higher amount of rainfall in catchment.

4.2.4 Donor sites chosen and QMED adjustment factors

Table 4-1: Donor sites chosen and QMED adjustment factors

NRFA no.	Method (AM/ POT/LF)	Adjustment for climatic variation?	QMED from flow data (m^3/s)	De-urbanised QMED from flow data (m^3/s) (A)	QMED from catchment descriptors (m^3/s) (B)	Adjustment ratio (A/B)
40035	AM	No	4.12	3.90	2.42	1.611
40021	AM	No	14.43	14.26	9.41	1.516
40011	AM	No	20.49	19.31	18.43	1.048
40022	AM	No	5.13	4.82	4.46	1.081

Methods: AM – Annual maxima; POT – Peaks over threshold; LF – Low flow (flow duration curve) statistics.

[7] Stewart, L., Faulkner, D., Formetta. F., Griffin, A., Haxton, T., Prosdocimi, I., Vesuviano, G., Young. A. (2019). Estimating flood peaks and hydrograph for small catchments (Phase 2). Report SC090031/R0, Environment Agency.

4.3 Estimating Growth Curves

4.3.1 Derivation of growth curves at subject sites

Table 4-2: Derivation of growth curves at subject sites

Site code	Method (SS, P, ESS, H.)	If P or ESS, name of pooling group	Distribution used and reason for choice	Any urban or non-flood years adjustments	Parameters of distribution (location, scale and shape after adjustments)	Growth factor for 100-year return period
ESUS	P	ESUS	Generalised Logistic (GL) as the distribution is used in permeable adjustment	Permeable adjustment applied	Location: 1 Scale: 0.288 Shape: -0.214 Bound: -0.346	3.266
TRIB1	P	TRIB1	Generalised Logistic (GL) as the distribution is used in permeable adjustment	Permeable adjustment applied	Location: 1 Scale: 0.299 Shape: -0.233 Bound: -0.286	3.479
TRIB2	P	TRIB2	Generalised Logistic (GL) as the distribution is used in permeable adjustment	Permeable adjustment applied	Location: 1 Scale: 0.300 Shape: -0.219 Bound: -0.368	3.391
TRIB3	P	TRIB3	Generalised Logistic (GL) as the distribution is used in permeable adjustment	Permeable adjustment applied	Location: 1 Scale: 0.297 Shape: -0.251 Bound: -0.183	3.309
ESDS	P	ESDS	Generalised Logistic (GL) as the distribution is used in permeable adjustment	Permeable adjustment applied	Location: 1 Scale: 0.270 Shape: -0.128 Bound: -1.108	2.683

Methods: SS - Single Site; P - Pooled; ESS - Enhanced Single Site; H - Historical. Pooled and ESS growth curves were derived using the procedures from Science Report SC050050 (2008). Urban adjustments are carried out using the method of Kjeldsen (2010).

4.3.2 Flood frequency curve plots

Figure 4-1: ESUS Final Non-Flood Year Adjusted Growth Curve

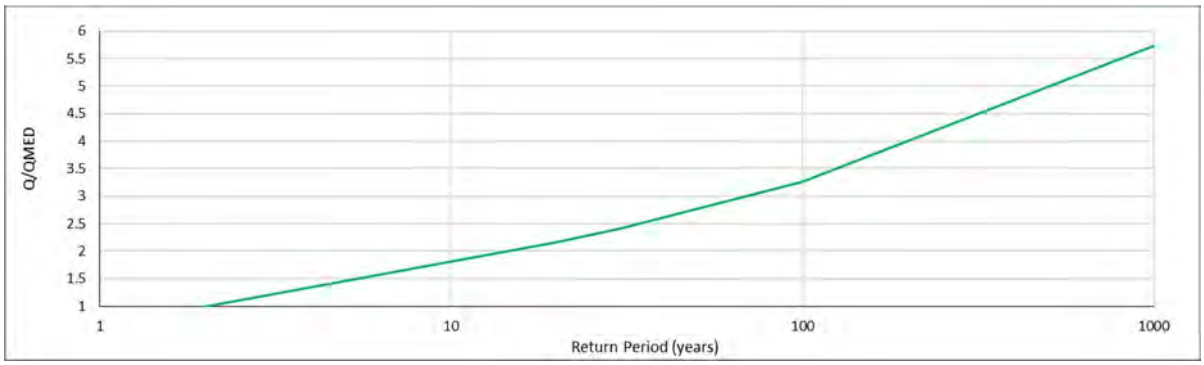


Figure 4-2: TRIB1 Final Non-Flood Year Adjusted Growth Curve

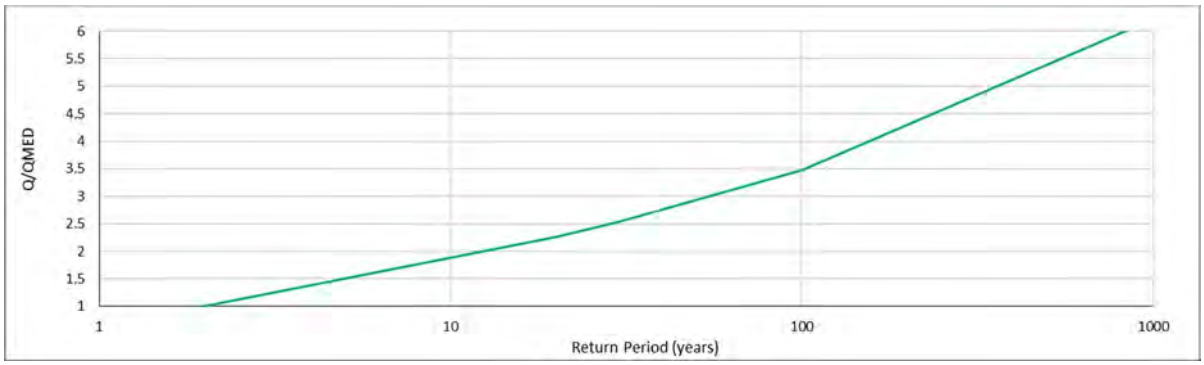


Figure 4-3: TRIB2 Final Non-Flood Year Adjusted Growth Curve

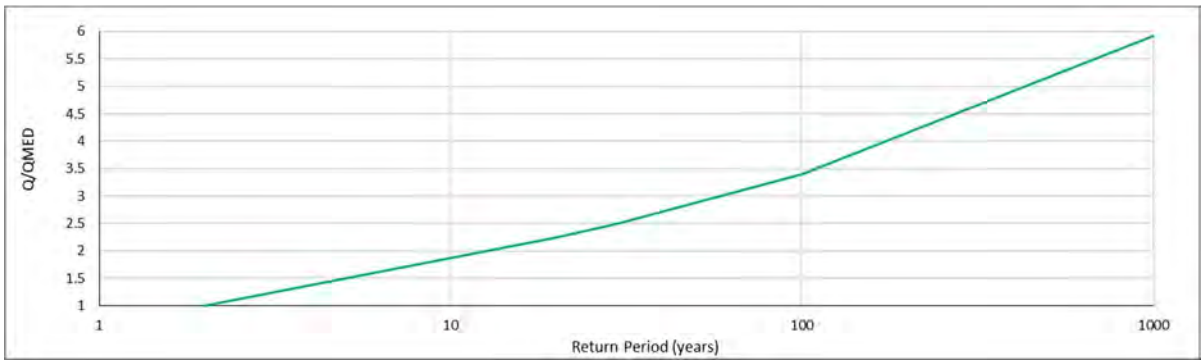


Figure 4-4: TRIB3 Final Non-Flood Year Adjusted Growth Curve

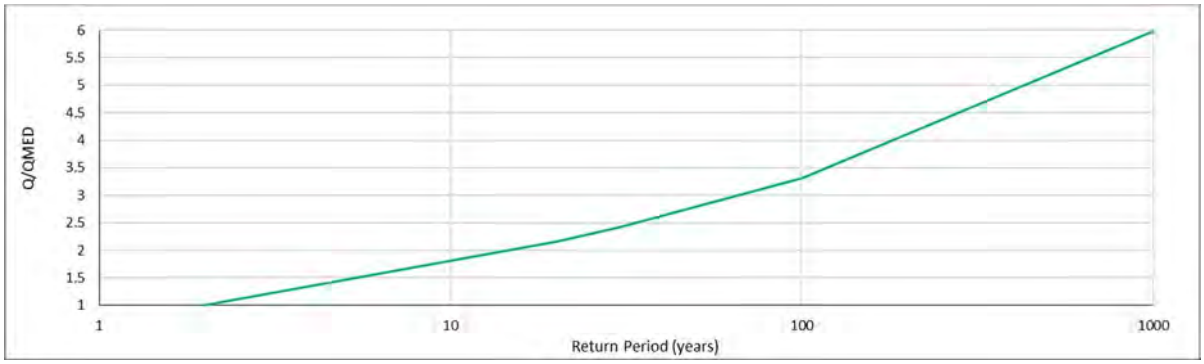
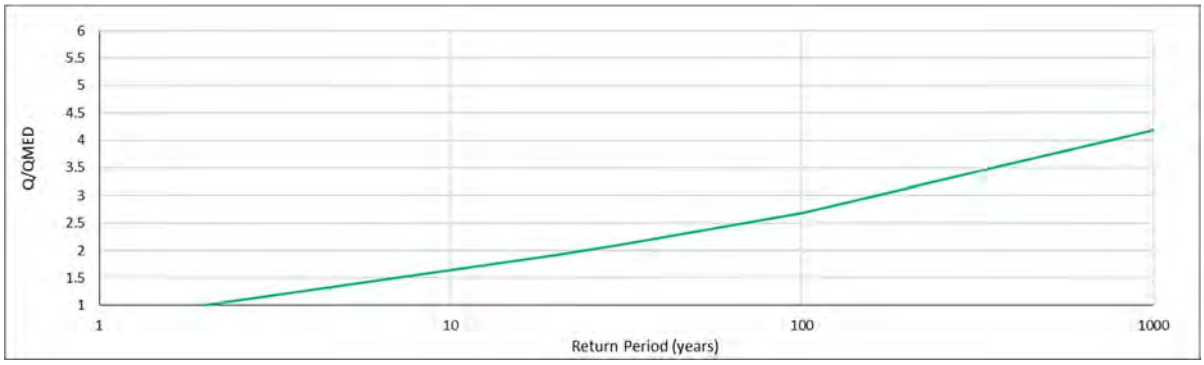


Figure 4-5: ESDS Final Non-Flood Year Adjusted Growth Curve



4.3.3 Derivation of pooling groups

Table 4-3: Derivation of pooling groups

Name of group	Site code from whose descriptors group was derived	Subject site treated as gauged? (ESS)	URBEXT2000 threshold applied to pooling group selection?	L-moments deurbanised (including subject site for ESS)?	Small catchment pooling procedure applied?
ESUS	ESUS	No	0.04	L-CV: 0.271 L-Skew: 0.233	Yes
TRIB1	TRIB1	No	0.04	L-CV: 0.291 L-Skew: 0.238	Yes
TRIB2	TRIB2	No	0.04	L-CV: 0.290 L-Skew: 0.224	Yes
TRIB3	TRIB3	No	0.04	L-CV: 0.264 L-Skew: 0.254	Yes
ESDS	ESDS	No	0.04	L-CV: 0.238 L-Skew: 0.169	No

Methods: Unless otherwise stated, pooling groups were derived using the procedures from Science Report SC050050 (2008). The small catchment pooling procedure is given in the report on Phase 2 of project SC090031 (2021) and implemented in WINFAP v5.

4.3.4 Pooling group composition

Table 4-4: Pooling group composition

Name of group	Changes made to default pooling group, with reasons	Weighted average L-moments
ESUS	Removed 28058 (Henmore Brook at Ashbourne) due to gauge having a negative L-Skew. Added 33054 (Babingley at Castle Rising) to ensure pooling group is still greater than 500 years.	L-CV: 0.271 L-Skew: 0.233

Name of group	Changes made to default pooling group, with reasons	Weighted average L-moments
TRIB1	Removed 28058 (Henmore Brook at Ashbourne) due to gauge having a negative L-Skew. Added 39033 (Winterbourne Stream at Bangor) to ensure pooling group is still greater than 500 years.	L-CV: 0.291 L-Skew: 0.238
TRIB2	Removed 28058 (Henmore Brook at Ashbourne) due to gauge having a negative L-Skew. Added 39033 (Winterbourne Stream at Bangor) to ensure pooling group is still greater than 500 years.	L-CV: 0.290 L-Skew: 0.224
TRIB3	Removed 28058 (Henmore Brook at Ashbourne) due to gauge having a negative L-Skew. Added 44013 (Piddle at Little Puddle) to ensure pooling group is still greater than 500 years.	L-CV: 0.264 L-Skew: 0.254
ESDS	Removed 26003 (Fosten Beck at Fosten Mill) due to gauge having a negative L-Skew. Added 36004 (Chad Brook at Long Melford) to ensure pooling group is still greater than 500 years.	L-CV: 0.238 L-Skew: 0.169

4.4 Final Choice of QMED and Growth Curves

4.4.1 Method choice and reasons

Table 4-5: Method choice and reasons

Site code	Final choice of QMED and reasons	Final choice of flood growth curve method and reasons
ESUS	Data Transfer – Site is ungauged and there are suitable gauges in the local vicinity.	Pooled – Site is ungauged
TRIB1	Data Transfer – Site is ungauged and there are suitable gauges in the local vicinity.	Pooled – Site is ungauged
TRIB2	Data Transfer – Site is ungauged and there are suitable gauges in the local vicinity.	Pooled – Site is ungauged
TRIB3	Data Transfer – Site is ungauged and there are suitable gauges in the local vicinity.	Pooled – Site is ungauged
ESDS	Data Transfer – Site is ungauged and there are suitable gauges in the local vicinity.	Pooled – Site is ungauged

4.4.2 Final flood estimates from stationary statistical methods

Table 4-6: Final flood estimates from stationary statistical methods

Site code	20 5%	30 3.3%	100 1%	1000 0.1%
ESUS	5.70	6.34	8.60	15.09
TRIB1	3.97	4.43	6.08	10.86
TRIB2	3.47	3.86	5.25	9.16
TRIB3	2.80	3.13	4.29	7.76
ESDS	14.12	15.40	19.69	30.62

Flood peak in m3/s for the return periods in years or AEP (%) events.

5.0 Revitalised Flood Hydrograph 2 (ReFH2) Method

5.1 Method Overview

5.1.1 What is the purpose of applying this method?

ReFH2 will be applied at all the study catchments to provide an estimate of hydrograph shape and comparative peak flows via the rainfall runoff method. Additionally, ReFH2 will be used to extend out the flood frequency curve for the extreme 0.1% AEP event.

5.1.2 Rural and urban catchment sub-divisions

All catchments are essentially rural, catchment URBEXT2000 descriptors were reviewed against aerial imagery and found to be representative. As such standard equations for urbanisation were applied.

5.1.3 Version of ReFH2 applied

ReFH2 V4.0

5.2 Model Parameters

5.2.1 Summary of model parameters

Table 5-1:Summary of model parameters

Site code	Method	Tp (hours) rural	Cmax (mm)	BL (hours)	Area modelled as urban (km2)	TP urban scaling factor	IF	IRF	DS
ESUS	CD	5.16	665.65	58.31	0.486	0.75	0.4	0.7	0.5
TRIB1	CD	3.50	529.63	47.17	0.368	0.75	0.4	0.7	0.5
TRIB2	CD	4.30	779.94	59.78	0.300	0.75	0.4	0.7	0.5
TRIB3	CD	2.83	337.91	34.79	0.000	0.75	0.4	0.7	0.5
ESDS	CD	6.46	580.04	61.05	1.244	0.75	0.4	0.7	0.5
IES1	DT from TRIB3	2.42	337.91	32.77	0.000	0.75	0.4	0.7	0.5
IES2	DT from TRIB3	2.55	337.91	33.45	0.000	0.75	0.4	0.7	0.5
ITRIB3	DT from TRIB3	2.07	337.91	30.89	0.000	0.75	0.4	0.7	0.5
ICULV1	PD	1.87	418.13	39.86	0.000	0.75	0.4	0.7	0.5
ICULV2	PD	2.13	418.13	41.28	0.000	0.75	0.4	0.7	0.5
ITRIB1a	PD	1.88	418.13	39.92	0.000	0.75	0.4	0.7	0.5
ITRIB1b	PD	1.59	418.13	38.12	0.000	0.75	0.4	0.7	0.5
ICHL	PD	1.57	418.13	38.01	0.000	0.75	0.4	0.7	0.5
ITRIB2a	PD	1.46	418.13	37.29	0.000	0.75	0.4	0.7	0.5
ITRIB2b	PD	1.36	418.13	36.56	0.000	0.75	0.4	0.7	0.5

Methods: OPT: Optimisation from event analysis, BR: Baseflow recession fitting, LAG: TP from lag analysis, CD: Catchment descriptors, DT: Data transfer, CAL: model calibration, PD: Point descriptors (uses plot scale equations).

5.2.2 Analysis undertaken to derive model parameters

For the three subcatchments where data transfer was used from TRIB3, the catchment area was updated to match the subcatchment delineation which can be seen in **HR Figure 2**. Additionally, DPLBAR was adjusted so that $\log_{AREA}(DPLBAR)$ was the same for the subcatchments and TRIB3.

5.3 Model Inputs for Design Events

5.3.1 Design events for lumped catchments

Table 5-2: Design events for lumped catchments

Site Code	Rainfall DDF Model	Urban or rural	Highly permeable?	Season of design event	Storm duration (hrs)	Initial soil moisture Cini	Initial baseflow BFO
ESUS	FEH22	Urban	Yes	Winter	24.25	71.40	0.223
TRIB1	FEH22	Urban	Yes	Winter	17.25	82.92	0.132
TRIB2	FEH22	Urban	Yes	Winter	24.25	64.38	0.102
TRIB3	FEH22	Urban	No	Winter	8.25	111.24	0.131
ESDS	FEH22	Urban	Yes	Winter	27.25	78.13	0.805

5.3.2 Design events for subcatchments and intervening areas

Table 5-3: Design events for subcatchments and intervening areas

Site code(s)	Rainfall DDF model	Season of design event	Storm duration (hrs)	Areal reduction factor ARF	Reason for selecting storm
IES1	FEH22	Winter	7.25	0.975	To test critical duration storm
IES2				0.974	
ITRIB3				0.980	
ICULV1				0.985	
ICULV2				0.982	
ITRIB1a				0.985	
ITRIB1b				0.988	
ICHL				0.988	
ITRIB2a				0.989	
ITRIB2b				0.990	
IES1	FEH22	Winter	8.25	0.977	Critical storm duration for TRIB3
IES2				0.975	
ITRIB3				0.981	
ICULV1				0.986	

Site code(s)	Rainfall DDF model	Season of design event	Storm duration (hrs)	Areal reduction factor ARF	Reason for selecting storm
ICULV2				0.983	
ITRIB1a				0.985	
ITRIB1b				0.988	
ICHL				0.988	
ITRIB2a				0.989	
ITRIB2b				0.990	
IES1	FEH22	Winter	17.25	0.982	Critical storm duration for TRIB1
IES2				0.981	
ITRIB3				0.985	
ICULV1				0.989	
ICULV2				0.987	
ITRIB1a				0.989	
ITRIB1b				0.991	
ICHL				0.991	
ITRIB2a				0.992	
ITRIB2b				0.993	
IES1	FEH22	Winter	24.25	0.984	Critical storm duration for ESUS and TRIB2
IES2				0.983	
ITRIB3				0.987	
ICULV1				0.990	
ICULV2				0.989	
ITRIB1a				0.990	
ITRIB1b				0.992	
ICHL				0.992	
ITRIB2a				0.993	
ITRIB2b				0.993	
IES1	FEH22	Winter	27.25	0.985	Critical storm duration for ESDS
IES2				0.984	
ITRIB3				0.988	
ICULV1				0.991	
ICULV2				0.989	
ITRIB1a				0.991	
ITRIB1b				0.992	
ICHL				0.992	
ITRIB2a				0.993	
ITRIB2b				0.994	

Site code(s)	Rainfall DDF model	Season of design event	Storm duration (hrs)	Areal reduction factor ARF	Reason for selecting storm
IES1	FEH22	Winter	36.25	0.986	To test critical duration of defended scenario
IES2				0.986	
ITRIB3				0.989	
ICULV1				0.992	
ICULV2				0.990	
ITRIB1a				0.992	
ITRIB1b				0.993	
ICHL				0.993	
ITRIB2a				0.994	
ITRIB2b				0.994	
IES1	FEH22	Winter	48.25	0.988	To test critical duration of defended scenario
IES2				0.987	
ITRIB3				0.990	
ICULV1				0.992	
ICULV2				0.991	
ITRIB1a				0.992	
ITRIB1b				0.994	
ICHL				0.994	
ITRIB2a				0.994	
ITRIB2b				0.995	
IES1	FEH22	Winter	60.25	0.989	To test critical duration of defended scenario
IES2				0.988	
ITRIB3				0.991	
ICULV1				0.993	
ICULV2				0.992	
ITRIB1a				0.993	
ITRIB1b				0.994	
ICHL				0.994	
ITRIB2a				0.995	
ITRIB2b				0.995	
IES1	FEH22	Winter	72.25	0.990	To test critical duration of defended scenario
IES2				0.989	
ITRIB3				0.991	
ICULV1				0.993	
ICULV2				0.992	
ITRIB1a				0.993	

Site code(s)	Rainfall DDF model	Season of design event	Storm duration (hrs)	Areal reduction factor ARF	Reason for selecting storm
ITRIB1b				0.995	
ICHL				0.995	
ITRIB2a				0.995	
ITRIB2b				0.996	
IES1	FEH22	Winter	84.25	0.990	To test critical duration of defended scenario
IES2				0.990	
ITRIB3				0.992	
ICULV1				0.994	
ICULV2				0.993	
ITRIB1a				0.994	
ITRIB1b				0.995	
ICHL				0.995	
ITRIB2a				0.995	
ITRIB2b				0.996	
IES1	FEH22	Winter	96.25	0.991	To test critical duration of defended scenario
IES2				0.990	
ITRIB3				0.992	
ICULV1				0.994	
ICULV2				0.993	
ITRIB1a				0.994	
ITRIB1b				0.995	
ICHL				0.995	
ITRIB2a				0.996	
ITRIB2b				0.996	

5.3.3 Storm duration testing

Storm duration testing was completed on the hydraulic model. The results of which are summarised below:

5.3.3.1 Defended Scenario

- 5% AEP (20yr RP) – 96.25hr event critical.
- 3.3% AEP (30yr RP) – 96.25hr event critical.
- 1% AEP (100yr RP) – 60.25hr event critical.
- 1% AEP + 30% CC (higher central) – 48.25hr event critical.
- 1% AEP + 55% CC (upper end) – 36.25hr event critical.
- 0.1% AEP (1000yr RP) – 27.25hr event critical.

5.3.3.2 Undefended Scenario

- 5% AEP (20yr RP) – 17.25hr event critical.
- 1% AEP (100yr RP) – 24.25hr event critical.
- 0.1% AEP (1000yr RP) – 24.25hr event critical.

5.4 Final Choice of ReFH2 Flow Estimates

5.4.1 Method choice and reasons

Table 5-4: Method choice and reasons

Site code	Final choice of design inputs and model parameters
ESUS	Catchment descriptors, default model parameters.
TRIB1	Catchment descriptors, default model parameters.
TRIB2	Catchment descriptors, default model parameters.
TRIB3	Catchment descriptors, default model parameters.
ESDS	Catchment descriptors, default model parameters.
IES1	Donor transfer from TRIB3, Area and DPLBAR adjusted.
IES2	Donor transfer from TRIB3, Area and DPLBAR adjusted.
ITRIB3	Donor transfer from TRIB3, Area and DPLBAR adjusted.
ICULV1	Point descriptor, catchment area manually derived using LiDAR data
ICULV2	Point descriptor, catchment area manually derived using LiDAR data
ITRIB1a	Point descriptor, catchment area manually derived using LiDAR data
ITRIB1b	Point descriptor, catchment area manually derived using LiDAR data
ICHL	Point descriptor, catchment area manually derived using LiDAR data
ITRIB2a	Point descriptor, catchment area manually derived using LiDAR data
ITRIB2b	Point descriptor, catchment area manually derived using LiDAR data

5.4.2 Final flood estimates from ReFH2 method

Table 5-5: Final flood estimates from ReFH2 method

Site code	20 5%	30 3.3%	100 1%	1000 0.1%
ESUS	3.59	3.99	6.14	12.68
TRIB1	2.30	2.54	3.75	7.54
TRIB2	2.10	2.34	3.69	7.69
TRIB3	2.59	2.82	3.71	6.95
IES1	1.56	1.69	2.15	3.73
IES2	1.80	1.95	2.47	4.30
ITRIB3	0.94	1.03	1.29	2.17
ICULV1	0.32	0.35	0.44	0.75

Site code	20 5%	30 3.3%	100 1%	1000 0.1%
ICULV2	0.46	0.50	0.64	1.10
ITRIB1a	0.33	0.35	0.45	0.76
ITRIB1b	0.19	0.21	0.27	0.45
ICHL	0.19	0.21	0.26	0.43
ITRIB2a	0.15	0.17	0.21	0.35
ITRIB2b	0.12	0.13	0.17	0.27
ESDS	10.13	11.29	17.54	35.16

Flood peak in m^3/s for the return periods in years or AEP (%) events.

6.0 Discussion and Summary of Results

6.1 Comparison of Results from Different Methods

Site code	Ratio of stationary statistical peak to ReFH2, 50% AEP	Ratio of stationary statistical peak to ReFH2, 1% AEP	Ratio of ReFH2 0.1% AEP to ReFH2 1% AEP
ESUS	1.589	1.401	2.064
TRIB1	1.727	1.620	2.007
TRIB2	1.653	1.423	2.084
TRIB3	1.083	1.158	1.876
ESDS	1.394	1.122	2.005

6.2 Final Choice of Method

6.2.1 Choice of method and reasons

6.2.1.1 Lumped Catchments

Due to the availability of gauge data for hydrologically similar catchments in the proximity of the study area which are suitable for QMED adjustment, the statistical method is deemed the most appropriate estimate of peak flows for return periods up to and including the 1% AEP event.

For the permeable catchments within the study, the catchment descriptors BFIHOST19 values are relatively high given the predominant underlying geology, however the same relationship is shown by the donor catchment (Old Mill Stream at Aylesford – 40035) used for the QMED adjustment and as such accounts for this uncertainty.

As hydrographs are required for the hydraulic model, the ReFH2 hydrograph shapes will be scaled so that the urbanised winter critical storm duration matches the final peak flow estimates from the statistical method.

6.2.1.2 Subcatchments and intervening areas

Due to the subcatchments and intervening areas having different catchment properties in particular geology to the upstream lumped catchments, the flow estimates using ReFH2 are considered most suitable. The final flows at the downstream extent of the hydraulic model have been reviewed against the final peak flow estimates for ESDS.

6.2.1.3 How will the 0.1% AEP flows be estimated?

For the lumped catchments, due to the greater availability of long rainfall records and spatial consistency of extreme rainfall events and therefore greater confidence in rainfall frequency curves for large return periods. A hybrid approach will be used for the 0.1% AEP event, with the ReFH2 0.1% to 1% AEP event ratio applied to the statistical 1% AEP event peak flow.

6.2.1.4 How will the flows be applied to a hydraulic model?

ESUS, TRIB1, TRIB2 and TRIB3 lumped flow estimates will be applied at the upstream extents of the model for their respective watercourses, the subcatchment flow estimates will be applied via distributed lateral inflows. Further details to the application of the inflow boundaries in the hydraulic model is provided in the hydraulic modelling report.

6.3 Final Results

Site code	20 5%	30 3.3%	100 1%	1000 0.1%
ESUS	5.70	6.34	8.60	17.76
TRIB1	3.97	4.43	6.08	12.21
TRIB2	3.47	3.86	5.25	10.93
TRIB3	2.80	3.13	4.29	8.05
IES1	1.56	1.69	2.15	3.73
IES2	1.80	1.95	2.47	4.30
ITRIB3	0.94	1.03	1.29	2.17
ICULV1	0.32	0.35	0.44	0.75
ICULV2	0.46	0.50	0.64	1.10
ITRIB1a	0.33	0.35	0.45	0.76
ITRIB1b	0.19	0.21	0.27	0.45
ICHL	0.19	0.21	0.26	0.43
ITRIB2a	0.15	0.17	0.21	0.35
ITRIB2b	0.12	0.13	0.17	0.27
ESDS	14.12	15.40	19.69	39.46

Critical duration storm flood peak in m^3/s for the return periods in years or AEP (%) events.

6.3.1 Climate change allowances

Given the Project will have an operational lifetime of 40 years. The peak river flow climate change allowances for the 2050s (2040-2069) epoch for the Stour Management Catchment have been applied. As the project is classified as essential infrastructure the 30% higher central allowance has been applied in line with the Environment Agencies guidance on climate change allowances for flood risk assessments[8]. Additionally, as the project is classified as nationally significant infrastructure project the 55% upper end allowance has been applied as a credible maximum climate change scenario.

Climate change allowances have been applied by scaling the ReFH2 1% AEP hydrographs to the peak flow estimate from the statistical 1% AEP plus the relevant climate change allowance.

6.4 Checks

6.4.1 Growth factor checks

Table 6-1: Growth factor checks

Site code	1% AEP growth factor	0.1% AEP / 1% AEP ratio
ESUS	3.266	2.064
TRIB1	3.479	2.007

[8] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Site code	1% AEP growth factor	0.1% AEP / 1% AEP ratio
TRIB2	3.391	2.084
TRIB3	4.291	1.876
ESDS	2.683	2.005

6.4.2 Specific discharge

Table 6-2: Specific discharge

Site code	20 5%	30 3.3%	100 1%	1000 0.1%
ESUS	2.93	3.25	4.41	9.11
TRIB1	5.54	6.19	8.50	17.06
TRIB2	2.70	3.00	4.08	8.50
TRIB3	7.54	8.42	11.55	21.67
IES1	7.37	7.99	10.16	17.63
IES2	7.08	7.67	9.71	16.91
ITRIB3	7.79	8.54	10.70	17.99
ICULV1	6.16	6.68	8.46	14.41
ICULV2	5.60	6.08	7.71	13.30
ITRIB1a	6.13	6.65	8.42	14.34
ITRIB1b	6.69	7.28	9.21	15.45
ICHL	6.74	7.35	9.28	15.56
ITRIB2a	7.05	7.70	9.72	16.27
ITRIB2b	7.19	7.84	9.88	16.29
ESDS	2.72	2.97	3.79	7.60

Flood peak in l/s/ha for the return periods in years or AEP (%) events.

6.4.3 Spatial consistency of results

In general, for the lumped catchments the growth factors are shown to be spatially consistent, with a higher growth factor seen for the 1% AEP event for TRIB3. Given the lower permeability of TRIB3 a higher growth factor is to be expected due to the higher runoff ratio. For the 0.1% AEP to 1% AEP ratio, again spatial consistency is observed for the lumped catchments, with a lower ratio seen for TRIB3. This too is to be expected for a lower permeability catchment with soils likely to be closer to fully saturated during a 1% AEP event and as such a lower difference in runoff ratio between the 1% AEP and 0.1% AEP events. The specific discharge shows similar variation with permeability, with the less permeable TRIB1 and TRIB3 catchments having higher specific discharges.

For the subcatchments the specific discharges are shown to be spatially consistent with little variation, this is to be expected given the similar geology of these catchments. Additionally, the specific discharges for the subcatchments are consistent with the lower permeability lumped catchments which also have similar geology.

6.4.4 Return periods for notable historic floods

Post event analysis has been undertaken by JBA in 2014 for the Autumn 2000[9] and Winter 2013 – 2014[10] events.

During the 4 – 9 November 2000 flood event, where the Aldington FSA overtopped the peak flow of 32.1m^3/s at the Great Stour at Wye gauging station located approximately 16km downstream of the Site, was assessed to have an annual probability of occurrence of 3.23% (1 in 31 years). The peak flow at the South Willesborough gauge reached 17.3m^3/s, which is located approximately 5km downstream of the Site. Adjusting for the approximate 13% increase in catchment area between the gauge and the downstream boundary of the model, a peak flow of 15.1m^3/s is expected for a similar event.

During the Winter 2013 – 2014 events, where the Aldington FSA overtopped peak flood levels were gauged to reach approximately 50.3mAOD (100mm above the spillway crest level) on the 15th February with the spill level overtopped for approximately 15 hours. The event was assessed to have an annual probability of occurrence between 3.3% (1 in 30 years) and 6.7% (1 in 15 years) along the East Stour. The peak flow at the South Willesborough gauge reached 11.5m^3/s on the 15th February. Adjusting for the increase in catchment area a peak flow of 10.15m^3/s is expected at the downstream extent of the model for a similar event.

During the defended scenario modelling of the 3.3% AEP event for the critical duration 96.25 hour event, flood levels at the Aldington FSA reached approximately 50.3mAOD, with a peak flow of 10.15m^3/s at the downstream extent of the model, showing good agreement with the historic flood data for the February 2014 event which was assessed to have a similar annual probability of occurrence.

6.4.5 Compatibility with longer-term flood history

The defended scenario modelling indicates that the Aldington FSA spillway is overtopped during longer duration (84.25 hours and longer) flood events with 5% (1 in 20 years) AEP, this shows good agreement with the longer-term flood history with the Aldington FSA overtopping during long duration winter storms in 2000 and 2014 which were assessed to have annual probabilities of occurrence between approximately 3.3% (1 in 30 years) and 6.6% (1 in 15 years).

6.4.6 Comparisons with previous studies

Preliminary hydrological analysis of the Upper Stour catchment undertaken by JBA in 2023[11] has been provided by the Environment Agency and includes flows into and out of the Aldington FSA. Design flows were calculated using Continuous Simulation Modelling (CSM) and compared below.

6.4.6.1 Defended Scenario

For the defended scenario, the peak flow estimates from JBA's CSM analysis into the Aldington FSA closest matched the peak flow estimates for the 27.25 hour duration event from this study and are compared in the table below.

As can be seen in the table below, the flows into the Aldington FSA for this study's hydraulic model are between 1.5% and 4.6% higher than those derived in JBA's CSM analysis for the

[9] Autumn 2000 Great Stour Flood Rarity report (JBA, 2014)

[10] 2013-2014 Post Flood Analysis: Kent and South London Area report (JBA, 2014)

[11] Upper Stour hydrological assessment by continuous simulation. Draft v3. JBA, May 2023.

27.25 hour duration event. This indicates that the flows into the Aldington FSA closely match the CSM analysis undertaken by JBA.

RP	AEP	JBA CSM analysis (m3/s)	SLR Hydraulic Model (m^3/s)	Difference
20	5%	14.74	15.46	+4.6%
30	3.3%	16.54	17.32	+4.5%
100	1%	23.48	24.51	+4.2%
1000	0.1%	46.91	47.61	+1.5%

Peak flow estimates into the Aldington FSA from JBA's CSM analysis and SLR's hydraulic model constructed for this study.

Peak flow estimates out from JBA's CSM analysis out of the Aldington FSA closest matched the peak flow estimates from the critical duration events from this study and are compared in the table below.

As can be seen in the table below, the flows out of the Aldington FSA for this study's hydraulic model are 2.0% and 3.2% lower for the 0.1% AEP and 1% AEP events respectively. For the 5% AEP and 3.3% AEP events, the study's hydraulic model flows are 17.7% and 12.1% lower respectively. This indicates that the 1% AEP and 0.1% AEP flows for the critical duration flood event closely match the CSM analysis undertaken by JBA. For the 5% AEP and 3.3% AEP event, the critical duration 96.25 hour rainfall event was the longest duration event tested. Given that flooding within the catchment is highly sensitive to flood volumes and the historic flooding issues associated with long duration rainfall events this is likely an indicator that the critical duration event for the more probable 5% AEP and 3.3% AEP is longer than the maximum 96.25 hour rainfall event tested.

RP	AEP	SLR Storm Duration (Hours)	JBA CSM Analysis (m^3/s)	SLR Hydraulic Model (m^3/s)	Difference
20	5%	96.25	8.88	7.547	-17.7%
30	3.3%	96.25	11.03	9.841	-12.1%
100	1%	60.25	18.53	17.95	-3.2%
1000	0.1%	27.25	45.77	44.89	-2.0%

Peak flow estimates out of the Aldington FSA from JBA's CSM analysis and SLR's hydraulic model constructed for this study.

6.4.6.2 Undefended Scenario

For the undefended scenario flows at the downstream extent of the model for the 24.25 hour rainfall event have been compared to JBA's CSM flow estimates at the South Willesborough gauge. To account for the 11.7% reduction in catchment area at the downstream extent of the model compared to the South Willesborough gauge site the same reduction has been applied to JBA's CSM flows at South Willesborough in the table below.

As can be seen in the table below, the SLR's hydraulic model flows are between 4.8% lower to 7.3% higher than the flows estimated for the same location based on JBA's CSM analysis. This indicates that the flows for the undefended scenario are broadly inline with the CSM analysis undertaken by JBA.

RP	AEP	JBA CSM Analysis (m^3/s)	SLR Hydraulic Model (m^3/s)	Difference
20	5%	17.04	17.92	+4.9%
100	1%	25.95	28.00	+7.3%
1000	0.1%	53.41	50.96	-4.8%

Peak flow at the downstream extent of SLR's hydraulic model compared to estimated peak flow based on JBA's CSM analysis.

6.4.7 Checks on hydraulic model results

The peak flows from the undefended scenario for the 24.25 hour rainfall event have been compared to the lumped flow estimate at ESDS in the table below.

RP	AEP	ESDS (m^3/s)	SLR Hydraulic Model (m^3/s)	Difference
20	5%	14.12	17.92	+21.2%
100	1%	19.69	28.00	+29.7%
1000	0.1%	39.46	50.96	+22.6%

Peak flow at the downstream extent of SLR's hydraulic model compared to estimated peak flow based on JBA's CSM analysis.

As can be seen, the peak flows in the hydraulic model are substantially higher than those estimated at ESDS. However, CSM analysis is generally considered to be more robust particularly for catchments which contain a mixture of low and high permeability geology and flood storage areas. Additionally, when deriving the inflow catchments into the hydraulic model, these were broken down into areas with similar geology, which better represents the variable permeability of the whole catchment. There is also good agreement between the hydraulic model peak flows to historic flood events assessed to have similar annual probabilities of occurrence. As such, there is greater confidence in the peak flows from the hydraulic model than those estimated at ESDS and no adjustment was undertaken to reconcile flows at the downstream extent of the model to the lumped estimate at ESDS.

6.5 Assumptions, limitations, and uncertainty

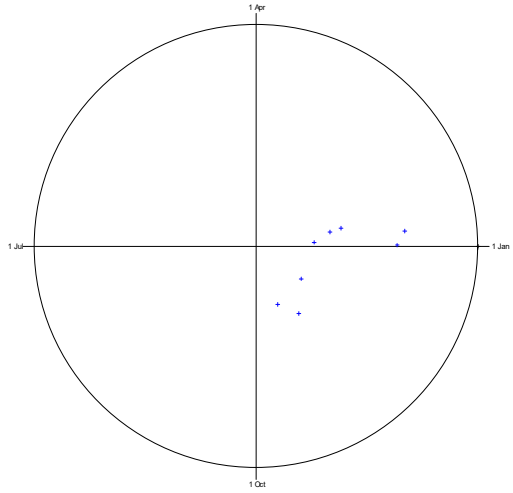
6.5.1 Assumptions

The main assumptions made are as follows:

- The FEH catchment descriptors for the permeable catchments significantly underestimate QMED due to the unusually high BFIHOST19 values for the predominant underlying geology.
- The seasonality of flooding events in the catchment area predominantly winter. The seasonality plots for the ESUS, TRIB1, TRIB2 and TRIB3 pooling groups can be seen below.
- The 0.1% AEP growth factors are best estimated for the rainfall-runoff approach, given that the confidence is greater in rainfall growth curves than in flood growth curves for longer return periods.

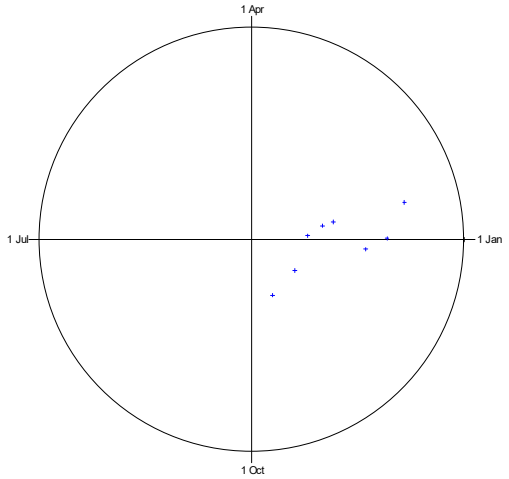
ESUS

Flood seasonality: TR 09400 37700 (27-07-2023 11:36) - ur...



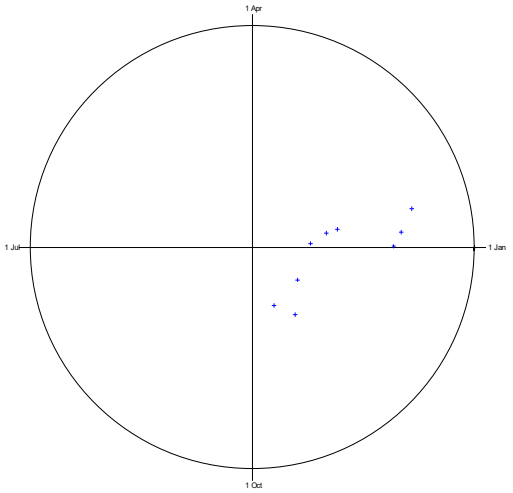
TRIB1

Flood seasonality: TR 08350 38850 (28-07-2023 09:23) - ru...



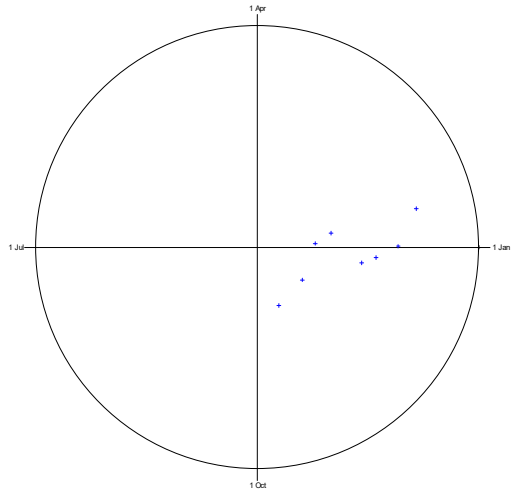
TRIB2

Flood seasonality: TR 08900 38550 (28-07-2023 10:08) - ur...



TRIB3

Flood seasonality: TR 07250 37150 (28-07-2023 10:31) - ur...



6.5.2 Limitations

Peak flow estimates do not account for the affect of the Aldington FSA and as such the flow estimates at ESDS are representative of the undefended scenario. Inline with this the gauging stations along the East Stour are not suitable for validation of peak flow estimates.

The longest duration rainfall event tested was the 96.25 hour event, with the longest duration event which ReFH2 can generate a hydrograph for being approximately 100 hours. Information from historical flood events and JBA's CSM analysis indicate that the critical duration event for the 5% AEP and 3.3% AEP events are likely longer than the 96.25 hour event assessed.

6.5.3 Uncertainty

Table 6-3: Uncertainty

Site code	50% AEP Lower 95%	50% AEP Upper 95%	5% AEP Lower 95%	5% AEP Upper 95%	1% AEP Lower 95%	1% AEP Upper 95%	0.1% AEP Lower 95%	0.1% AEP Upper 95%
ESUS	1.84	3.74	3.93	8.21	5.94	12.56	11.90	26.46
TRIB1	1.10	2.76	2.38	6.58	3.53	10.46	6.59	22.71
TRIB2	1.08	2.20	2.39	4.99	3.62	7.66	7.32	16.29
TRIB3	0.91	1.84	1.93	4.04	2.96	6.27	5.39	11.99
ESDS	5.14	10.42	9.74	20.33	13.58	28.74	26.44	58.80

Upper and lower 95% confidence bounds for the flood peak in m^3/s for the AEP (%) events.

6.5.4 Suitability of results for future studies

Suitable for the Site only as the hydrology has been targeted towards flows at the Site, and not locations upstream or downstream.

6.5.5 Recommendations for future work

The estimates are suitable for use in the study and no further work is recommended at this stage.

Figures

HR1 Local Hydrology
HR2 Catchment and Gauging Stations
HR3 Aldington Flood Storage Area Extent
HR4 Catchments and Sub catchments

Hydrology Report

Stonestreet Green Solar Farm

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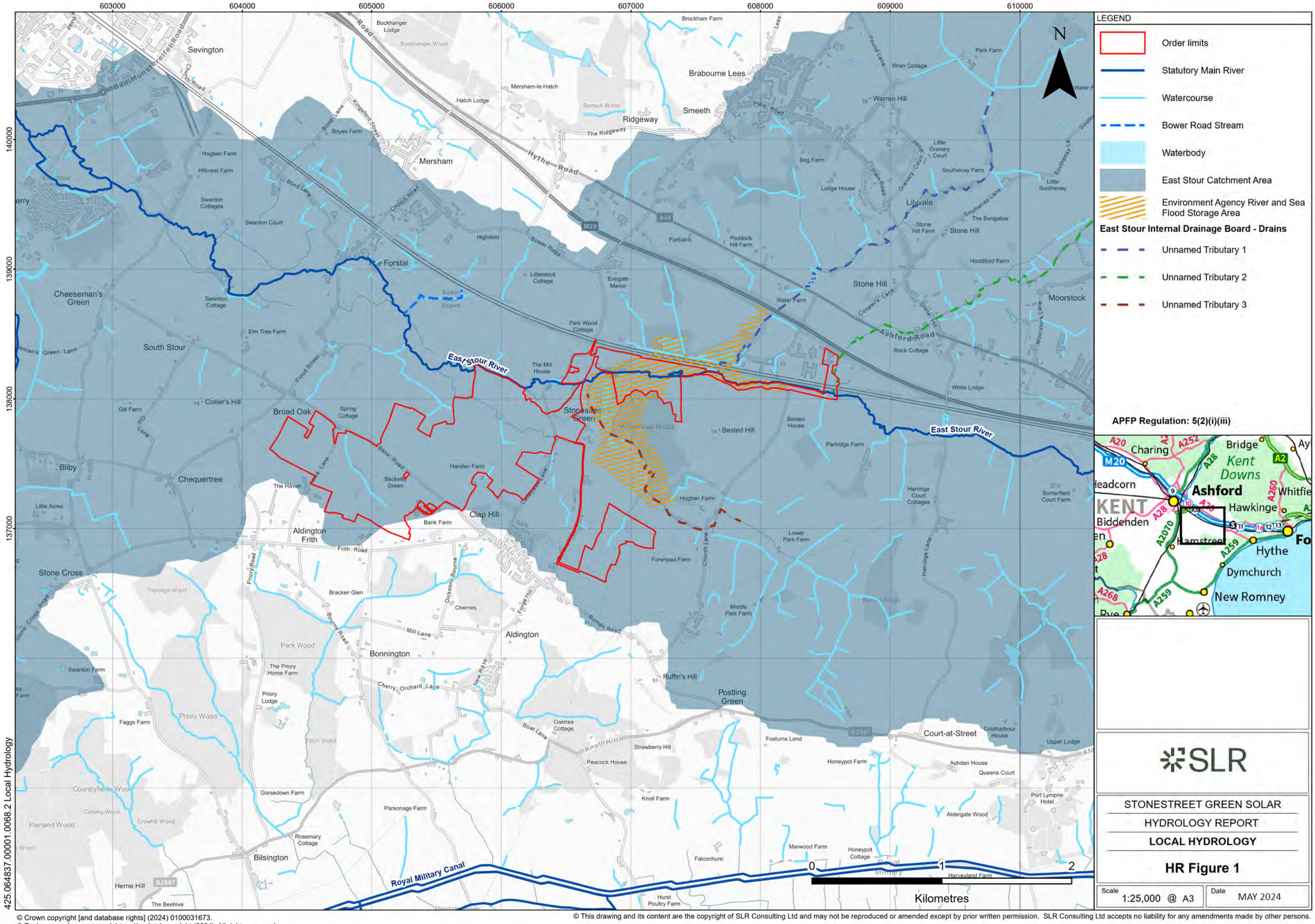

STONESTREET GREEN SOLAR

HYDROLOGY REPORT

LOCAL HYDROLOGY

HR Figure 1

Scale 1:25,000 @ A3

Date MAY 2024

425.064837.00001.0068.2 Local Hydrology

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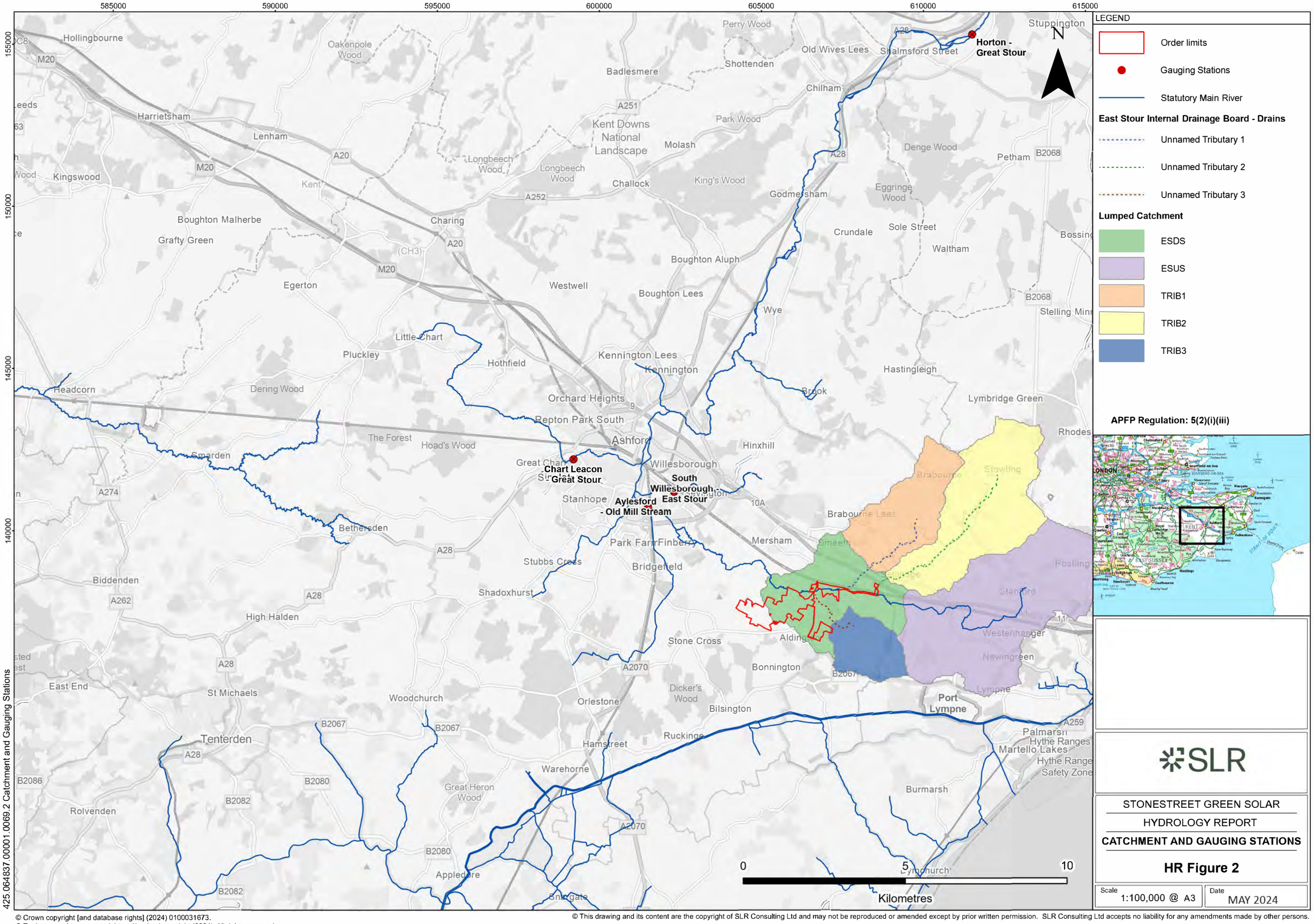

LEGEND

- Order limits
- Gauging Stations
- Statutory Main River

East Stour Internal Drainage Board - Drains

- Unnamed Tributary 1
- Unnamed Tributary 2
- Unnamed Tributary 3

Lumped Catchment

- ESDS
- ESUS
- TRIB1
- TRIB2
- TRIB3

APFP Regulation: 5(2)(i)(iii)

SLR

STONESTREET GREEN SOLAR

HYDROLOGY REPORT

CATCHMENT AND GAUGING STATIONS

HR Figure 2

Scale	Date
1:100,000 @ A3	MAY 2024

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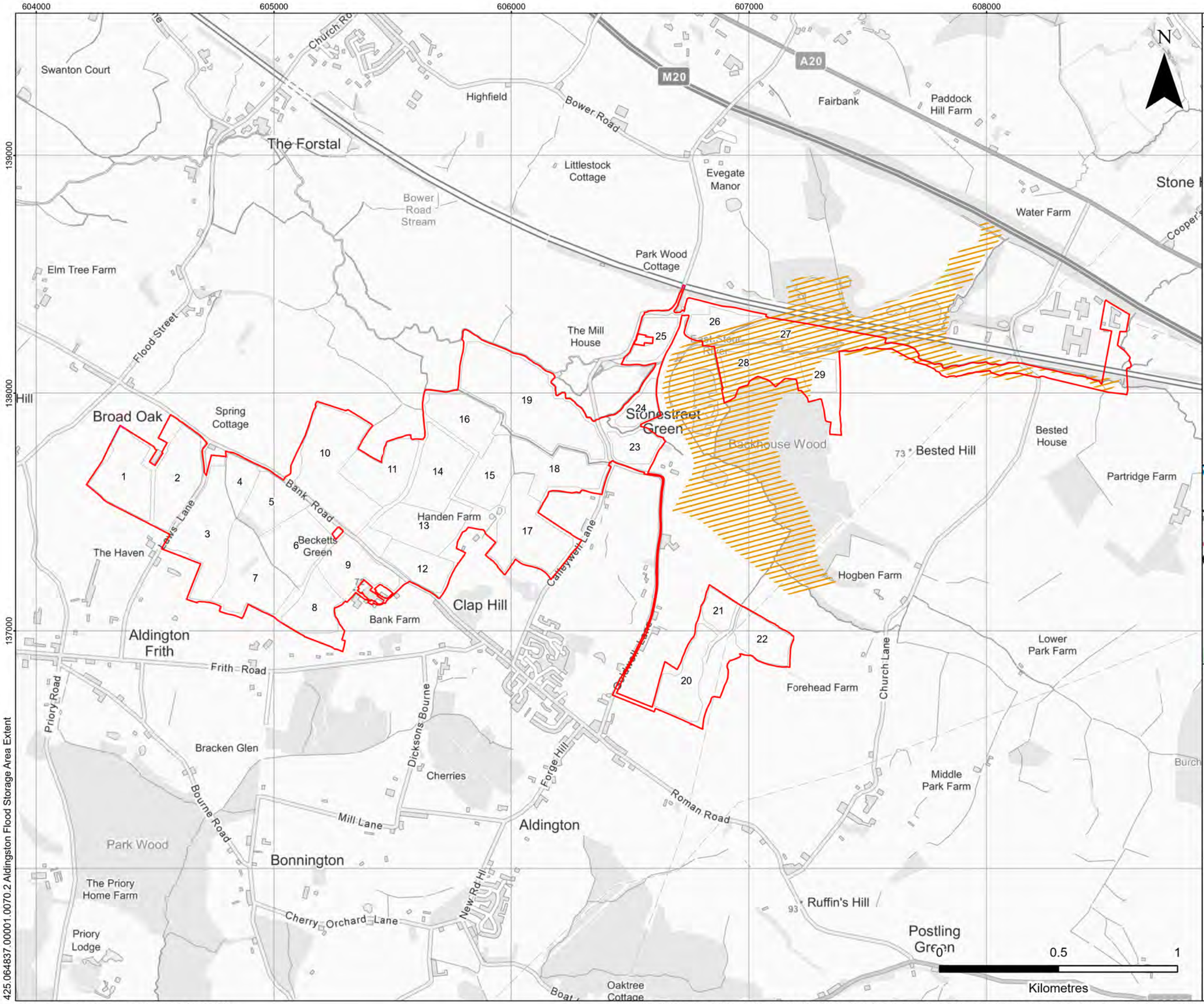

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STONESTREET GREEN SOLAR

HYDROLOGY REPORT

ALDINGSTON FLOOD STORAGE AREA EXTENT

HR Figure 3

Scale	Date
1:15,000 @ A3	MAY 2024

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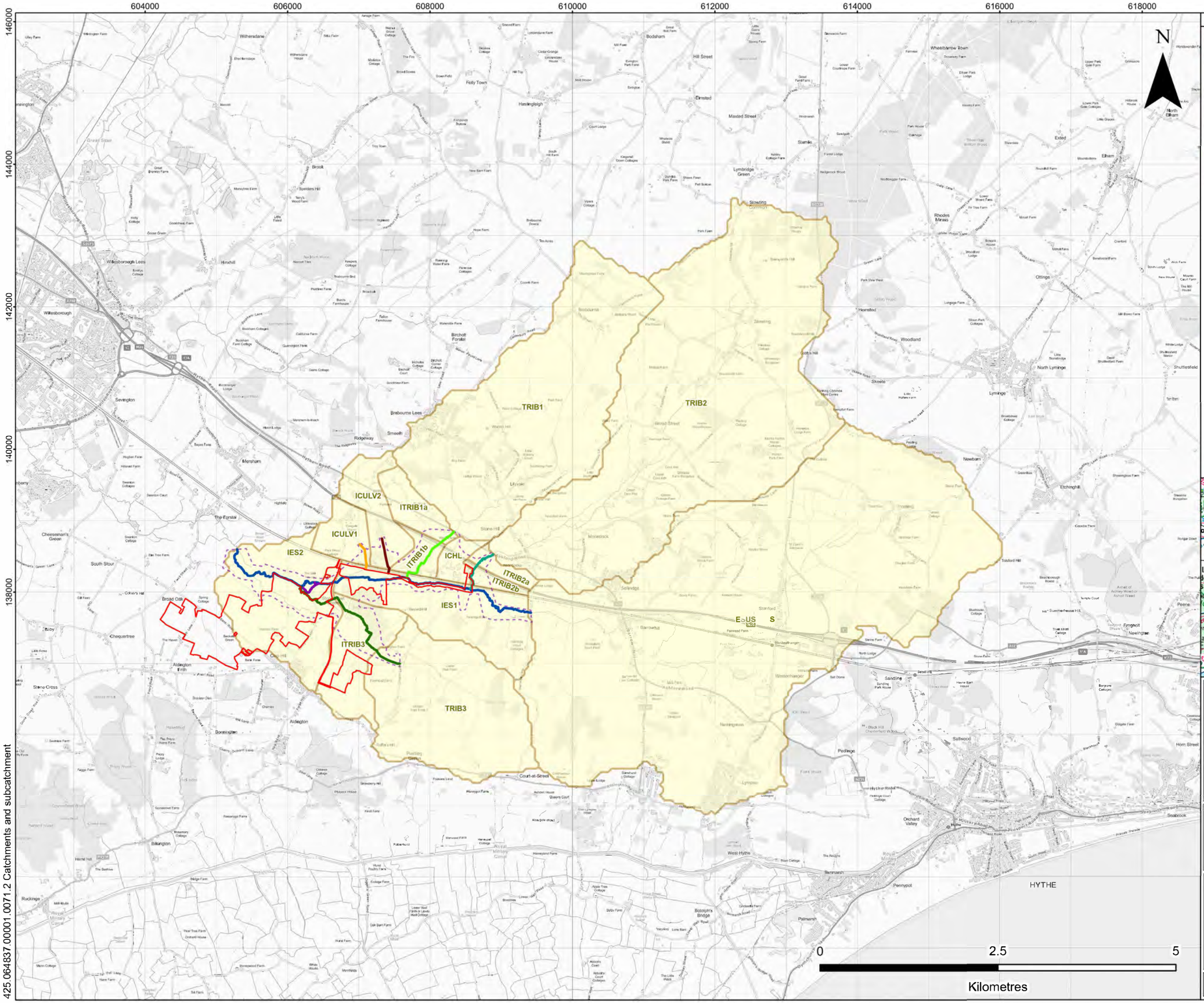


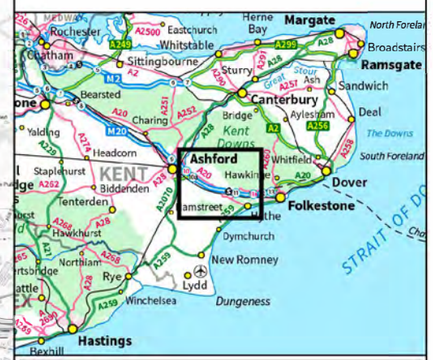
LEGEND

- Order limits
- Catchment
- Model Extent

Modelled Water Courses

- Culvert 1
- Culvert 2
- East Stour River
- Mill Race
- Unnamed Tributary 1
- Unnamed Tributary 2
- Unnamed Tributary 3

APFP Regulation: 5(2)(i)(iii)



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STONESTREET GREEN SOLAR

HYDROLOGY REPORT

CATCHMENT AND SUB-CATCHMENT

HR Figure 4

Scale	Date
1:50,000 @ A3	MAY 2024

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Digital Files – Input Data

FEH_Catchment_Descriptors_609400_137700_v5_0_1.xml
FEH_Catchment_Descriptors_608350_138850_v5_0_1.xml
FEH_Catchment_Descriptors_608900_138550_v5_0_1.xml
FEH_Catchment_Descriptors_607250_137150_v5_0_1.xml
FEH_Catchment_Descriptors_605300_138600_v5_0_1.xml
FEH_Point_Descriptors_605897_137543_v5_0_1.xml

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Digital Files – Project or Calculation Files

ReFH2_and_WINFAP_Design_Flow_Estimation_Summary_Sheet_v2.xlsx

Stat – WINFAP Projects and Non Flood Years Adjustment Spreedsheets

ReFH – ReFH Projects and CSV ouputs

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Digital Files – Output Data

ESUS Scaled Hydrographs.xlsx
ICHL Scaled Hydrographs.xlsx
ICULV1 Scaled Hydrographs.xlsx
ICULV2 Scaled Hydrographs.xlsx
IES1 Scaled Hydrographs.xlsx
IES2 Scaled Hydrographs.xlsx
ITRIB1a Scaled Hydrographs.xlsx
ITRIB1b Scaled Hydrographs.xlsx
ITRIB2a Scaled Hydrographs.xlsx
ITRIB2b Scaled Hydrographs.xlsx
ITRIB3 Scaled Hydrographs.xlsx
TRIB1 Scaled Hydrographs.xlsx
TRIB2 Scaled Hydrographs.xlsx
TRIB3 Scaled Hydrographs.xlsx

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Other Supporting Information

Autumn 2000 Great Stour flood rarity. JBA, July 2014.

East Stour Flood Event Photo Reconnaissance. Environment Agency, November 2000.

2013-2014 Post Flood Analysis: Kent & South London Area. JBA, December 2014.

East Stour Flood Event Photo Reconnaissance. Environment Agency, February 2014.

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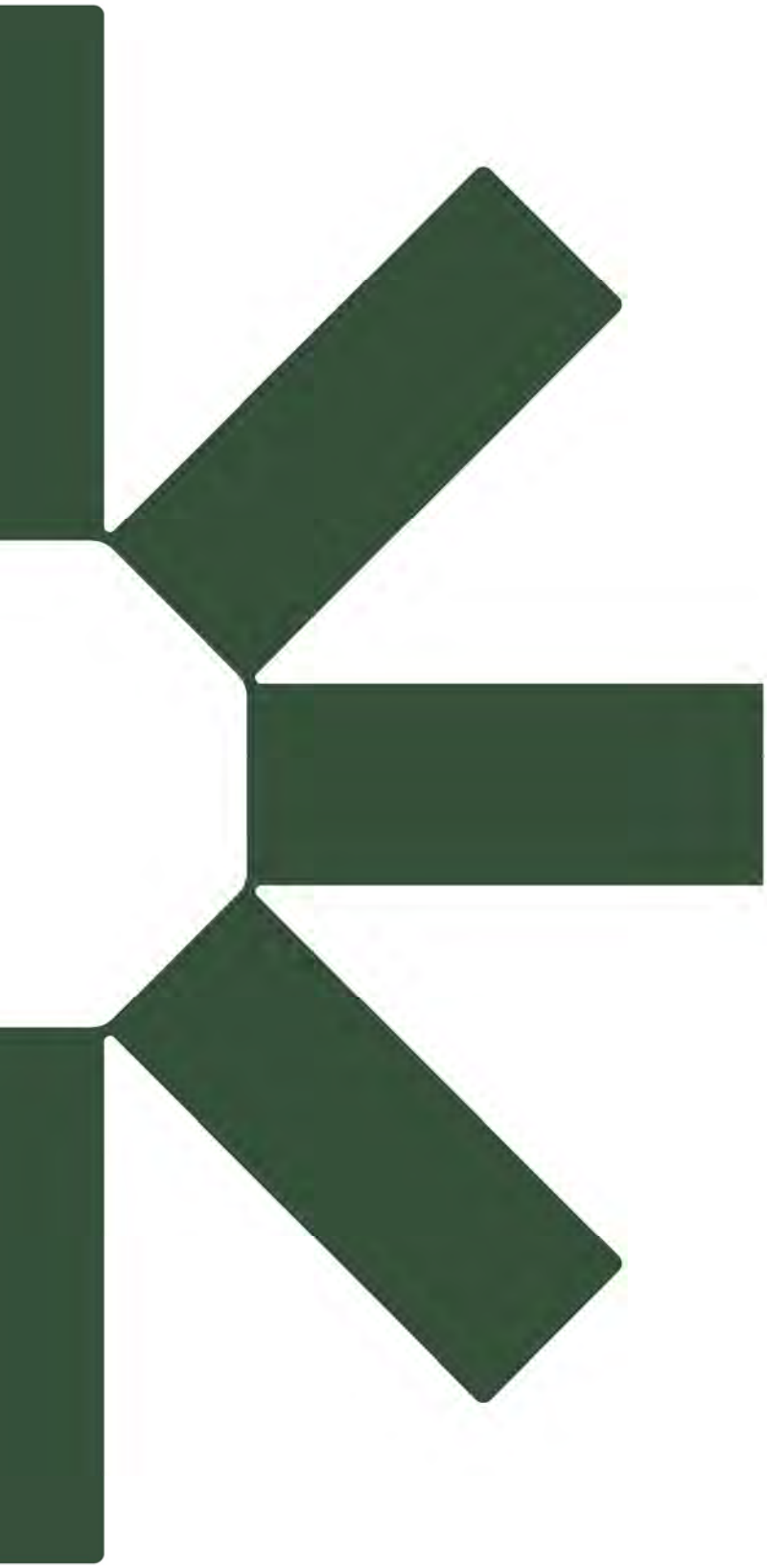

Making Sustainability Happen

Annex E Environment Agency Aldington FSA Information

Annex B: East Stour Hydraulic Modelling Report

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Aldington FSA - Modelling arrangements for JBA 2023 Ashford model update

Key notes regarding the Aldington FSA modelling arrangements for JBA 2023 Ashford model update:

FSA Outlets

- Compensation Outlet to Evegate Mill

1997 record drawings and inspection reports show an orifice plate (300mm dia) in a 600mm pipe, which has an upstream IL 46.6mAOD. The stage discharge curve with a max discharge of 0.34m3/s is shown on the chart titled "ALDINGTON FLOOD DETENTION STORAGE - Stage / Discharge and Stage / Storage Curves" with footnote "1966/X - Rofe, Kennard and Lapworth - Feb 1991".

- Main outlet (1500mm dia pipe) with hydrobrake

The hydrobrake design stage discharge curve is shown on the chart titled "ALDINGTON FLOOD DETENTION STORAGE - Stage / Discharge and Stage / Storage Curves" with footnote "1966/X - Rofe, Kennard and Lapworth - Feb 1991".

The file 'Aldington & Hothfield FSRs - Gaugings & hydrobrakes performance r1' includes the hydrobrake design stage discharge curve, spot flow gaugings downstream of the hydrobrake and an estimated actual stage discharge curve for the hydrobrake, which takes account of the spot flow gaugings and the inlet structure low weir at 44.65mAOD. The model update uses the estimated actual stage discharge curve, but there is uncertainty in it due to the limited spot flow gaugings.

Overflow spillway

The record drawings provide the co-ords and chainages for the spillway crest and transitions to the embankment flanks:-

Ch 370.6 - 380.6 10m transition from embankment flank to spillway crest at 50.2mAOD

Ch 380.6 - 680.6 300m spillway crest at 50.2mAOD

Ch 680.6 - 690.6 10m transition from spillway crest at 50.2mAOD to embankment flank

For modelling, the spillway design crest level at 50.2mAOD is used.

Potential future options for Ashford flood risk to keep pace with climate change

Further spot flow gaugings during FSA operation will be needed to refine the hydrobrake stage discharge curve. Potential future options for Ashford flood risk to keep pace with climate change could include modifying the FSA arrangements, including the outlet and overflow spillway arrangements, and also raising the embankment flanks.

Aldington Flood Storage Reservoir Information

Table 3-1 Key dimensions relating to reservoir and dam

Feature	Unit	Dimension	Source
Reservoir capacity	Mm^3	1.3	Reservoir Record
Reservoir area at TWL	Mm^2	0.77	
Invert of upstream channel	mOD	44.65	Drg RD10
Level of East Stour side weir	mOD	47.5 to 47.4	Drg RD9
Level to which floodwater may be "temporarily stored", as certified in Final Certificate	mOD	50.2	Final Certificate
Embankment crest (non overflow)	mOD	51.3	Drg RD7
Downstream toe of embankment	mOD	46.8	Drg RD8
Invert of downstream channel	mOD	44.3	

3.1.2 Original Construction

The reservoir, in conjunction with the flood detention reservoir at Hothfield on the Great Stour west of Ashford, forms the Ashford Flood Alleviation Scheme. This scheme was completed in 1989 to reduce the frequency and intensity of flooding in both the rural and urban areas of the town and nearby villages. The works at Aldington were designed to reduce the flood flows from a peak of about $19m^3/s$ for the 100-year event to just in excess of $4m^3/s$ for the peak outflow by means of a hydrobrake with temporary detention of the additional volume for discharge over a larger timescale. The scheme was designed for floods in excess of the nominal 100-year event to overtop the embankment in a controlled manner.

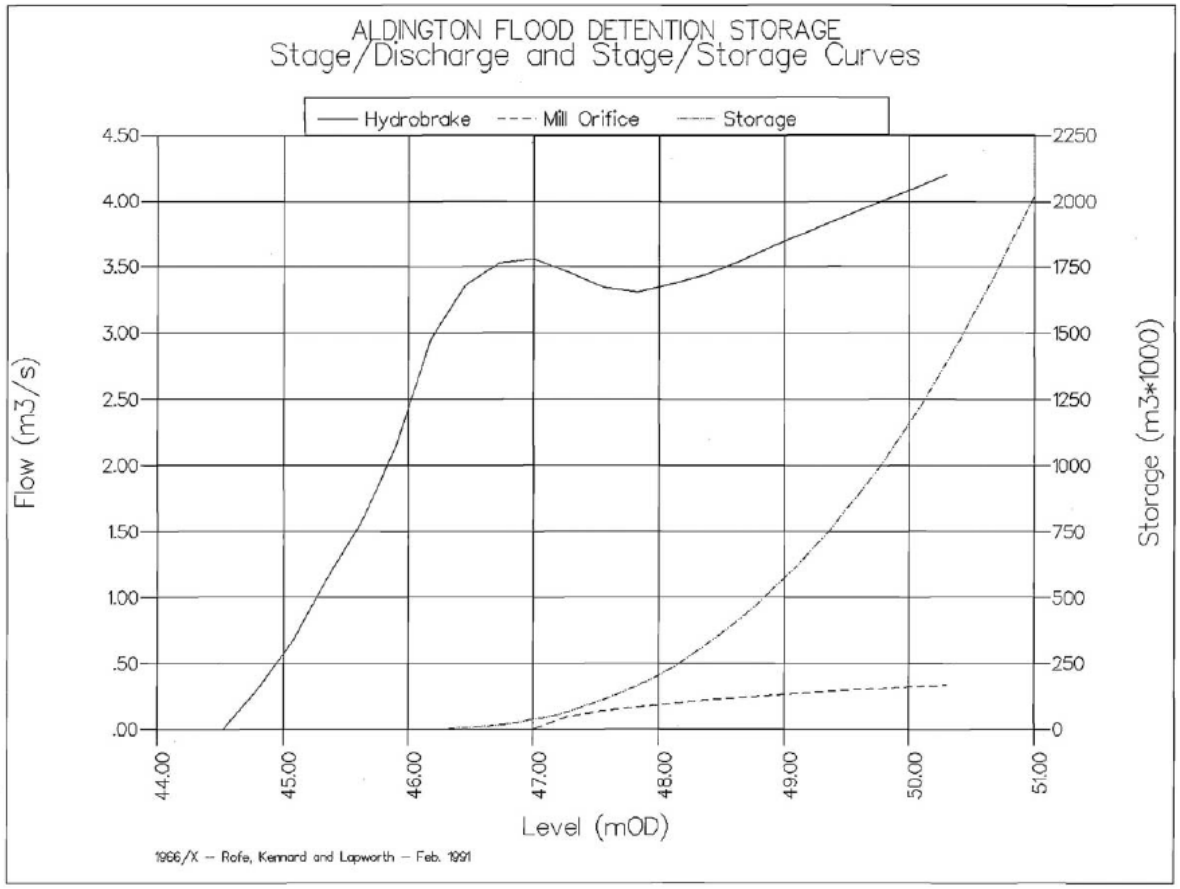
The reservoir is situated on the East Stour River and forms a flood detention area adjacent to the river and allied watercourses. The reservoir area is laid to pasture and is normally dry with flow through the area in the East Stour and Aldington Dyke watercourses. When full the reservoir occupies an area of about 1.5km x 1.5km.

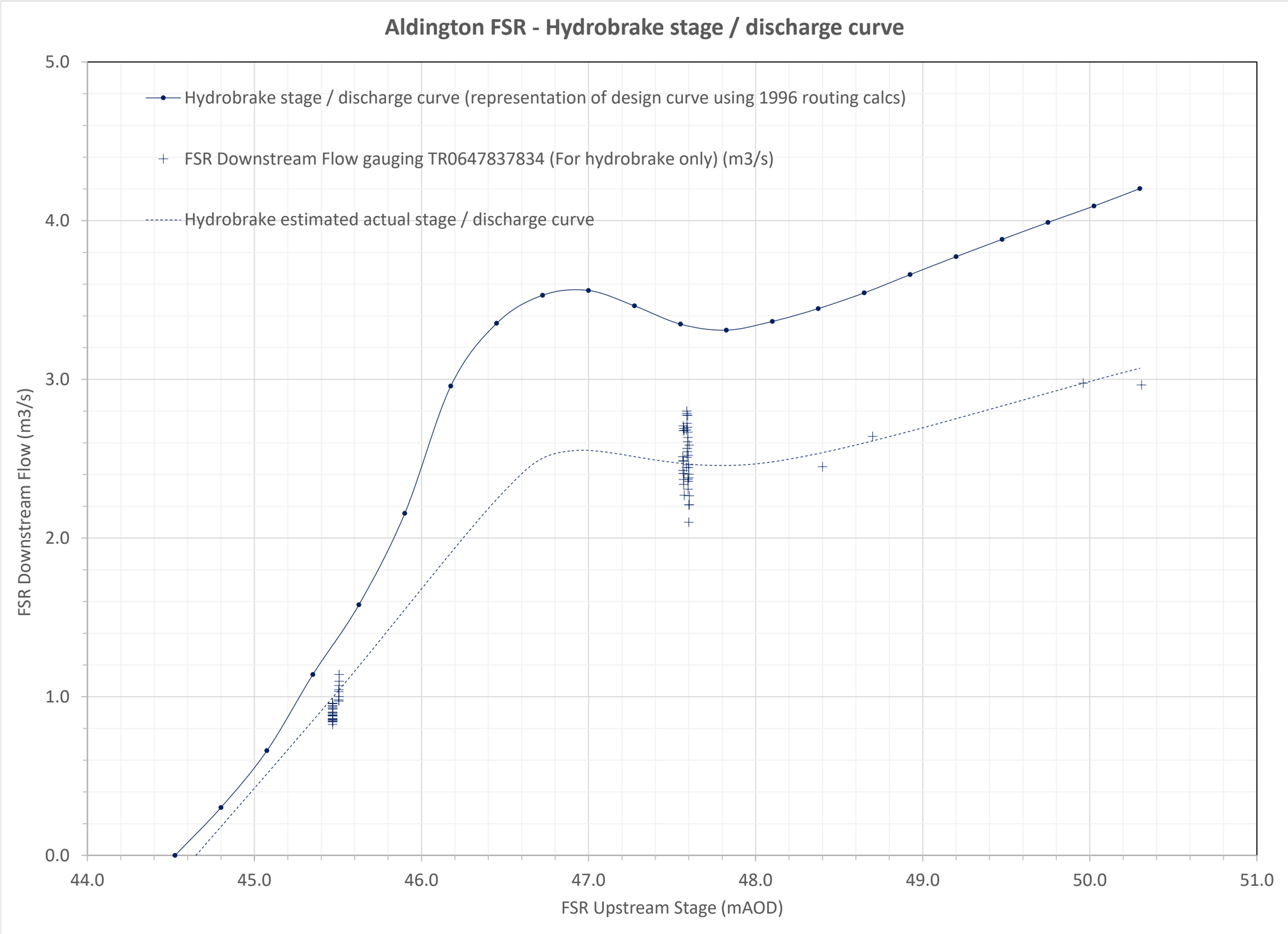
3.7.1 General

There are two outlets from the reservoir and one hydraulic structure to control inflows within the reservoir, as summarised in Table 3.6.

Table 3-6 Summary of outlets

Outlet	Control	Upstream invert level (m OD)	Other features which may control discharge (invert level)	Discharge (m^3/s)
Main outlet (Aldington Dyke)	Hydrobrake	44.65	None	4.16 at WL of 50.2mOD – see figure in App. A
Compensation pipe & fish pass; `East Stour	300mm dia orifice in 600mm DI pipe	46.6	None	0.34
East Stour side weir	Weir	47.4 to 47.5	Crest level set to ensure that the mill wheel can be operated and that it starts to spill when inflows exceed $0.12m^3/s$.	


ALDINGTON FLOOD DETENTION STORAGE
Stage/Discharge and Stage/Storage Curves
Hydrobrake
Mill Orifice
Storage
Flow (m3/s)
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
.50
.00
Storage (m3*1000)
2250
2000
1750
1500
1250
1000
750
500
250
0
44.00
45.00
46.00
47.00
48.00
49.00
50.00
51.00
Level (mOD)
1966/X – Rofe, Kennard and Lapworth – Feb. 1991


Aldington FSR - Hydrobrake stage / discharge curve
Hydrobrake stage / discharge curve (representation of design curve using 1996 routing calcs)
FSR Downstream Flow gauging TR0647837834 (For hydrobrake only) (m3/s)
Hydrobrake estimated actual stage / discharge curve
FSR Downstream Flow (m3/s)
FSR Upstream Stage (mAOD)
5.0
4.0
3.0
2.0
1.0
0.0
44.0
45.0
46.0
47.0
48.0
49.0
50.0
51.0

Hydrobrake stage / discharge curve (representation of

Values from Aldington reservoir flood routing calcs 13/11/96 for 1252mm hydrobrake.
Note 1997 record dwgs also show 1252mm Type C conical hydrobrake.
Note curve visually checked that it matches curve on chart titled "ALDINGTON FLOOD DETENTION STORAGE - Stage / Discharge and Stage / Storage Curves" with footnote "1966/X - Rofe, Kennard and Lapworth - Feb 1991"

FSR Upstream Stage (mAOD)	FSR Downstream Flow (m3/s)
44.525	0.000
44.800	0.302
45.075	0.660
45.350	1.140
45.625	1.579
45.900	2.155
46.175	2.957
46.450	3.353
46.725	3.530
47.000	3.560
47.275	3.463
47.550	3.348
47.825	3.310
48.100	3.365
48.375	3.446
48.650	3.545
48.925	3.660
49.200	3.773
49.475	3.882
49.750	3.989
50.025	4.092
50.300	4.202

Hydrobrake estimated actual stage /

Values selected to create best estimate of actual stage discharge curve taking account of inlet structure low weir at 44.65mAOD, available SFGs & the design curve shape

FSR Upstream Stage (mAOD)	FSR Downstream Flow (m3/s)
44.65	0
45.506	1.042
46.5	2.30
46.9	2.55
48.1	2.48
50.3	3.07

Notes

1) There is another FSR outlet which is a separate compensation pipe flow to Evegate Mill. 1997 record dwgs and inspection reports show a 300mm dia orifice in a 600mm pipe, which has an upstream IL 46.6mAOD. The stage discharge curve with a max discharge of 0.34m3/s is shown on the chart titled "ALDINGTON FLOOD DETENTION STORAGE - Stage / Discharge and Stage / Storage Curves" with footnote "1966/X - Rofe, Kennard and Lapworth - Feb 1991".

TECHNICAL NOTE

JBA Project Code	2021s0048
Contract	Ashford modelling
Client	Environment Agency
Day, Date and Time	17 February 2023
Author	Chris Smith
Reviewer / Sign-off	James Jones / Chris Smith
Subject	Aldington and Hothfield area and volume checks

1 Aldington and Hothfield area and volume checks

This note compares the area and volume calculations for the Aldington and Hothfield flood storage areas from the current modelling work (2022) with earlier versions from 2010 (previous hydraulic model) and 2000 (flood routing calculations). The calculated data are also compared to the key reservoir data from the 2019 Section 19 reports.

1.1 Aldington Reservoir

The reservoir dimensions have been updated for the latest modelling and these data compared against previous sources. The hydraulic model reservoir unit uses a level-area relationship which has been derived from LIDAR and this has also been extended to a volume calculation.

The spillway level is at 50.2mAOD which is between the increments used in 2000 and 2010 calculations.

The area and volume values around this level are slightly variable but all reasonably close to each other, within 10%.

Table 1-1: Level, area and volume from 2000,2010 and 2022 for Aldington

	Area (m2)			Volume (m3)		
Level (mOAD)	2000	2010	2022	2000	2010	2022
51	998000	998000	947560	2022000	2063750	1954651
50.5	858000	858000	821439	1558000	1599750	1512826
50.2	-	-	739821	-	-	1278511
50	730000	730000	682984	1161000	1202750	1136204
49.5	579000	579000	569101	833750	875500	824369
49	463000	463000	454466	573250	615000	566865
48.5	368000	368000	341454	365500	407250	365527
48	265000	265000	259583	207250	249000	213284
47.5	159000	159000	164531	101250	143000	109043
47	94000	94000	87716	38000	79750	45662
46.5	29000	61500	37468	7250	40875	14435
46	0	29000	4051	0	18250	1562
45.5	0	17000	1438	0	6750	519
45	0	5000	435	0	1250	62
44.5	0	0	0	0	0	0

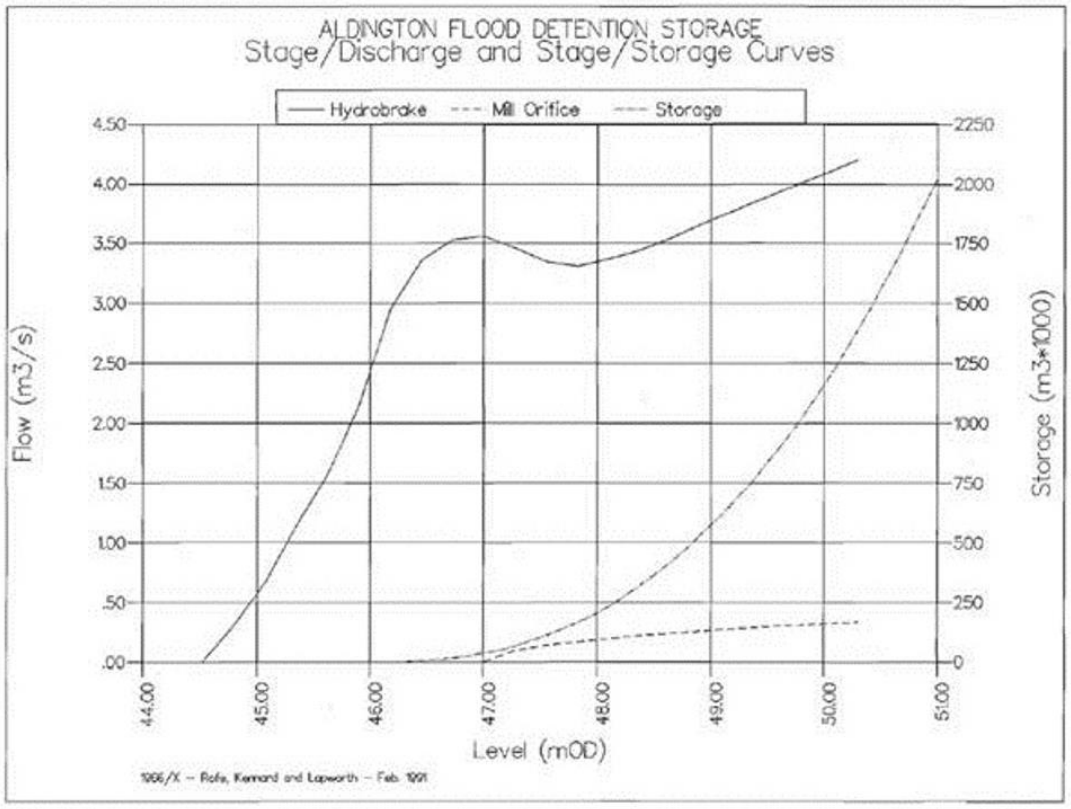
Table 1-2: Key reservoir dimensions from Aldington 2019 Section 10 report.

Feature	Unit	Dimension	Source
Reservoir capacity	Mm^3	1.3	Reservoir Record
Reservoir area at TWL	Mm^2	0.77	
Invert of upstream channel	m AOD	44.65	Drg RD10
Level of East Stour side weir	m AOD	47.5 to 47.4	Drg RD9
Level to which floodwater may be "temporarily stored", as certified in Final Certificate	m AOD	50.2	Final Certificate

The 2022 calculations of area and volume also agree closely with the data in the 2019 Section 10 report, comfortably with 5%.

Aldington (but not Hothfield) had a graph of the storage volume against the elevation supplied with the As-built records (date unknown). The volumes on this chart are also consistent with the more recently calculated values.

Figure 1-1: Aldington flood storage curve supplied with flood routing records



1.2 Hothfield Reservoir

The reservoir dimensions have been updated for the latest modelling and these data compared against previous sources. The hydraulic model reservoir unit uses a level-area relationship which has been derived from LIDAR and this has also been extended to a volume calculation.

The spillway level is at 48.5mOAD. The area and volume values at this level are slightly variable but all reasonably close to each other, within 10%.

Table 1-3: Level, area and volume from 2000,2010 and 2022 for Hothfield

	Area (m2)			Volume (m3)		
Level (mOAD)	2000	2010	2022	2000	2010	2022
49	1152000	1140000	1118000	2322500	2416158	2263074
48.5	1013000	994286	1000464	1781250	1882587	1733351
48	874000	873333	860695	1309500	1415682	1266387
47.5	733000	728000	708742	907750	1015349	874422
47	612000	580000	543452	571500	688349	560999
46.5	380000	426667	397341	323500	436682	326769
46	235000	340000	244006	169750	245016	164295
45.5	126000	320000	131345	79500	80016	73376
45	62000	10	64245	32500	13	25360
44.5	3000	10	17719	1500	8	7090
44	0	10	4357	0	3	253
43.5	0	0	0	0	0	0

Table 1-4: Key reservoir dimensions from Hothfield 2019 Section 10 report.

Feature	Value	Source / comment
Reservoir capacity	1.2Mm^3	Prescribed Form of Record
Reservoir area at TWL	1Mm^2	
Invert of upstream channel	44m AOD	Drawing RD5 & RD6
Invert of Pig Brook intake	44m AOD	
Low-level outlet	43.3m AOD	
Level to which floodwater may be "temporarily stored", as certified in Final Certificate	48.5m AOD	Final Certificate
Embankment crest	49.5m AOD	Drawing RD3
Downstream toe of embankment	44.4m AOD	Drawing RD4
Invert of downstream channel	43.57m AOD	

The 2022 calculation of area agrees closely with the data in the Section 10 report, within 1%.

The volume calculation for 2022 (and also 2000 and 2010) are all around 45% larger than the reservoir capacity given in the Section 10 report. Given the consistency of the

calculated values from different data sources they would seem likely to be correct and the value in the Section 10 report the anomaly. There is no further information regarding how this value was derived.

Annex F SLR Site Walkover Photos

Annex B: East Stour Hydraulic Modelling Report

Stonestreet Green Solar Farm

EPL 001 Limited

SLR Site Walkover Photos

Photo 1: CH_Lane_P1 (25 July 2023)	Photo 2: CH_Lane_P2 (25 July 2023)	Photo 3: CULV1_D_P1 (25 July 2023)
Photo 4: CULV1_D_P2 (24 July 2023)	**Photo 5: CULV2_D_P1 (25 July 2023)**	**Photo 6: DITCH_P1 (24 July 2023)**

Photo 7: DITCH_P2 (24 July 2023)	Photo 8: ES_001_P1 (25 July 2023)	Photo 9: ES_002_P1 (25 July 2023)
Photo 10: ES_002_P2 (25 July 2023)	**Photo 11: ES_002_P3 (25 July 2023)**	**Photo 12: ES_003_P1 (25 July 2023)**

Photo 13: ES_003_P2 (25 July 2023)	Photo 14: ES_004_P1 (24 July 2023)	Photo 15: ES_004_P2 (24 July 2023)
Photo 16: ES_004_P3 (24 July 2023)	**Photo 17: ES_005_P1 (24 July 2023)**	**Photo 18: ES_005_P2 (24 July 2023)**

Photo 19: ES_005_P3 (24 July 2023)	Photo 20: ES_005_P4 (24 July 2023)	Photo 21: ES_006_P1 (24 July 2023)
Photo 22: ES_006_P2 (24 July 2023)	**Photo 23: ES_006_P3 (24 July 2023)**	**Photo 24: ES_006_P4 (24 July 2023)**

Photo 25: ES_006_P5 (24 July 2023)	Photo 26: ES_006-007_P1 (24 July 2023)	Photo 27: ES_006-007_P2 (24 July 2023)
Photo 28: ES_006-007_P3 (24 July 2023)	**Photo 29: ES_007_P1 (24 July 2023)**	**Photo 30: ES_008_P1 (24 July 2023)**

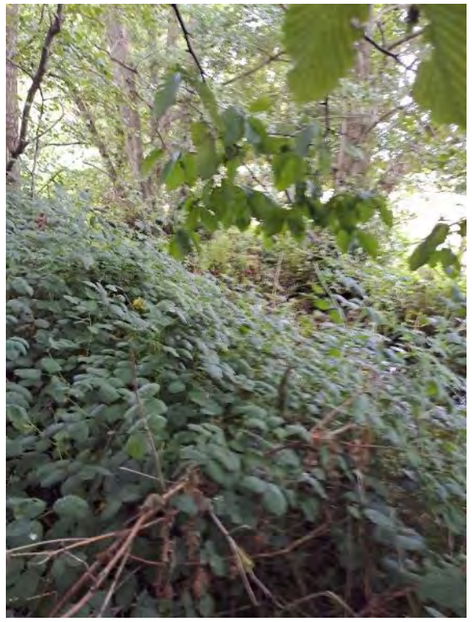
Photo 31: ES_008_P2 (24 July 2023)	Photo 32: ES_008-009_P1 (24 July 2023)	Photo 33: ES_009_P1 (24 July 2023)
		
Photo 34: ES_009_P2 (24 July 2023)	**Photo 35: ES_011_P1 (24 July 2023)**	**Photo 36: ES_011_P2 (24 July 2023)**

Photo 37: ES_011_P3 (24 July 2023)	Photo 38: ES_011_P4 (24 July 2023)	Photo 39: ES_011_P5 (24 July 2023)
Photo 40: ES_011_P6 (24 July 2023)	**Photo 41: ES_011_P7 (24 July 2023)**	**Photo 42: ES_011_P8 (25 July 2023)**

Photo 43: ES_012-013_P1 (24 July 2023)	Photo 44: ES_013_P1 (24 July 2023)	Photo 45: ES_013_P2 (24 July 2023)
Photo 46: ES_013_P3 (24 July 2023)	**Photo 47: ES_013_P4 (24 July 2023)**	**Photo 48: ES_013-014_P1 (24 July 2023)**

Photo 49: ES_013-014_P2 (24 July 2023)	Photo 50: ES_014_P1 (24 July 2023)	Photo 51: ES_014_P2 (24 July 2023)
Photo 52: ES_014_P3 (24 July 2023)	**Photo 53: FSA_Embankment_P1 (24 July 2023)**	**Photo 54: FSA_Embankment_P2 (24 July 2023)**

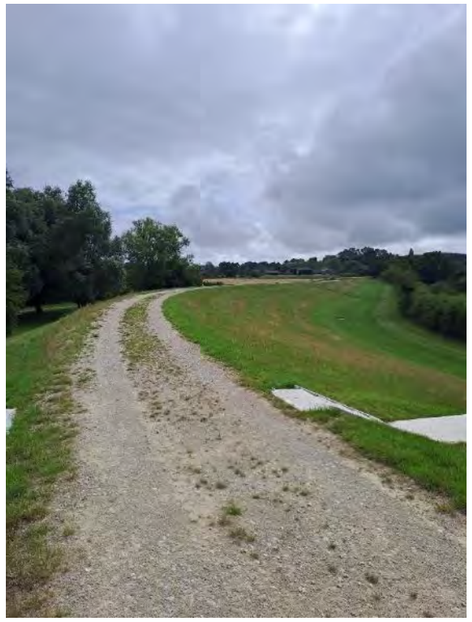
Photo 55: FSA_Embankment_P3 (24 July 2023)	Photo 56: FSA_Embankment_P4 (24 July 2023)	Photo 57: FSA_Embankment_P5 (24 July 2023)
		
Photo 58: FSA_South_P1 (24 July 2023)	**Photo 59: FSA_South_P2 (24 July 2023)**	**Photo 60: FSA_South_P3 (24 July 2023)**

Photo 61: MILL_003_P1 (24 July 2023)	Photo 62: MILL_003_P2 (24 July 2023)	Photo 63: MILL_003_P3 (24 July 2023)
Photo 64: MILL_003_P4 (24 July 2023)	**Photo 65: MILL_003_P5 (24 July 2023)**	**Photo 66: MILL_003_P6 (24 July 2023)**

Photo 67: MILL_004_P1 (24 July 2023)	Photo 68: MILL_004_P2 (24 July 2023)	Photo 69: TRIB1_001_P1 (25 July 2023)
Photo 70: TRIB1_001_P2 (25 July 2023)	**Photo 71: TRIB1_001-002_P1 (25 July 2023)**	**Photo 72: TRIB1_001-002_P2 (25 July 2023)**

Photo 73: TRIB1_001-002_P3 (25 July 2023)	Photo 74: TRIB1_002_P1 (25 July 2023)	Photo 75: TRIB1_002_P2 (25 July 2023)
Photo 76: TRIB1_002_P3 (25 July 2023)	**Photo 77: TRIB1_002_P4 (25 July 2023)**	**Photo 78: TRIB1_002_P5 (25 July 2023)**

Photo 79: TRIB1_002_P6 (25 July 2023)	Photo 80: TRIB1_003_P1 (25 July 2023)	Photo 81: TRIB1_003_P2 (25 July 2023)

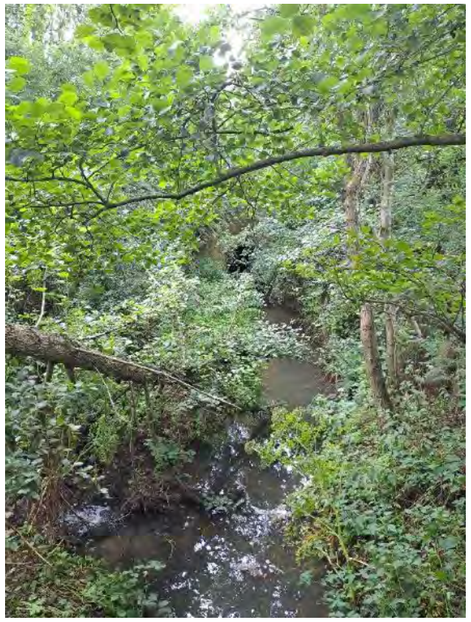



Photo 82: TRIB1_003_P3 (25 July 2023)	**Photo 83: TRIB1_004_P1 (25 July 2023)**	**Photo 84: TRIB1_004_P2 (25 July 2023)**

Photo 85: TRIB1_004_P3 (25 July 2023)	Photo 86: TRIB1_004-005_P1 (25 July 2023)	Photo 87: TRIB1_005_P1 (24 July 2023)
Photo 88: TRIB1_005_P2 (24 July 2023)	**Photo 89: TRIB1_005_P3 (25 July 2023)**	**Photo 90: TRIB1_006_P1 (24 July 2023)**

Photo 91: TRIB1_Pond_P1 (25 July 2023)	Photo 92: TRIB1_Pond_P2 (25 July 2023)	Photo 93: TRIB2_001_P1 (25 July 2023)
Photo 94: TRIB2_001_P2 (25 July 2023)	**Photo 95: TRIB2_002b_P1 (25 July 2023)**	**Photo 96: TRIB3_001_P1 (24 July 2023)**

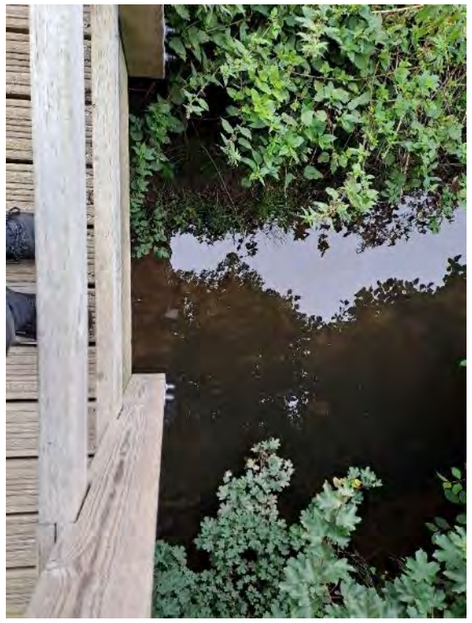
Photo 97: TRIB3_001_P2 (24 July 2023)	Photo 98: TRIB3_001_P3 (24 July 2023)	Photo 99: TRIB3_002_P1 (24 July 2023)
Photo 100: TRIB3_002_P2 (24 July 2023)	**Photo 101: TRIB3_002_P3 (24 July 2023)**	**Photo 102: TRIB3_003_P1 (24 July 2023)**
		

Photo 103: TRIB3_004_P1 (24 July 2023)

Photo 104: TRIB3_004_P2 (24 July 2023)

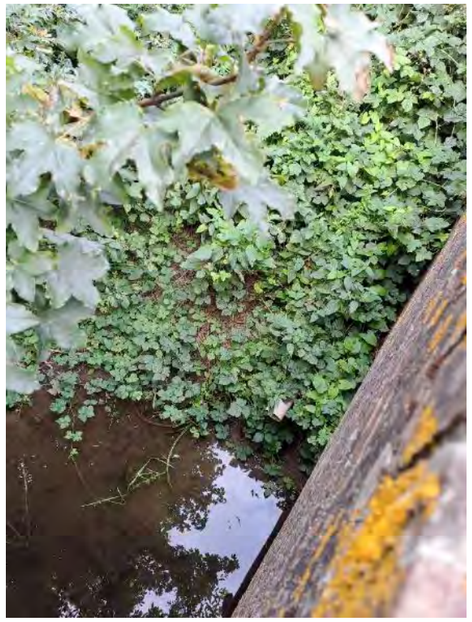


Photo 105: TRIB3_004_P3 (24 July 2023)

Photo 106: TRIB3_004_P4 (24 July 2023)

Photo 107: TRIB3_004_P5 (24 July 2023)

Photo 108: TRIB3_004_P6 (24 July 2023)

Photo 109: TRIB3_004_P7 (24 July 2023)	Photo 110: TRIB3_004_P8 (24 July 2023)	Photo 111: TRIB3_005_P1 (24 July 2023)
Photo 112: TRIB3_005_P2 (24 July 2023)	**Photo 113: TRIB3_005_P3 (24 July 2023)**	**Photo 114: TRIB3_005_P4 (24 July 2023)**

Photo 115: TRIB3_005_P5 (24 July 2023)		

Annex G 2D Bridge Loss Calculation Sheet

Annex B: East Stour Hydraulic Modelling Report

Stonestreet Green Solar Farm

EPL 001 Limited

From TuFLOW Guidance

Deck Height to Thickness Ratio	Peak Form Loss Coefficient	hB/T
Scenario A (hB/T) = 2	0.42	2
Scenario B (hB/T) = 4	0.28	4
Scenario C (hB/T) = 6	0.2	6

Scenario	Gradient [FLC/(hB/T)]	
hB/T <= 4	-0.07	<4
hB/T > 4	-0.04	>4

Inputs

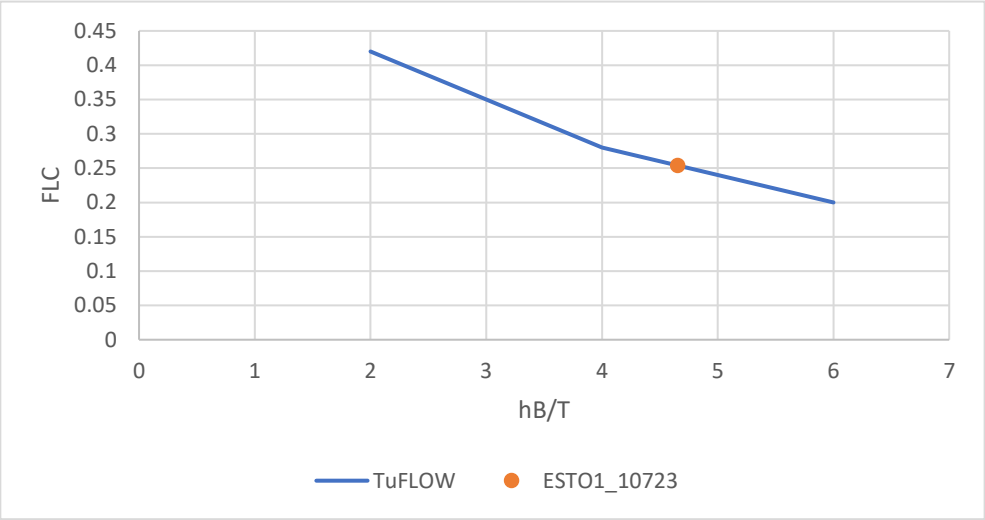
Parameter	Level (m aOD)	
Bed Level	46.49	
Soffit Level	47.84	
Deck Level	48.13	
Rail Level	48.13	
Rail Blockage Ratio	10%	

Calculations

Parameter	Value	
hB (height of opening)	1.35	
T	0.29	
hB/T	4.655172414	>4
FLC	0.253793103	-0.04

Outputs

Attribute	Value	
ID	ESTO1_10723	Enter unique name
Option	-	Not used (leave blank)
Pier_pBlockage	0.000	0 for no piers, 5 for 5% blockage etc.
Pier_FLC	0.000	0 if no pier. If piers use "Hydraulics of Bridge Waterways (Bradly, 1978)" to calculate loss coefficient
Deck_Soffit	47.840	Soffit level (top of opening)
Deck_Depth	0.290	Thickness of Bridge Deck (vertical)
Deck_Width	3.820	Deck width (In direction of flow)
Deck_pBlockage	100	100 assumes solid deck, update if required
Rail_Depth	0.000	Thickness of Rail (vertical)
Rail_pBlockage	10	% Blockage of rail
SuperS_FLC	0.254	Deck form loss coefficient
SuperS_lpf	1.6	Default value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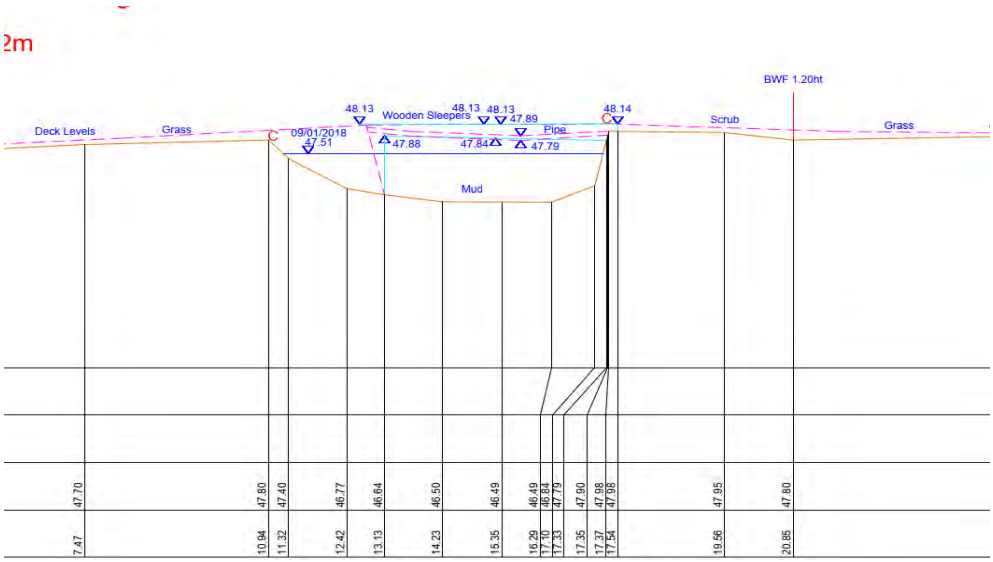
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
FLC
0
1
2
3
4
5
6
7
hB/T
TuFLOW
ESTO1_10723


2m
BWF 1.20ht
Deck Levels
Grass
09/01/2018
47.51
48.13
Wooden Sleepers
48.13
48.13
47.89
Pipe
48.14
Scrub
Grass
47.88
47.84
47.79
Mud
47.70
47.80
47.40
46.77
46.64
46.50
46.49
46.49
46.43
47.79
47.90
47.98
47.98
47.95
47.80
7.47
10.94
11.32
12.42
13.13
14.23
15.35
16.29
16.70
17.35
17.35
17.37
17.54
19.56
20.85

From TuFLOW Guidance

Deck Height to Thickness Ratio	Peak Form Loss Coefficient	hB/T
Scenario A (hB/T) = 2	0.42	2
Scenario B (hB/T) = 4	0.28	4
Scenario C (hB/T) = 6	0.2	6

Scenario	Gradient [FLC/(hB/T)]	
hB/T <= 4	-0.07	<4
hB/T > 4	-0.04	>4

Inputs

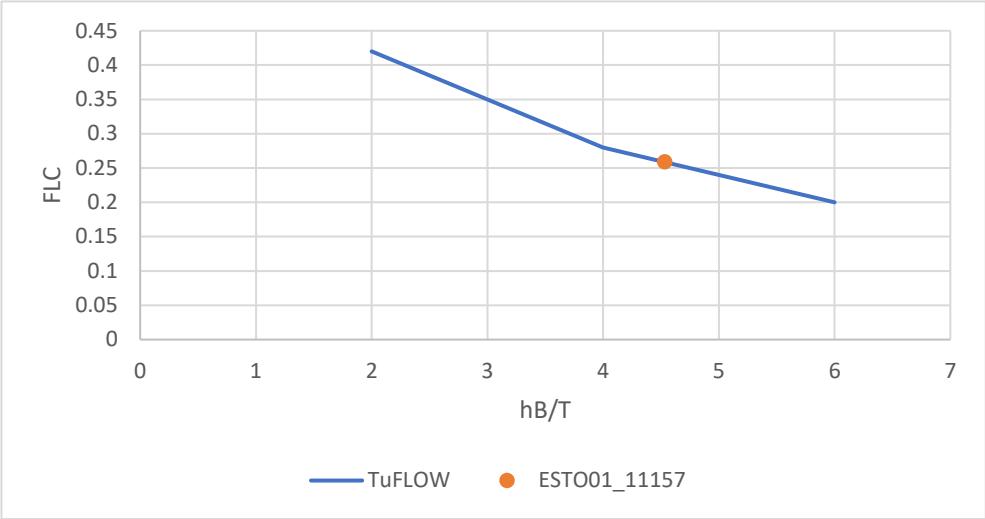
Parameter	Level (m aOD)	
Bed Level	46.1	
Soffit Level	48.63	
Deck Level	49.07	
Rail Level	50.25	
Rail Blockage Ratio	10%	

Calculations

Parameter	Value	
hB (height of opening)	2.53	
T	0.558	
hB/T	4.534050179	>4
FLC	0.258637993	-0.04

Outputs

Attribute	Value	
ID	ESTO01_11157	Enter unique name
Option	-	Not used (leave blank)
Pier_pBlockage	0.000	0 for no piers, 5 for 5% blockage etc.
Pier_FLC	0.000	0 if no pier. If piers use "Hydraulics of Bridge Waterways (Bradly, 1978)" to calculate loss coefficient
Deck_Soffit	48.630	Soffit level (top of opening)
Deck_Depth	0.440	Thickness of Bridge Deck (vertical)
Deck_Width	1.140	Deck width (In direction of flow)
Deck_pBlockage	100	100 assumes solid deck, update if required
Rail_Depth	1.180	Thickness of Rail (vertical)
Rail_pBlockage	10	% Blockage of rail
SuperS_FLC	0.259	Deck form loss coefficient
SuperS_lpf	1.6	Default value


0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
FLC
0
1
2
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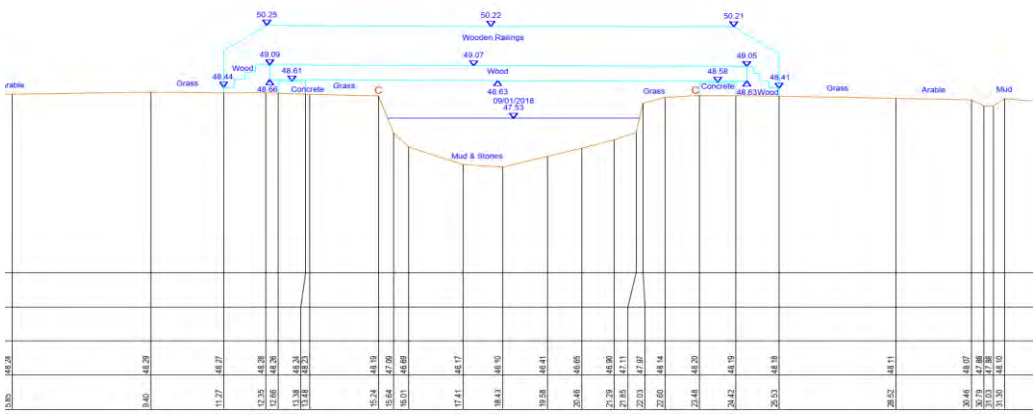
4
5
6
7
hB/T
TuFLOW
ESTO01_11157


50.25
50.22
50.21
Wooden Railings
49.09
49.07
49.05
Wood
48.61
48.44
48.58
48.41
Grass
Concrete
Grass
Wood
48.63
09/01/2018
47.53
Grass
Concrete
48.63Wood
Grass
Arable
Mud
Mud & Stones

From TuFLOW Guidance

Deck Height to Thickness Ratio	Peak Form Loss Coefficient	hB/T
Scenario A (hB/T) = 2	0.42	2
Scenario B (hB/T) = 4	0.28	4
Scenario C (hB/T) = 6	0.2	6

Scenario	Gradient [FLC/(hB/T)]	
hB/T <= 4	-0.07	<4
hB/T > 4	-0.04	>4

Inputs

Parameter	Level (m aOD)	
Bed Level	46.67	
Soffit Level	48.74	
Deck Level	49.09	
Rail Level	50.06	
Rail Blockage Ratio	10%	

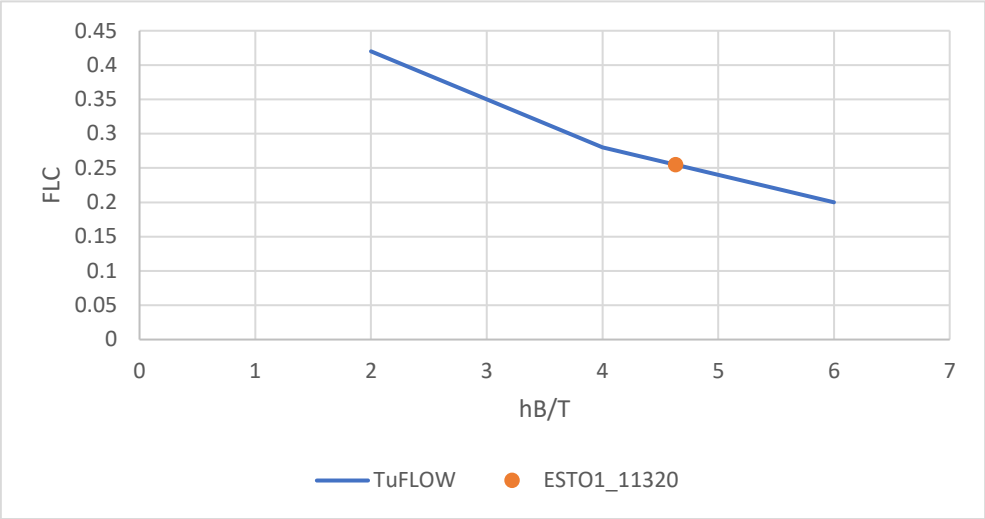
Calculations

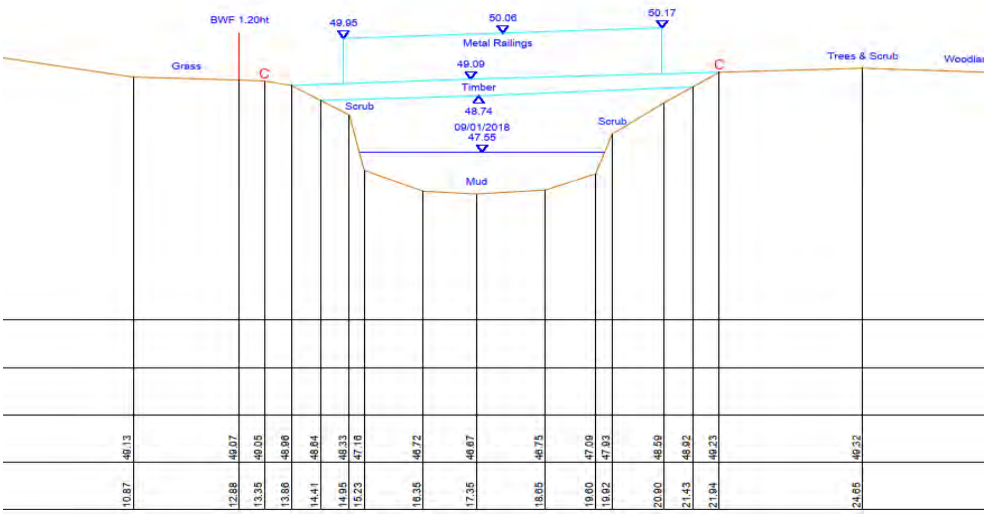
Parameter	Value	
hB (height of opening)	2.07	
T	0.447	
hB/T	4.630872483	>4
FLC	0.254765101	-0.04

Outputs

Attribute	Value	
ID	ESTO1_11320	Enter unique name
Option	-	Not used (leave blank)
Pier_pBlockage	0.000	0 for no piers, 5 for 5% blockage etc.
Pier_FLC	0.000	0 if no pier. If piers use "Hydraulics of Bridge Waterways (Bradly, 1978)" to calculate loss coefficient
Deck_Soffit	48.740	Soffit level (top of opening)
Deck_Depth	0.350	Thickness of Bridge Deck (vertical)
Deck_Width	0.690	Deck width (In direction of flow)
Deck_pBlockage	100	100 assumes solid deck, update if required
Rail_Depth	0.970	Thickness of Rail (vertical)
Rail_pBlockage	10	% Blockage of rail
SuperS_FLC	0.255	Deck form loss coefficient
SuperS_lpf	1.6	Default value

ESTO01_11320
Bridge Loss Calculation Sheet





From TuFLOW Guidance

Deck Height to Thickness Ratio	Peak Form Loss Coefficient	hB/T
Scenario A (hB/T) = 2	0.42	2
Scenario B (hB/T) = 4	0.28	4
Scenario C (hB/T) = 6	0.2	6

Scenario	Gradient [FLC/(hB/T)]	
hB/T <= 4	-0.07	<4
hB/T > 4	-0.04	>4

Inputs

Parameter	Level (m aOD)	
Bed Level	49.59	
Soffit Level	51.84	
Deck Level	52.22	
Rail Level	53.42	
Rail Blockage Ratio	10%	

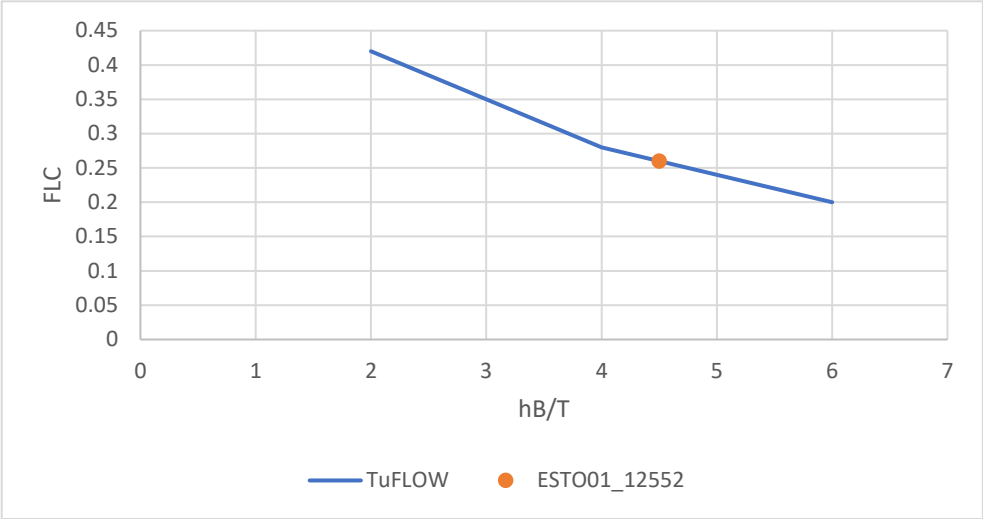
Calculations

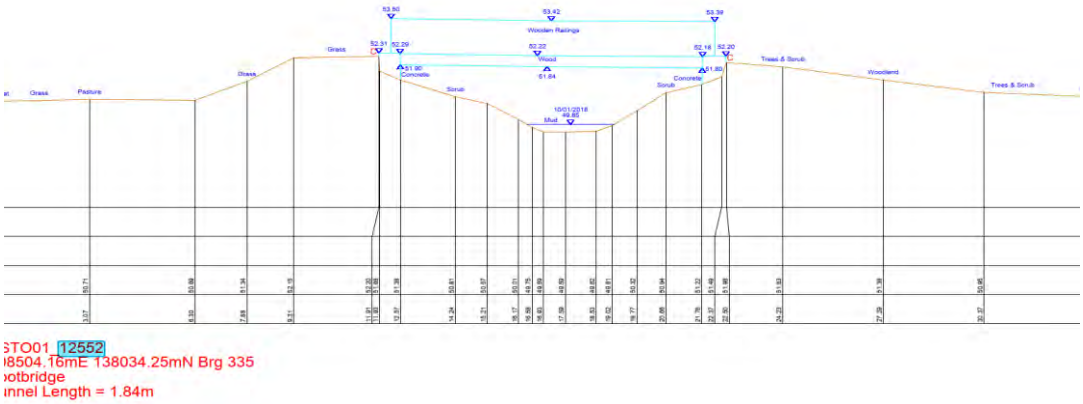
Parameter	Value	
hB (height of opening)	2.25	
T	0.5	
hB/T	4.5	>4
FLC	0.26	-0.04

Outputs

Attribute	Value	
ID	ESTO01_12552	Enter unique name
Option	-	Not used (leave blank)
Pier_pBlockage	0.000	0 for no piers, 5 for 5% blockage etc.
Pier_FLC	0.000	0 if no pier. If piers use "Hydraulics of Bridge Waterways (Bradly, 1978)" to calculate loss coefficient
Deck_Soffit	51.840	Soffit level (top of opening)
Deck_Depth	0.380	Thickness of Bridge Deck (vertical)
Deck_Width	1.840	Deck width (In direction of flow)
Deck_pBlockage	100	100 assumes solid deck, update if required
Rail_Depth	1.200	Thickness of Rail (vertical)
Rail_pBlockage	10	% Blockage of rail
SuperS_FLC	0.260	Deck form loss coefficient
SuperS_lpf	1.6	Default value

ESTO01_12552
Bridge Loss Calculation Sheet





From TuFLOW Guidance

Deck Height to Thickness Ratio	Peak Form Loss Coefficient	hB/T
Scenario A (hB/T) = 2	0.42	2
Scenario B (hB/T) = 4	0.28	4
Scenario C (hB/T) = 6	0.2	6

Scenario	Gradient [FLC/(hB/T)]	
hB/T <= 4	-0.07	<4
hB/T > 4	-0.04	>4

Inputs

Parameter	Level (m aOD)	
Bed Level	49.87	
Soffit Level	51.87	
Deck Level	52.26	
Rail Level	53.47	
Rail Blockage Ratio	10%	

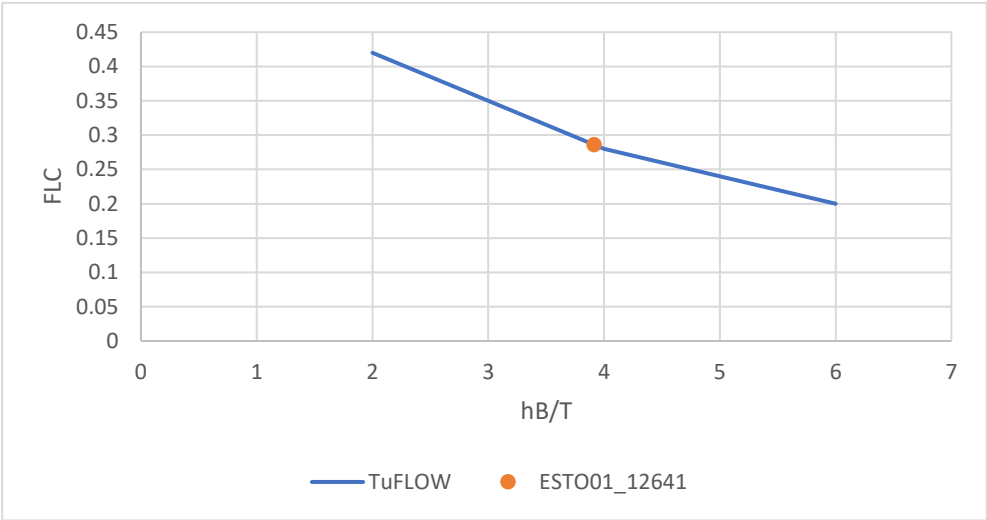
Calculations

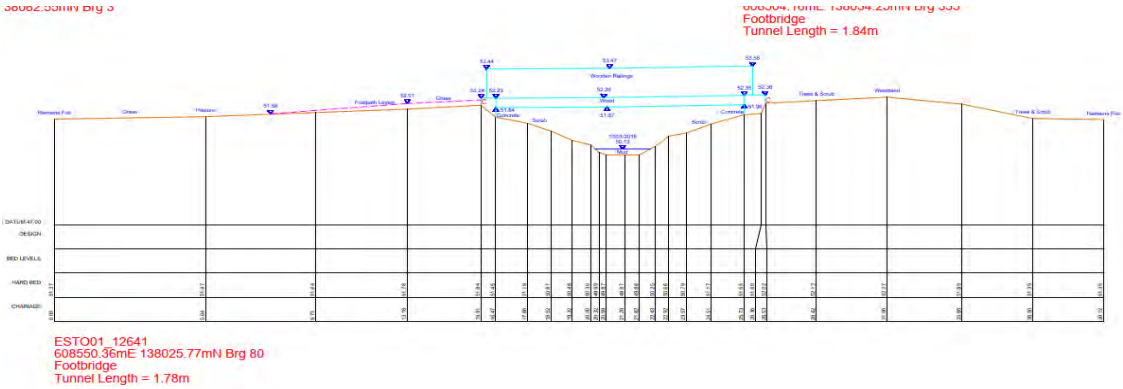
Parameter	Value	
hB (height of opening)	2	
T	0.511	
hB/T	3.913894325	<4
FLC	0.286027397	-0.07

Outputs

Attribute	Value	
ID	ESTO01_12641	Enter unique name
Option	-	Not used (leave blank)
Pier_pBlockage	0.000	0 for no piers, 5 for 5% blockage etc.
Pier_FLC	0.000	0 if no pier. If piers use "Hydraulics of Bridge Waterways (Bradly, 1978)" to calculate loss coefficient
Deck_Soffit	51.870	Soffit level (top of opening)
Deck_Depth	0.390	Thickness of Bridge Deck (vertical)
Deck_Width	1.780	Deck width (In direction of flow)
Deck_pBlockage	100	100 assumes solid deck, update if required
Rail_Depth	1.210	Thickness of Rail (vertical)
Rail_pBlockage	10	% Blockage of rail
SuperS_FLC	0.286	Deck form loss coefficient
SuperS_lpf	1.6	Default value

ESTO01_12641
Bridge Loss Calculation Sheet





From TuFLOW Guidance

Deck Height to Thickness Ratio	Peak Form Loss Coefficient	hB/T
Scenario A (hB/T) = 2	0.42	2
Scenario B (hB/T) = 4	0.28	4
Scenario C (hB/T) = 6	0.2	6

Scenario	Gradient [FLC/(hB/T)]	
hB/T <= 4	-0.07	<4
hB/T > 4	-0.04	>4

Inputs

Parameter	Level (m aOD)	
Bed Level	50.28	
Soffit Level	52.13	
Deck Level	52.5	
Rail Level	53.44	
Rail Blockage Ratio	10%	

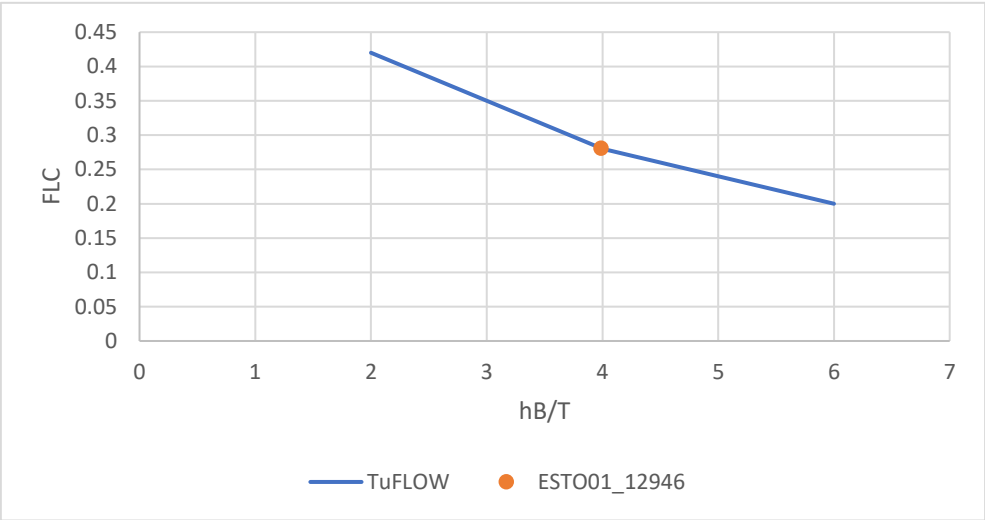
Calculations

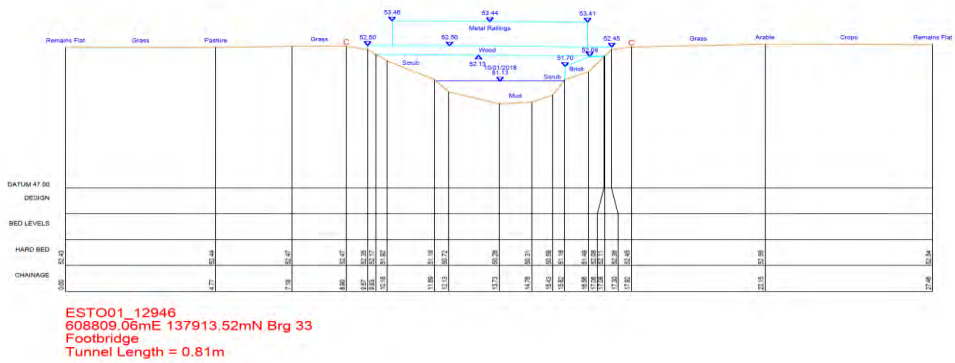
Parameter	Value	
hB (height of opening)	1.85	
T	0.464	
hB/T	3.987068966	<4
FLC	0.280905172	-0.07

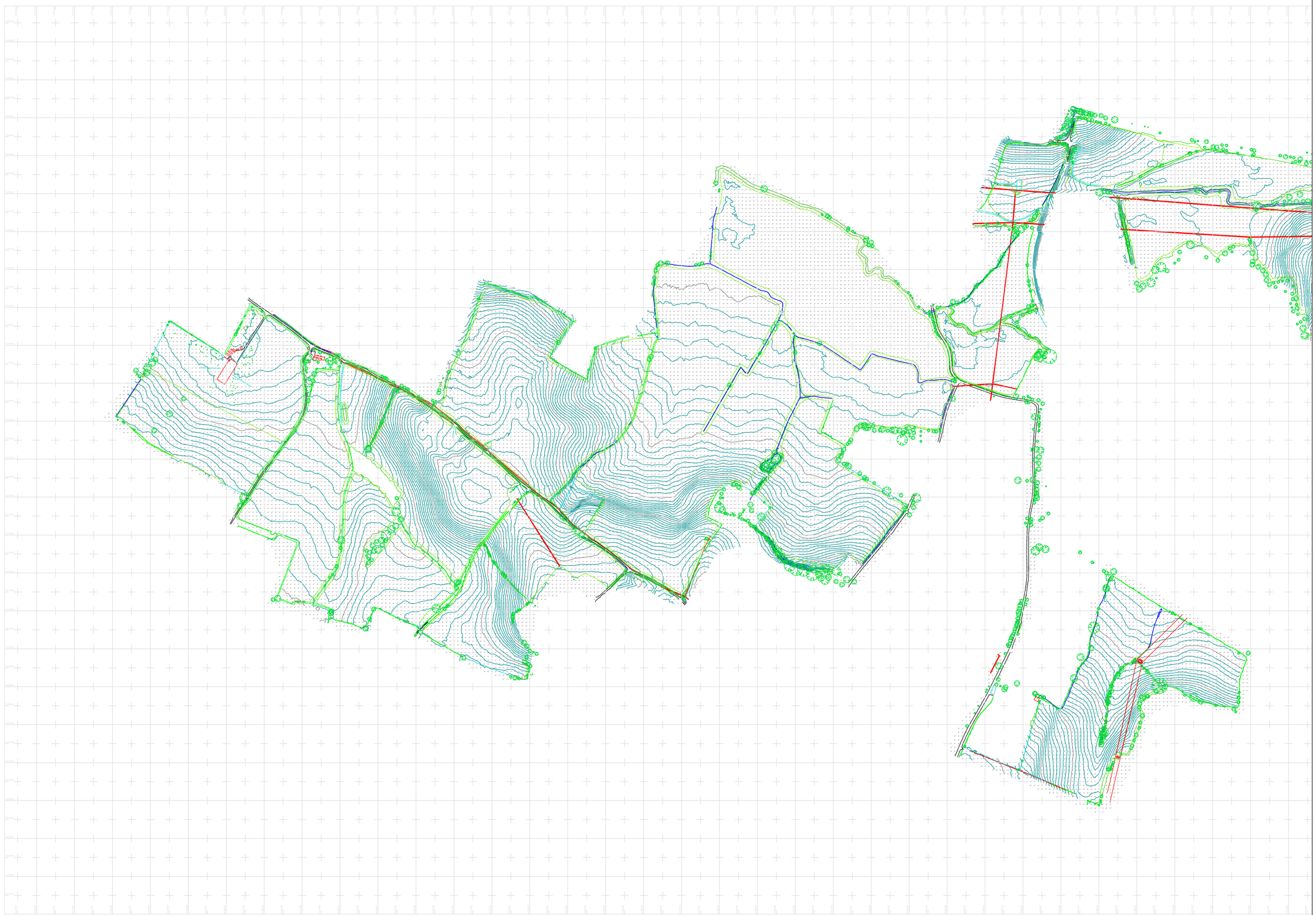
Outputs

Attribute	Value	
ID	ESTO01_12946	Enter unique name
Option	-	Not used (leave blank)
Pier_pBlockage	0.000	0 for no piers, 5 for 5% blockage etc.
Pier_FLC	0.000	0 if no pier. If piers use "Hydraulics of Bridge Waterways (Bradly, 1978)" to calculate loss coefficient
Deck_Soffit	52.130	Soffit level (top of opening)
Deck_Depth	0.370	Thickness of Bridge Deck (vertical)
Deck_Width	0.810	Deck width (In direction of flow)
Deck_pBlockage	100	100 assumes solid deck, update if required
Rail_Depth	0.940	Thickness of Rail (vertical)
Rail_pBlockage	10	% Blockage of rail
SuperS_FLC	0.281	Deck form loss coefficient
SuperS_lpf	1.6	Default value

ESTO01_12946
Bridge Loss Calculation Sheet







Legend

- Building
- Bottom of Bank
- Concrete
- Drainage Ditch
- Fence
- Foot Path
- Grass Edge
- Hedge (Edge)
- Hedge Polyline
- KerbChannel
- KerbTop
- Overhead Wires
- Tarmac
- Top of Bank
- Edge of Tree Canopy Left
- Edge of Tree Canopy Right
- Verge
- Wall
- Waters Edge
- White Line
- Gate
- Tree 2Pt Canopy
- EP Electricity Pole

Issue	Date	By	Chkd	Appd
01	12/12/23	VP	JJ	BC

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Client
EPL 001 Ltd

Job Title
Stonestreet Solar Farm
(revision of S22213)

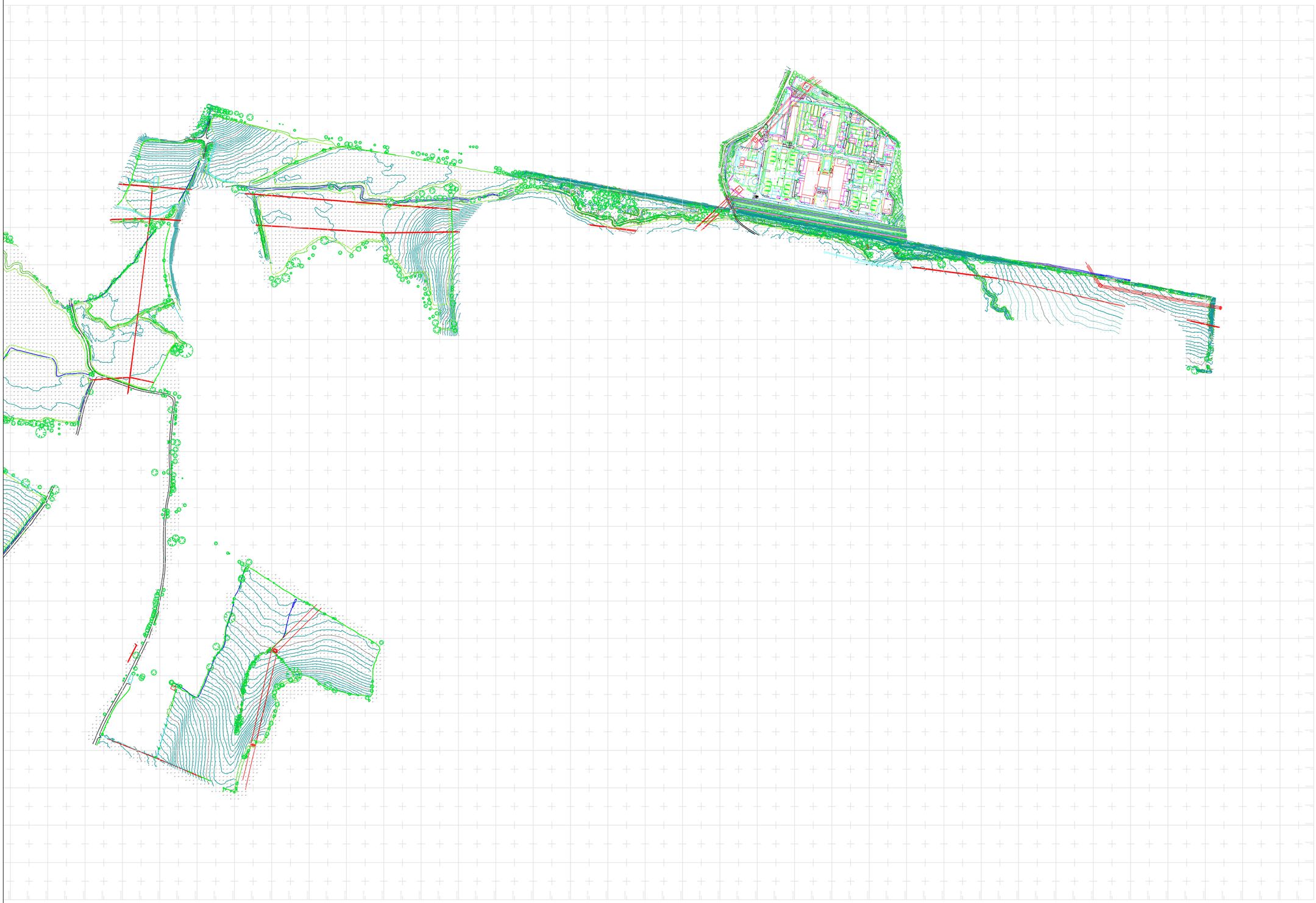
Drawing Title
Topographic Survey derived from UAV Photogrammetry & Lidar Point Clouds
Grid: OSGB36NG & OSGM15

Scale at A1 1:5000

Plot ID S23347_Stone-Street_Sensat-Topo-01

Drawing Status
Final

Job No	Drawing No	Issue
S23347	**Sheet 1 of 2**	**A**



Legend

- Building
- Bottom of Bank
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Issue	Date	By	Chkd	Appd
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Plot ID S23347_Stone-Street_Sensat-Topo-01

Drawing Status
Final

Job No	Drawing No	Issue
S23347	**Sheet 2 of 2**	**A**

Floodplain Compensation Level for Level Calculations

SLR

Approval

Model Revision:	034
Prepared By:	[redacted]
Approved By:	[redacted]
Date:	21/12/2023

Floodplain Loss Calculations

Analysis	
Area of section (m2)	9.30E-04
Max Flood Level (mAOD)	46.60
Min Ground Level (mAOD)	44.22
Volume of Fill (m3)	1.80

Sense Check	
No. of legs in flood extent	10121
Average Depth of Flooding (m)	0.192
Estimated Volume (m3)	1.80

Floodplain Compensation Calculations

Analysis			
Scrape Base Width (m)	0.5	Max Flood Level (mAOD)	46.61
Scrape Top Width (m)	3.5	Min Invert Level (mAOD)	43.77
Scrape Depth (m)	0.5	Volume of Compensation (m3)	1543.11
Side Slope (%)	33%		

Sense Check	
Length of Scrape in Flood Extent (m)	1579
Cross-sectional Area of Scrape (m2)	1
Estimated Volume (m3)	1579

	Level (mAOD)		Volume of Floodplain Filled (m3)						Compensatory Volume Provided (m3)						Level for Level Volume Change (m3)					
Bands	Min	Max	Field 16	Field 18	Field 19	Field 23	Field24	ALL	Field 16	Field 18	Field 19	Field 23	Field24	ALL	Field 16	Field 18	Field 19	Field 23	Field24	ALL
1	43.7	43.8	-	-	-	-	-	-	-	-	0.06	-	-	0.06	-	-	0.06	-	-	0.06
2	43.8	43.9	-	-	-	-	-	-	0.01	-	1.47	-	-	1.49	0.01	-	1.47	-	-	1.49
3	43.9	44	-	-	-	-	-	-	0.18	-	4.50	-	-	4.68	0.18	-	4.50	-	-	4.68
4	44	44.1	-	-	-	-	-	-	1.36	-	14.97	-	-	16.35	1.36	-	14.97	-	-	16.35
5	44.1	44.2	-	-	-	-	-	-	5.41	-	31.34	-	-	36.91	5.41	-	31.34	-	-	36.91
6	44.2	44.3	-	-	0.00	-	-	0.00	13.27	-	45.57	-	-	59.13	13.27	-	45.57	-	-	59.13
7	44.3	44.4	-	-	0.01	-	-	0.01	30.47	-	53.27	-	-	84.15	30.47	-	53.26	-	-	84.14
8	44.4	44.5	-	-	0.02	-	-	0.02	49.37	-	57.13	-	-	107.02	49.37	-	57.11	-	-	107.01
9	44.5	44.6	0.00	-	0.06	-	-	0.06	62.45	0.00	29.80	-	-	92.81	62.45	0.00	29.74	-	-	92.75
10	44.6	44.7	0.00	-	0.12	-	-	0.13	66.06	0.45	1.88	-	-	68.42	66.05	0.45	1.76	-	-	68.29
11	44.7	44.8	0.00	-	0.20	-	-	0.20	21.53	2.57	-	-	-	24.09	21.52	2.57	- 0.20	-	-	23.89
12	44.8	44.9	0.01	-	0.17	-	-	0.18	21.53	2.57	-	-	-	24.09	21.52	2.57	- 0.17	-	-	23.91
13	44.9	45	0.00	-	0.12	-	-	0.12	3.21	5.42	-	-	-	8.63	3.21	5.42	- 0.12	-	-	8.51
14	45	45.1	0.00	-	0.09	-	-	0.10	-	10.77	0.75	-	-	11.52	- 0.00	10.77	0.65	-	-	11.43
15	45.1	45.2	-	-	0.09	-	-	0.09	-	19.01	5.27	-	-	24.28	-	19.01	5.17	-	-	24.19
16	45.2	45.3	-	-	0.08	-	-	0.08	-	27.69	18.84	-	-	46.53	-	27.69	18.76	-	-	46.45
17	45.3	45.4	-	-	0.08	-	-	0.08	-	35.22	34.11	0.18	0.39	69.90	-	35.22	34.03	0.18	0.39	69.82
18	45.4	45.5	-	-	0.06	-	-	0.06	-	36.93	51.46	4.57	3.52	96.48	-	36.93	51.40	4.57	3.52	96.42
19	45.5	45.6	-	-	0.05	-	-	0.05	-	32.73	65.32	15.88	12.69	126.61	-	32.73	65.27	15.88	12.69	126.57
20	45.6	45.7	-	0.00	0.04	-	-	0.04	-	13.11	62.83	29.68	24.40	130.01	-	13.11	62.79	29.68	24.40	129.97
21	45.7	45.8	-	0.01	0.04	-	-	0.05	-	6.39	29.86	46.05	37.95	120.25	-	6.39	29.81	46.05	37.95	120.20
22	45.8	45.9	-	0.00	0.05	0.00	0.00	0.05	-	5.87	17.57	60.69	52.16	136.28	-	5.87	17.52	60.69	52.16	136.23
23	45.9	46	-	0.00	0.02	0.01	0.00	0.03	-	5.39	4.99	53.86	54.11	118.36	-	5.39	4.98	53.85	54.11	118.32
24	46	46.1	-	0.00	0.00	0.04	0.01	0.05	-	2.06	-	31.08	36.47	69.60	-	2.06	- 0.00	31.04	36.46	69.55
25	46.1	46.2	-	-	-	0.06	0.03	0.09	-	0.11	-	15.44	26.84	42.39	-	0.11	-	15.39	26.81	42.30
26	46.2	46.3	-	-	-	0.08	0.05	0.13	-	-	-	1.58	17.37	18.95	-	-	-	1.50	17.33	18.83
27	46.3	46.4	-	-	-	0.08	0.05	0.13	-	-	-	-	4.11	4.11	-	-	-	- 0.08	4.06	3.98
28	46.4	46.5	-	-	-	0.01	0.03	0.04	-	-	-	-	-	-	-	-	-	- 0.01	- 0.03	- 0.04
29	46.5	46.6	-	-	-	-	0.02	0.02	-	-	-	-	-	-	-	-	-	-	- 0.02	- 0.02
30	46.6	46.7	-	-	-	-	0.00	0.00	-	-	-	-	-	-	-	-	-	-	- 0.00	- 0.00
31	46.7	46.8	-	-	-	-	0.00	0.00	-	-	-	-	-	-	-	-	-	-	- 0.00	- 0.00
TOTAL	**43.7**	**46.7**	**0.02**	**0.01**	**1.30**	**0.27**	**0.21**	1.80	**274.83**	**206.28**	**531.00**	**259.00**	**270.00**	1,543.11	274.82	206.28	529.70	258.73	269.79	1,541.31

From: KSLPlanning <KSLPLANNING@environment-agency.gov.uk>
Sent: Tuesday, April 23, 2024 2:18 PM
To: [redacted]>
Cc: [redacted]>
Subject: Stonestreet Green Hydraulic Model - ENVPAC/1/KSL/00636

Good afternoon, [redacted] *et al*

Thank you for seeking our review of your flood modelling in support of your flood risk assessment for the above development.

We have applied a risk based approach to the assessment of this model. In this instance a basic review has been carried out (a review of the hydrology and hydraulic model reports, but not the model files). We don't have any specific comments on the reports and consider that the model appears to provide a suitable basis for assessing the flood risk.

The proposed substation building is to be located outside the Aldington FSA and above the FSA embankment crest level designed to contain the 1in10,000 year flood event. The solar panels in the fields downstream of the FSA will be on legs above the design flood levels with appropriate freeboard to be assessed by the designer.

From the information so far provided we are unlikely to raise an objection to a formal application on flood risk grounds.

Kind Regards,

[redacted]
Planning Specialist
Sustainable Places – Kent and South London

kslplanning@environment-agency.gov.uk

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