

**Tillbridge Solar Project
EN010142**

**Volume 6.2
Environmental Statement
Appendix 10-5: Water Environment Stakeholder
Correspondence
Document Reference: EN010142/APP/6.2**

**Regulation 5(2)(a)
Infrastructure Planning (Applications: Prescribed Forms and
Procedure) Regulations 2009**

**April 2024
Revision Number: 00**

tillbridgesolar.com

Table of Contents

Executive Summary	1
Preliminary FRA Response	2
Water Environment Stakeholder Meeting Minutes	3

Executive Summary

This appendix to **Chapter 10: Water Environment** of the Environmental Statement (ES) **[EN010142/APP/6.1]**, in relation to the Development Consent Order (DCO) application for the construction, operation and decommissioning of the Tillbridge Solar Project (the Scheme), consists of correspondence with water environment stakeholders in relation to the methodologies of the assessments undertaken within **Chapter 10: Water Environment** (and its appendices) of the ES **[EN010142/APP/6.1]**.

Included in this appendix is:

- a. Correspondence from the Environment Agency relating to the Preliminary Flood Risk Assessment that was previously appended to Chapter 10 of the Preliminary Environmental Information Report (PEI Report); and,
- b. Minutes from a meeting held with the AECOM and the Environment Agency, Scunthorpe and Gainsborough Water Management Board, Upper Witham Internal Drainage Board, Trent Valley Internal Drainage Board, Lincolnshire County Council, and Nottinghamshire County Council.

Environment Agency Preliminary FRA Response

██████████
Associate Director, Development
Infrastructure
AECOM
Marlborough Court 10
Bricket Road
St Albans
AL1 3JX

Our ref: AN/2023/134332/01-L01

Your ref: EN010142-000010

Date: 24 May 2023

Dear ██████████

**Tillbridge Solar Scheme, south of the A631 between Heaptham and Hartswell –
Flood Risk Assessment review**

Thank you for submitting your preliminary Flood Risk Assessment (FRA) for our review in connection with the above proposed development.

We are pleased to provide our advice to you under agreement no. ENVPAC/1/LNA/00178 as follows:

We consider that the details in the FRA (labelled as Appendix 10-2 dated April 2023) are appropriate for the scale, nature and location of the proposed development. Please note that our review has only considered the risk of flooding from a fluvial and tidal perspective; we have not considered the risk of flooding from groundwater, drainage systems, reservoirs, canals or ordinary watercourses. You will need to gain further advice from other relevant flood risk management authorities (such as the Lead Local Flood Authority or Drainage Boards) on potential flooding from these sources.

We note that the FRA has focused on flood risk to the Principal Site, as the Cable Route Corridor will all be underground with no permanent above-ground (built) development. However, the cable route includes two Main River crossings; the River Till and the River Trent. The construction/installation phase of the Cable Route Corridor has the potential to have a detrimental impact on flood risk, particularly where it crosses under the Main River channels. You will need to ensure that the methodology employed for the crossings has no impact on the river channel or flood risk.

Under the Environmental Permitting (England and Wales) Regulations 2016, permission must be obtained from the Environment Agency for any proposed activities which will take place:

- in, over, under or within 8 metres of a main river (16 metres if tidal);
- on or within 8 metres of a flood defence structure or culvert (16 metres if tidal);
- on or within 16 metres of a sea defence;

- within 16 metres of any main river, flood defence (including a remote defence) or culvert for quarrying or excavation;
- in a flood plain more than 8 metres from the river bank, culvert or flood defence structure (16 metres if tidal) having the potential to divert flood flows to third parties, if planning permission has not already been granted for the works.

Under Section 150 of the Planning Act 2008, there is a provision for an applicant to remove a requirement for a prescribed consent or authorisation, if the relevant body has consented to the inclusion of the provision. The Environment Agency's agreement to remove the requirement for a permit for a flood risk activity would be subject to agreeing appropriate protective provisions, to be included in the Development Consent Order (DCO).

We would advise you to carry out the river crossings in line with the criteria set out within the exemption parameters known as "Flood Risk Activity 3. Service Crossing below the bed of a main river not involving an open cut technique (FRA3)" – [Exempt flood risk activities: environmental permits - GOV.UK \(www.gov.uk\)](http://www.gov.uk).

We also note that other 'flood risk' activities may take place as part of the Cable Route Corridor works. These may include the storage of materials in the floodplain (e.g. excavated material, cable, equipment). You should consider the methodology and detail any areas used for the storage of material in relevant supporting documents for the DCO, using Flood Zone 1 where possible.

Should you require any additional information, or wish to discuss these matters further, please do not hesitate to contact me at the number below.

Yours sincerely

[Redacted signature block]

Direct dial [Redacted]
Direct e-mail [Redacted]

Water Environment Stakeholder Meeting Minutes

Title	Tillbridge Solar – Meeting with Water Environment Stakeholders	
Date	04 September 2023	
Location	Microsoft Teams	
Meeting Chair	[REDACTED]	
Tillbridge Solar attendees	Role/Organisation	Abbreviation
[REDACTED]	Associate Director (EIA), AECOM	ST
[REDACTED]	Associate Director (Water), AECOM	CB
[REDACTED]	Technical Director (Ecology), AECOM	PC
[REDACTED]	Principal Engineer (Water), AECOM	IH
[REDACTED]	Principal Consultant (Water), AECOM	DH
[REDACTED]	Consultant (EIA), AECOM	CRW
[REDACTED]	Engineer (Water), AECOM	PM
Stakeholder attendees		
[REDACTED]	Environment Agency	AH
[REDACTED]	Environment Agency	CW
[REDACTED]	Environment Agency	HS
[REDACTED]	Environment Agency	AS
[REDACTED]	Scunthorpe and Gainsborough WMB	PJ
[REDACTED]	Upper Witham IDB	MK
[REDACTED]	Upper Witham IDB	GH
[REDACTED]	Trent Valley IDB	EJ
[REDACTED]	Trent Valley IDB	DC
[REDACTED]	Lincolnshire County Council	IF
[REDACTED]	Nottinghamshire County Council	SS

1	Introductions	ST
2	Safety moment - Refer to presentation slides.	DH
3	Summary of the Scheme - Refer to presentation slides.	DH
4	Summary of Water Environment baseline - Refer to presentation slides.	DH & CB
5	Assessments carried out to date: - Flood Risk Assessment (FRA) - Drainage Strategy	DH, IH & CB

	<ul style="list-style-type: none"> – IH introduced the proposed drainage strategy. As the Solar panels are raised from the ground and the gravel access roads are permeable, both these items will not contribute additional impermeable area to the scheme and therefore no formal drainage system is required for them. – New impermeable areas within the site result from the proposed Battery Energy Storage System (BESS) and substations. These have been modelled as 100% impermeable with a CV of 1 as a worst case. – Drainage systems for BESS and substations will consist of a surrounding swale which will accommodate the 1 in 100 year event + 40% CC. Discharge from the swale will be restricted to QBAR rates up to this event via a flow control before discharging to the nearest watercourse. – Exceedance flows from drainage systems will be managed by perimeter swales on edges of certain fields. – For the BESS swale this will also need to hold firewater runoff in the event of a fire so that it can be tested for contamination before discharge to watercourse or being pumped out. The swale will contain an impermeable liner below and penstock valve on the outflow to prevent fire water runoff entering ground/watercourse. The BESS swale will therefore be dual purpose for firewater and surface water storage. There is potential that the event of a fire, the swale may already contain surface water and reduce the capacity for fire water storage. It is extremely unlikely a fire will occur at the same time as the 1 in 100 year event. Therefore, taking a pragmatic approach, an allowance has been made that a 1 in 1 year event could occur at the same time as a fire. Therefore, the swale will need to contain the 1 in 1 year event plus the fire water storage runoff or the 1 in 100 year + 40% event on its own, whichever is greater (thereby providing for the worst case scenario). – Foul water is proposed as private cess pit at compound areas <ul style="list-style-type: none"> – no formal public connection proposed to sewer. – Sea Level Calculations (within the FRA) – 	
6	<p>Points for agreement:</p> <p>All channels in Trent Valley IDB to be non-intrusively crossed.</p> <ul style="list-style-type: none"> – DC confirmed that the expectation for all watercourses in Trent Valley IDB area to be non-intrusively crossed. HDD or similar. <p>Agreement of point of measurement for the buffer zones on watercourses:</p>	DH, IH & CB

- DC indicated the measure of bank top/berm/highest bank, 9m from top. For minor watercourses this could be less.
- PJ indicated it should be approx. 9m from bank top. If 10m then have no need for permitting going forward.
- GH agree with buffer zone distances, need to ensure maintenance of watercourses is achievable.

Agreement of the crossings of WFD monitored reaches by HDD:

- The Environment Agency agreed.
- PJ indicated Scunthorpe and Gainsborough IDB channels will have to be HDD or similarly crossed as well. PJ will send shapefile to identify these courses.
- GH stated that Upper Witham IDB will also send shapefile of watercourses. Upper Witham IDB will need finalised Cable Route Corridor to confirm all. GH noted that the temporary works crossings are of most concern and requested a shapefile of Scheme.
- CW indicated from the perspective of the Environment Agency, the River Till crossing will need to be trenchless as well. Exemption will need to be registered with expectations of HDD, so that local teams are aware of works.

Agreement of Sea Level Assessment for FRA – no further work required:

- CB asked for any comments or queries on the assessment.
- No comments received from group. Matter agreed and closed.

Agreement to Drainage Strategy Approach

- CB clarified that an Outline Battery Fire Safety Management Plan is being produced in consultation with the Lincolnshire Fire Service to confirm the firewater storage requirements for the BESS swale.
- CB asked for any further comments on the drainage strategy.
- No comments received from group. Matter agreed and closed.

Agreement to Flood Risk Tech Note assessment approach – agree fluvial modelling not required for FRA

- PJ asked if are there any BESS/substations at flood risk or are floor levels/electronics/junction boxes etc. above predicted flood levels.?
- CB indicated panels only in flood zones 2 and 3, no BESS.
- CB discussed that the EA has provided a response to the Preliminary Flood Risk Assessment, in their letter dated 24 May 2023, under agreement ENVPAC/1/LNA/00178, which notes the EA considers the details in the FRA “are appropriate for the scale, nature and location of the proposed

	<p>development”, CB discussed the flood risk technical note and asked stakeholders if the climate change assessment in the fluvial flood risk technical note’s (Annex B of FRA) approach presented for the Harpswell Lane and Kexby Road flood risk areas was deemed acceptable with no further hydraulic modelling being proposed to assess flood risk to the panels in Flood Zone 3.</p> <ul style="list-style-type: none"> – No further comments received from group. Matter agreed and closed. 	
7	<p>AOB</p> <p>Foul Water Drainage</p> <ul style="list-style-type: none"> – AH asked if locations of the compounds were known at this time or if they would be provided at detailed design stage. The Environment Agency preference/policy is for foul drainage to be connected to the main sewers, if possible, rather than installation of cesspits. If compounds are near villages, then connection could be possible. – CB indicated that AECOM looks at sewer public records when deciding use of cesspits or connection to mains. On previous projects, if within 20m then we would look to connect to mains. – AH indicated that the Environment Agency expects a connection if within 30m of mains. – CB noted, 30m will be considered. <p>Disapplication of Land Drainage Act</p> <ul style="list-style-type: none"> – GH asked if disapplication of the Land Drainage Act as part of DCO was planned. If so, GH asked how the team intends to slot in agreements with the IDBs. Upper Witham IDB would be happy picking this up using a Statement of Common Ground (SoCG) or Protective Provisions (PPs). – DH indicated this would be looked at going forward and with the legal team. – GH indicated this would be acceptable. – DH asked if a joint SoCG be acceptable or one for each IDB. – PJ and GH indicated this would be on an individual basis; a SoCG is the most useful whether byelaws are disappplied or consent is applied for. <p>Lifetime of Panels</p> <ul style="list-style-type: none"> – PJ asked about the life expectancy of solar panels. – ST explained that the operational period of scheme being assessed in the Environmental Statement is 60 years. <p>Land Ownership/Classification</p>	ST

	<ul style="list-style-type: none"> – PJ asked whether the developer or current landowners will own the land. – ST will consult land consultant and get back on this. – PJ asked if the land classification will be switched to business rate from agriculture rate. – DC indicated that solar farms do change it to a business rate. <p>Land Drainage Act</p> <ul style="list-style-type: none"> – DC indicated that neighbouring proposals mention disapplication of the Land Drainage Act. We will need to discuss this in detail for the Tillbridge Solar scheme as this is contentious. – DC indicated that where installation of culverts is to happen, these need to be temporary and removed even if landowner asks to keep in place. The IDB will apply a maintenance fee and reminding the landowners they will need to pay for this is important. <p>BESS Locations/Firewater</p> <ul style="list-style-type: none"> – CW queried that if BESS is close to a main river and swales retain firewater, what will the mitigation be if swales become overwhelmed and water enters main river. – IH indicated that there is no BESS near main rivers. However, with regards to other watercourses the drainage team looking at firewater storage requirements for BESS are currently adding 30% additional capacity. An allowance for 1 in 1 year surface water storage is also made alongside the firewater storage as a worst-case scenario. There are also perimeter swales to further mitigate risk of contamination to watercourses if the swale were to overtop. It is felt these all these measures make this a robust strategy. – CW noted. – CB noted BESS are now mentioned in the Planning Practice Guidance, as of the August 2023 update, with specific reference to the National Fire Chiefs Council (NFCC) guidance on firewater runoff. The drainage strategy will consider this when assessing firewater requirements. 	
8	<p>Actions</p> <ul style="list-style-type: none"> – PJ to send shapefile of watercourses within S&G WMB – GH to send shapefile of watercourses within UW IDB – CRW to send shapefile of scheme to UW IDB – ST to email PJ with land ownership detail. – Aecom to prepare minutes and circulate to the attendees with the presentation slides. 	All



Tillbridge

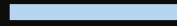
Solar

Tillbridge Solar meeting with water environment stakeholders
4 September 2023

AGENDA.

- Welcome and Introductions
- Safety Moment
- Scheme Overview : Tillbridge Solar Farm
- Water Environment Baseline
- Preliminary Environmental Information Report Summary including:
 - Flood Risk Assessment
 - Drainage Strategy
 - Sea Level Calculation discussion
 - WFDa and Watercourse crossing methodologies
- Next Steps / Discussion





WELCOME & INTRODUCTIONS, SAFETY MOMENT.

BUILD.

OWN.

OPERATE.

MAINTAIN.

Importance of sharing knowledge.

A recent incident occurred where an Ecologist got bogged down in mud and needed to be extracted by a mechanical excavator.

On investigation, it became clear that the works were on a site which AECOM were familiar with, having done significant amounts of work there before. Therefore, it was known that dangerous ground conditions existed.

Works approval involved liaison with the site operators to gain access. However, all communication was directed through the client and not directly between AECOM and the site operator. This led to key information, specifically the proposed site walkover plan, not being passed on.

The site operator was asked to review the SHE Plan by the client and made some basic comments but failed to comment on the adverse ground conditions in the far south east of the site which was part of the area to be covered by the site walkover, as it was assumed we would not be working in this area.

When attending the site operator's induction, the walkover plan was not shared, as it was understood the site operator had already been issued this information.

Sharing knowledge about tasks, personnel, locations, equipment and plant, etc. is a primary requirement that drives risk control. This is why the issue of Pre-Construction Information is a legal requirement within CDM 2015.

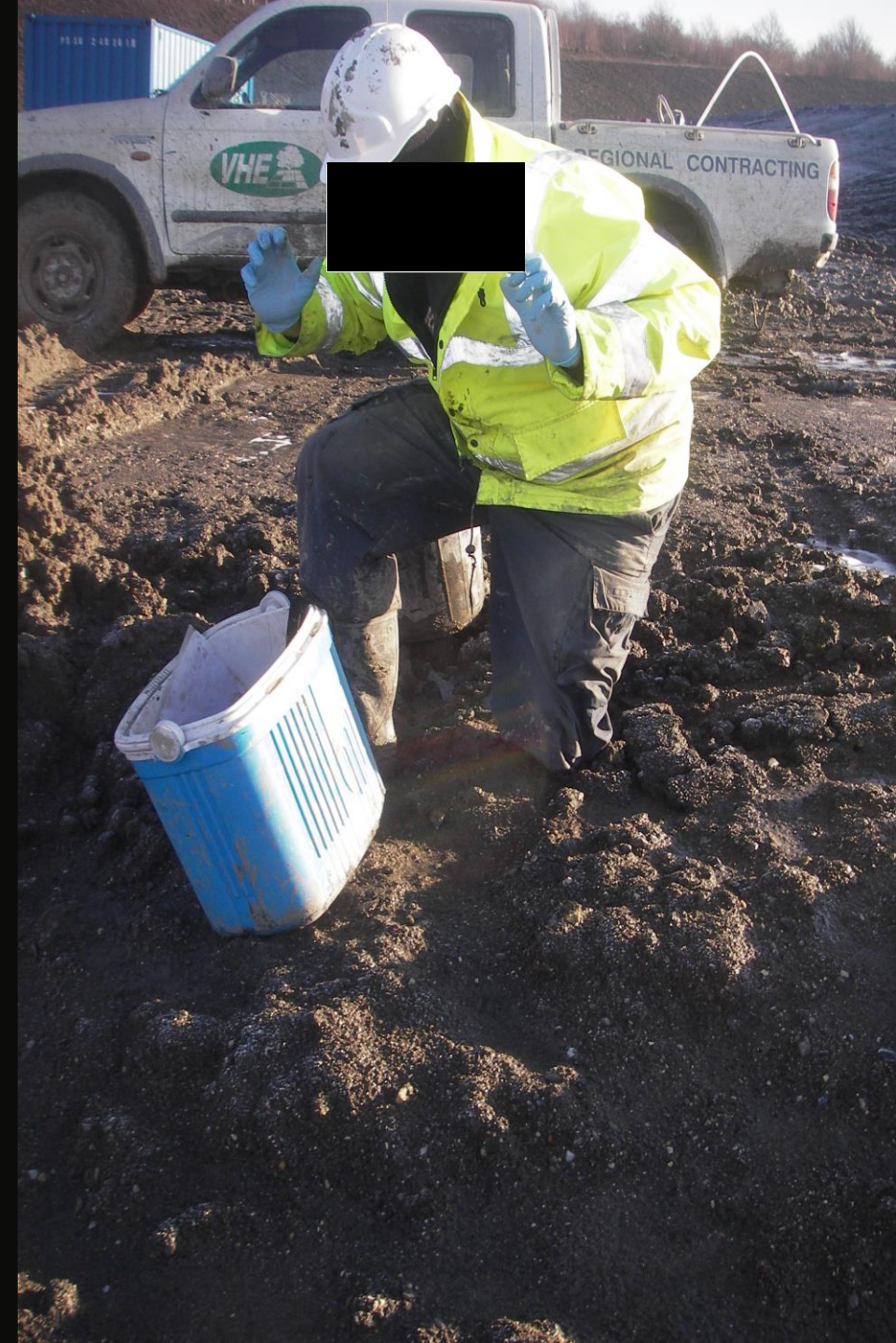
Lessons Learnt:

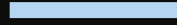
Microsoft Teams is a really useful way of reaching colleagues to ask for advice or information. A quick message on the EWE Teams site reaches hundreds of colleagues and where colleagues have location specific information it can be provided efficiently.

When issuing safety documents, make sure that all appendices and plans are referenced, and all contained within the documents issued.

By clearly stating what information your SHE Plan is based on and what supporting information should be reviewed when assessing the suitability of the SHE Plan, we minimise the risk of assumptions.

Don't assume others know what you know, share your insights.





TILLBRIDGE SOLAR – SCHEME OVERVIEW.

BUILD.

OWN.

OPERATE.

MAINTAIN.

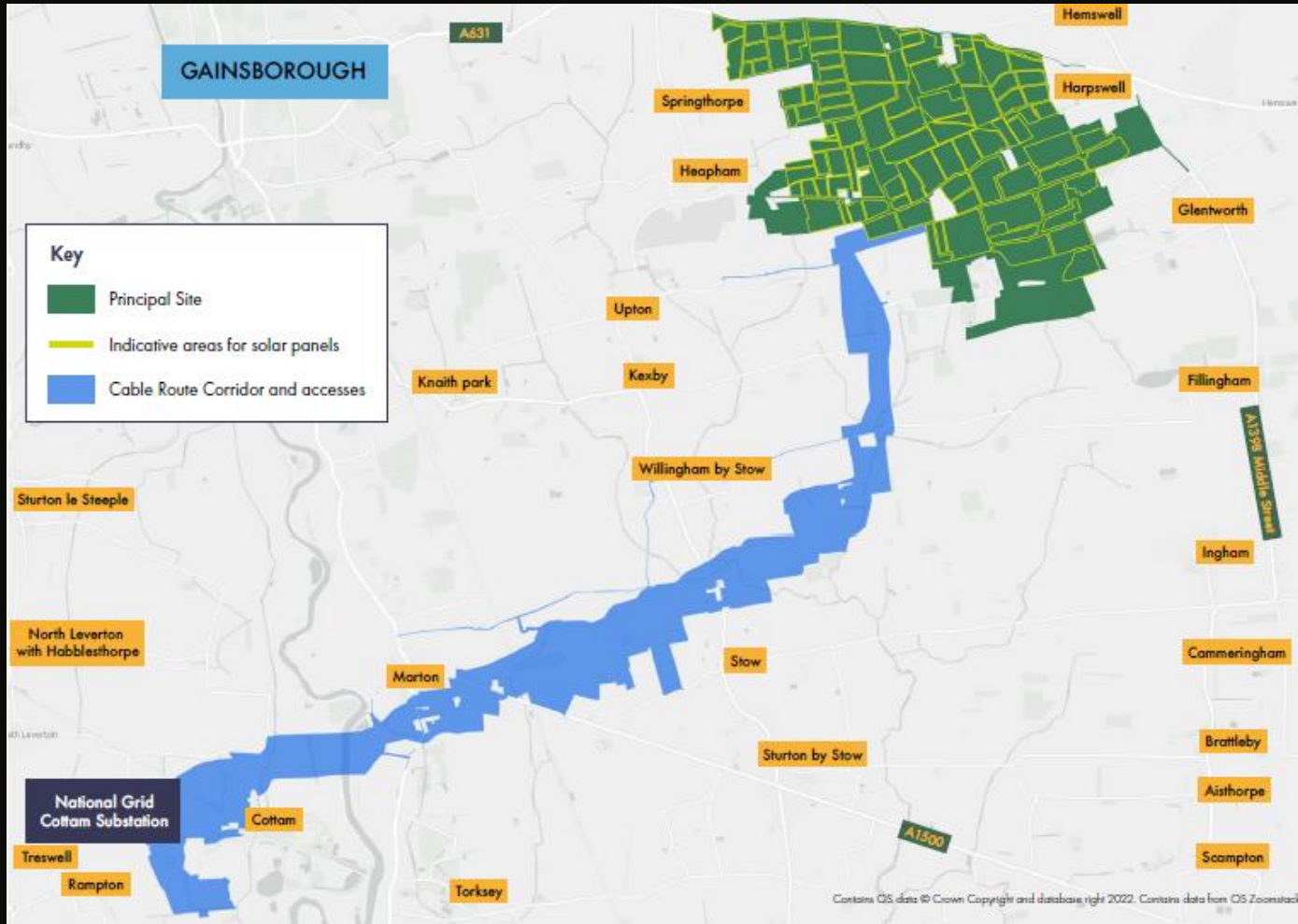
SCHEME OVERVIEW.

- A new solar and energy storage scheme within Lincolnshire, spanning across into Nottinghamshire: West Lindsey and Bassetlaw.
- Generation capacity exceeding 50MW, providing enough clean energy to power approx. 300,000 UK homes.
- Principal Site approx. 1,400 hectares (ha):
 - consisting of solar PV panels and associated infrastructure, and environmental mitigation and enhancement
- Connect to the National Grid at Cottam Substation via underground electricity cables.
- Battery Storage Capability onsite (BESS)



East-west single axis tracker system, finished array
(Note example is in Australia).

SITE LOCATION.



Approx. five kilometres east of Gainsborough and approx. 13 kilometres north of Lincoln.

The Principal Site, where the ground mounted solar PV, electrical substations and energy storage facilities would be located.

Land to the south of Harpswell Lane (A631), to the west of Middle Street (B1398) and largely to the north of Kexby Road and to the east of Springthorpe.

Cable Route Corridor linking the Principal Site to the National Grid at Cottam Substation.

**TILLBRIDGE SOLAR FARM
– WATER ENVIRONMENT BASELINE.**

BUILD.

OWN.

OPERATE.

MAINTAIN.

SOLAR PV SITE AND THE GRID CONNECTION CORRIDOR.

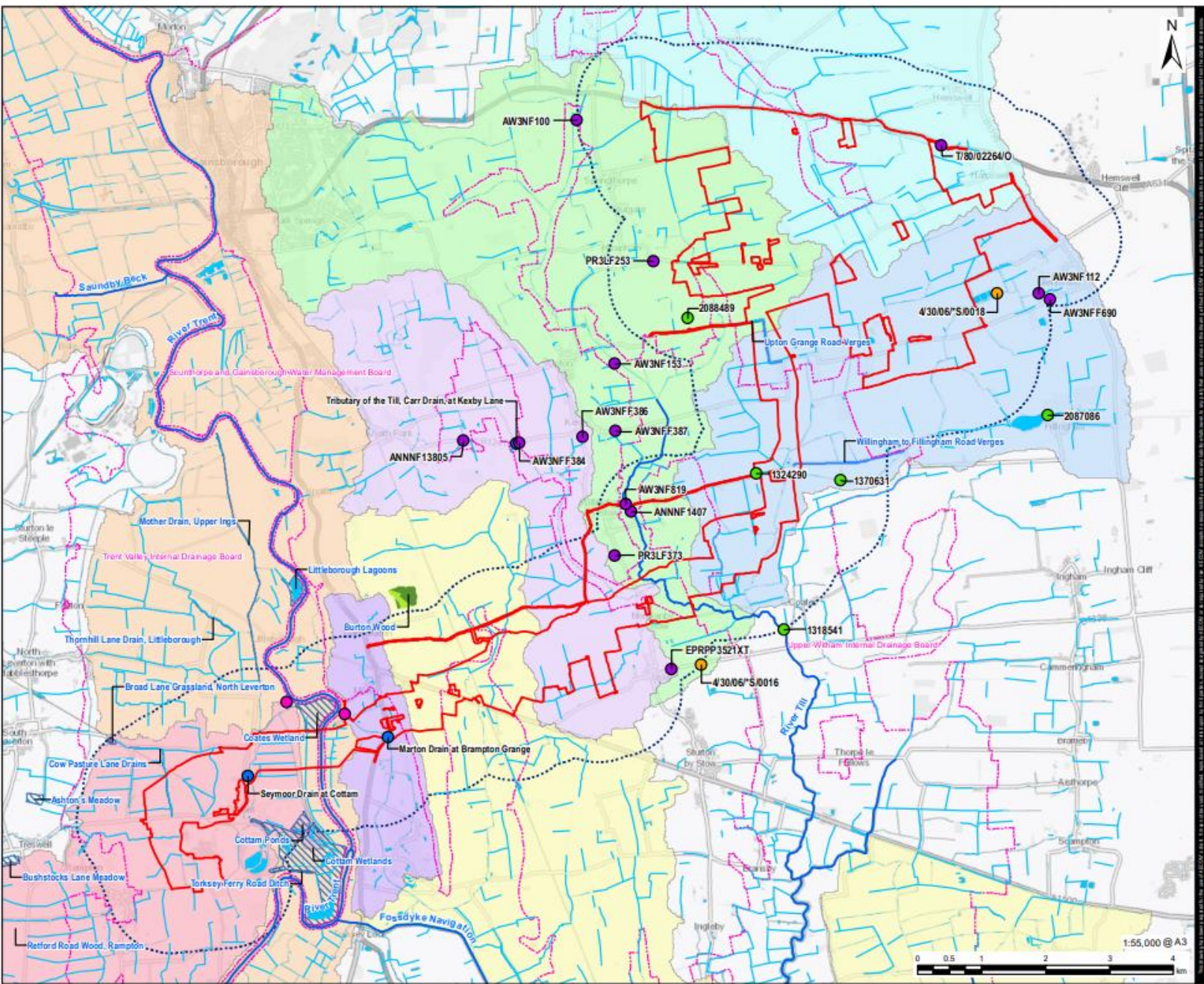
The Site consists predominately of agricultural fields.

The Grid Connection passes through many WFD surface watercourse catchments, which are shown on the next slide.

Witham Lias and Lower Trent Erewash WFD Groundwater Bodies

Flood Risk is generally low from all sources with two small areas of higher fluvial risk within the Principal Site Boundary.





AECOM

PROJECT
 Tillbridge Solar

CLIENT
 Tillbridge Solar Limited

CONSULTANT
 Algate Tower
 2, Leman Street
 London, E1 8FA
 United Kingdom
 T +44-0207-645-2000

LEGEND

- Scheme Boundary
- 1km Buffer
- Discharge Consent
- Pollution Incident: 2015-2022 Only, Category 1-3 Only
- Surface Water Abstraction
- Environment Agency Monitoring Location
- IDB Pumping Station
- Main River
- Waterbody
- Internal Drainage District
- Statutory Site
 - Lincolnshire Local Wildlife Site
 - Nottinghamshire Local Wildlife Site
 - Ancient & Semi-Natural Woodland
 - Ancient Replanted Woodland
- WFD Surface Waterbodies
 - Eau from Source to Notthorpe Beck
 - Fillingham Beck
 - Marion Drain Catchment (trib of Trent)
 - Seymour Drain Catchment (trib of Trent)
 - Stellingthorpe Main Drain
 - Till (Witham)
 - Trent from Carlton-on-Trent to Laughton Drain
 - Tributary of Till

NOTES

Reproduced from Ordnance Survey digital map data © Crown copyright 2022. All rights reserved. Licence number 010021673.
 Contains OS data © Crown copyright and database right 2022.
 © Environment Agency copyright and/or database right. © Crown copyright and database right 2018. All rights reserved. Some features of this map are based on digital spatial data from the Centre for Ecology & Hydrology. © NERC/Centre for Ecology & Hydrology. © Crown copyright and database right 2018. Ordnance Survey 100024108.

Whole area is contained within a Natura Vulnerable Zone.

ISSUE PURPOSE
 PEI Report

PROJECT NUMBER
 60677969

FIGURE TITLE
 Surface Water Features and Their Attributes

FIGURE NUMBER
 Figure 10-1

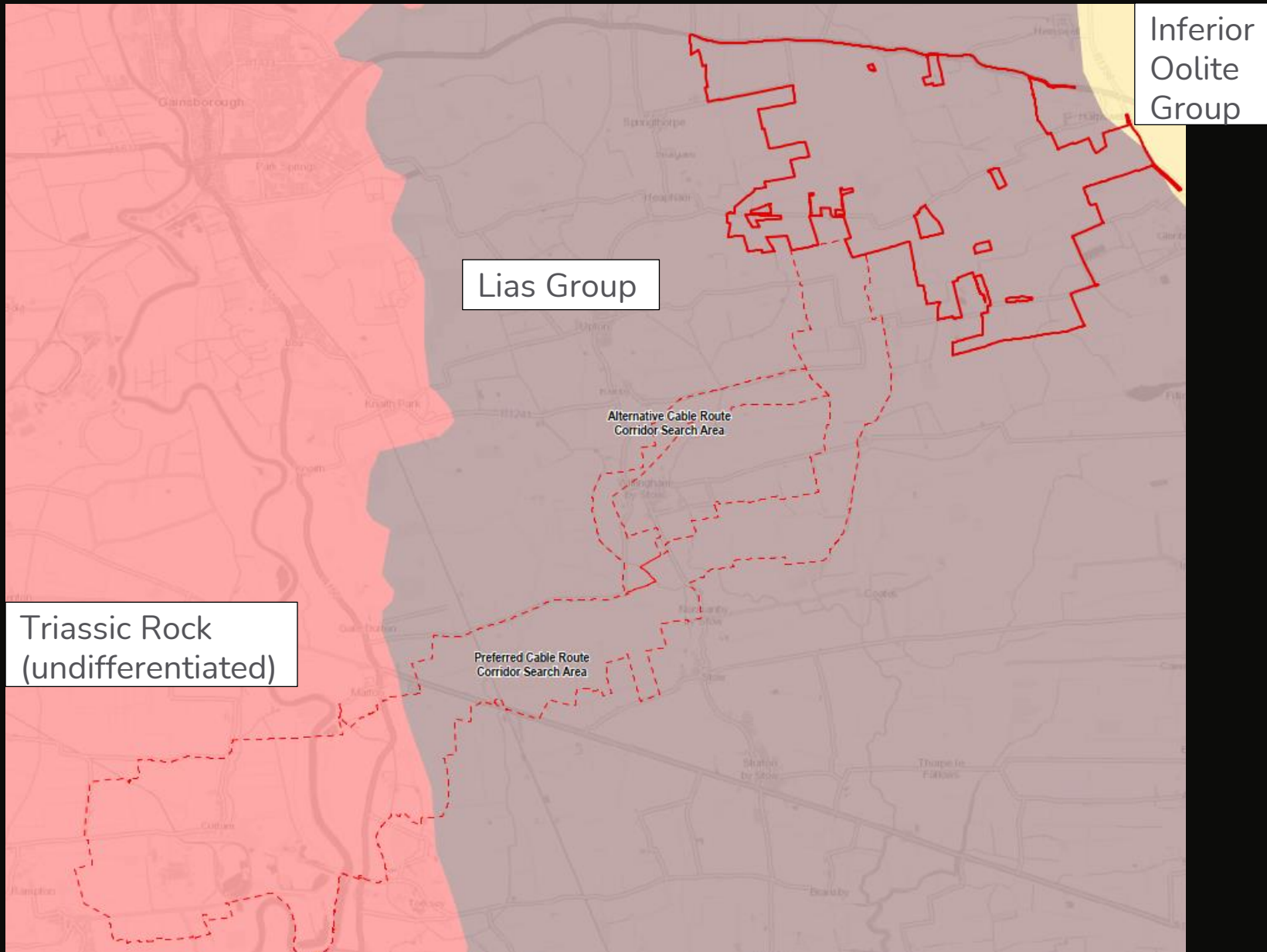




Fillingham
Beck, top left;

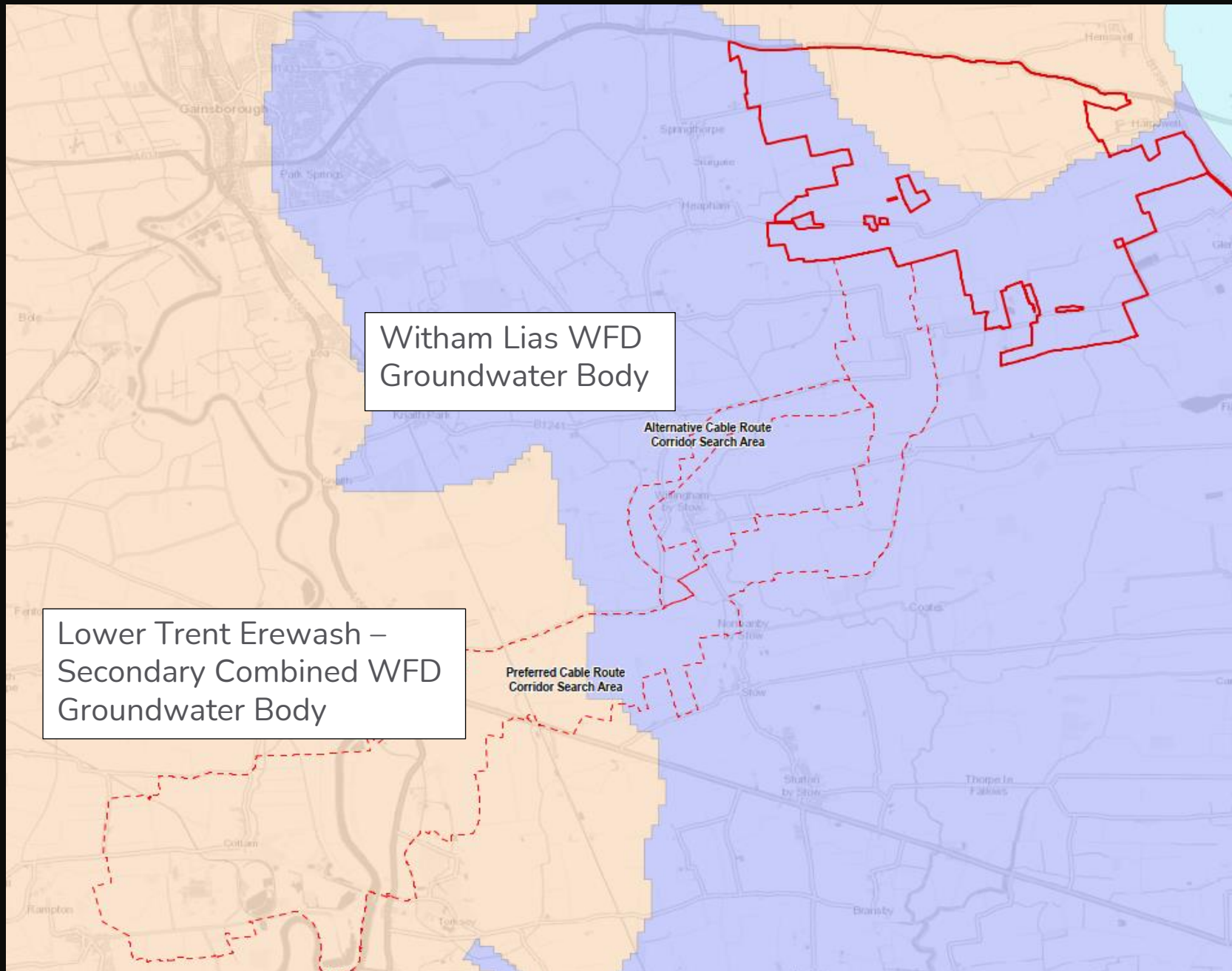
River Till, top
right;

Tributary of
Till, bottom



Geology

- **Superficial Geology**
- The Principle Site is mostly underlain by till-diamicton. The Cable Route Corridor also passes through alluvium, river terrace deposit and sands.
- **Bedrock Geology**
- The majority of the Site is underlain by the Lias Group (mudstone, siltstone, limestone and sandstone)
- The west of the Cable Route Corridor is underlain by the Triassic rocks (mudstone, siltstone and sandstone.
- The eastern edge of the Principle Site is underlain by the Inferior Oolite Group.



Witham Lias WFD
Groundwater Body

Lower Trent Erewash –
Secondary Combined WFD
Groundwater Body

Alternative Cable Route
Corridor Search Area

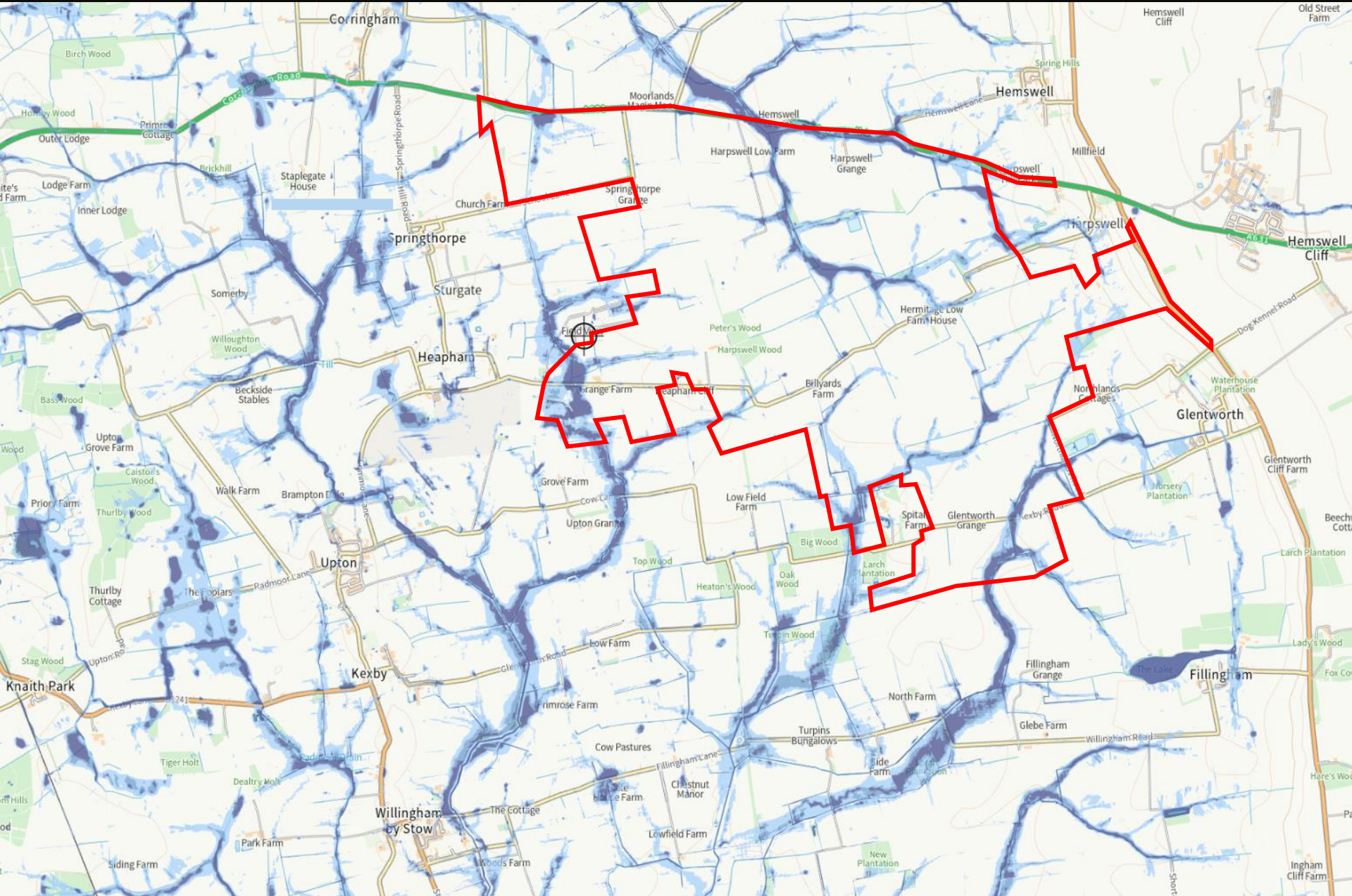
Preferred Cable Route
Corridor Search Area

Groundwater

- **Superficial Aquifers**
- Alluvium, river terrace deposit and sands are noted as a Secondary A aquifer. The till-diamicton unit are noted as a Secondary (undifferentiated). Therefore there may be pockets of groundwater throughout these units.
- **Bedrock Aquifers**
- Witham Lias and Lower Trent are by Secondary aquifers (either Secondary B or Secondary (undifferentiated)). The WFD Groundwater bodies are the Witham Lias and the Lower Trent Erewash to the west.

Principal Site Flood Risk Summary

Source	Pre-Scheme Flood Risk Level	Post-Scheme Flood Risk Level	Overview
Fluvial	Low	Low	<p>Discharge from impermeable areas are to be restricted to Greenfield rates, mitigating increases to peak river flow rates.</p> <p>Solar PV Panel infrastructure within the Flood Zones 2/3 “interaction zones” are not envisaged to alter the existing flood extents topography (negligible loss to floodplain volume) and are proposed to be installed to enable sufficient freeboard to remain operational during worst case flooding scenarios.</p> <p>No change to flood risk level.</p>
Tidal	Low	Low	<p>No change to flood risk level.</p>
Pluvial	Low	Low	<p>The Preliminary Drainage Strategy proposes to manage increases in surface water runoff from BESS/substation areas ect. by mimicking the pre-Scheme conditions for up to and including the 1 in 100 + 40% CC event using SuDS discharging at restricted Greenfield rates to on-site watercourses.</p> <p>No change to flood risk level.</p>
Groundwater	Low	Low	<p>The Preliminary Drainage Strategy does not propose to utilise infiltration techniques to discharge increased surface water runoff.</p> <p>No change to flood risk level.</p>
Sewers	Low	Low	<p>No change to flood risk level.</p>
Artificial sources	Low	Low	<p>No change to flood risk level.</p>

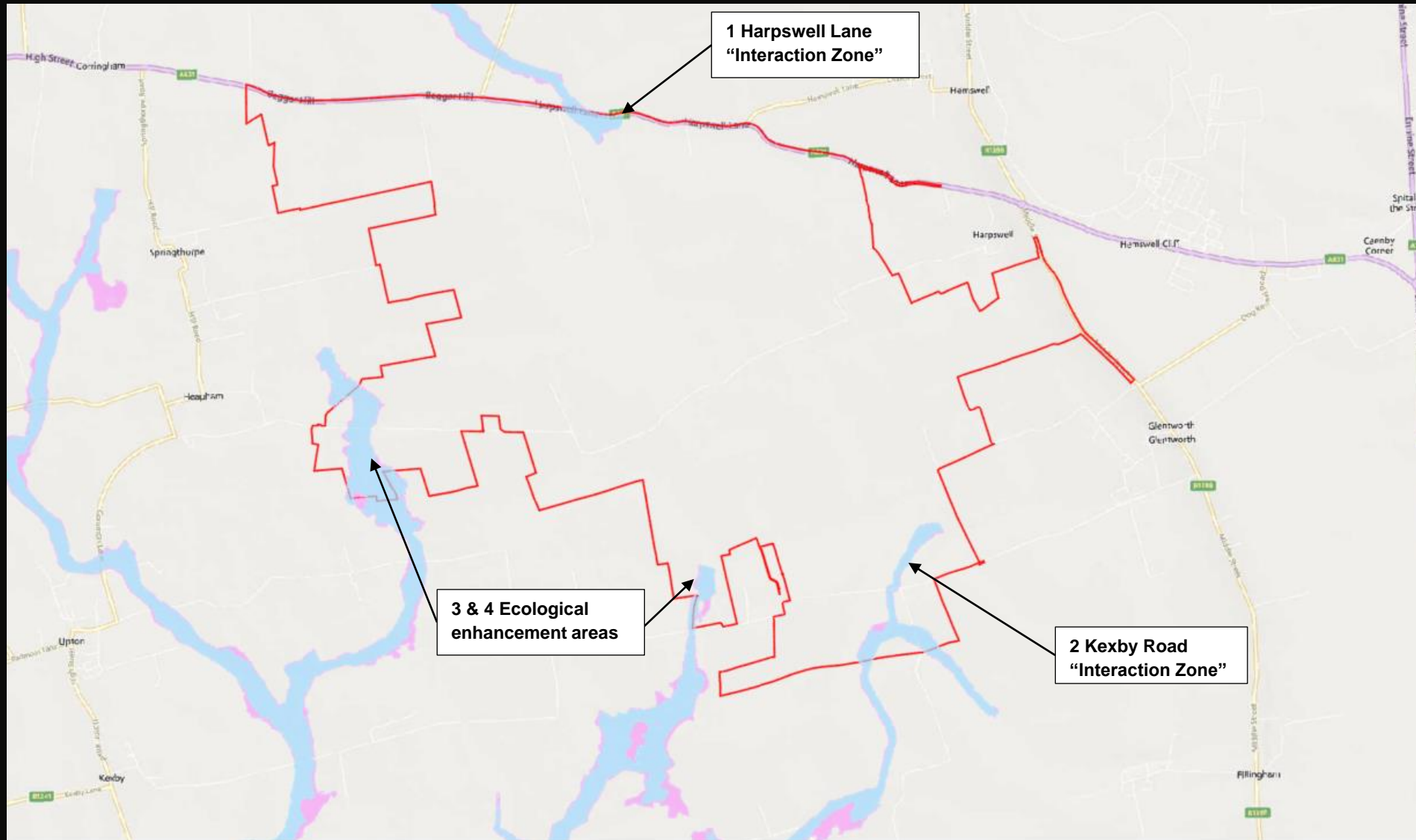


Principal Site Pluvial Flood Risk

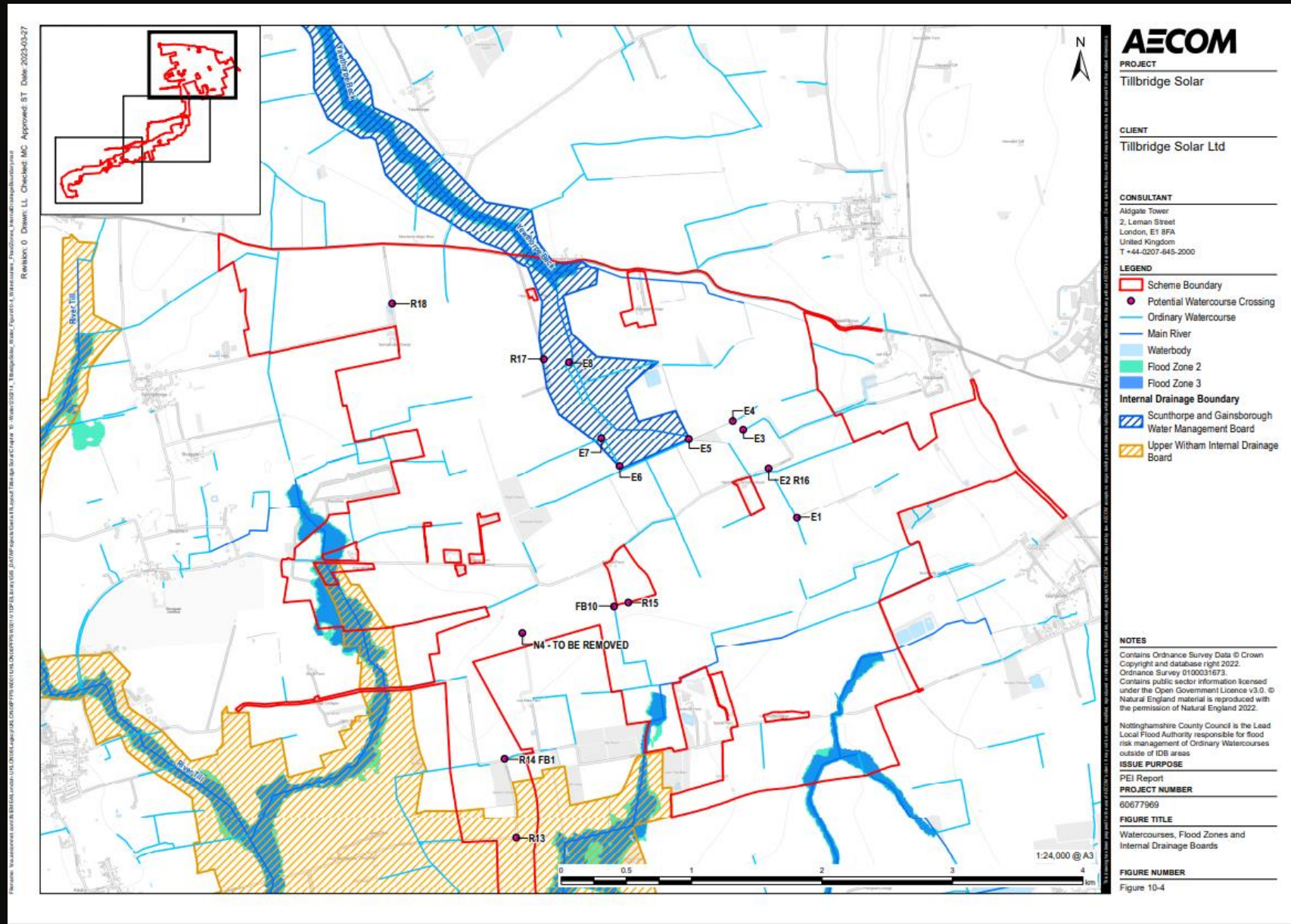
- Majority of Site at very low risk
- Some areas associated with watercourses at higher risk levels
- Surface water runoff to be managed through attenuating and restricting flows via SuDS features to mimic pre-Scheme conditions up to and including 1 in 100 year + 40% cc event
- Surface water flood risk will not increase as a result of the Scheme

Principal Site Fluvial Flood Risk

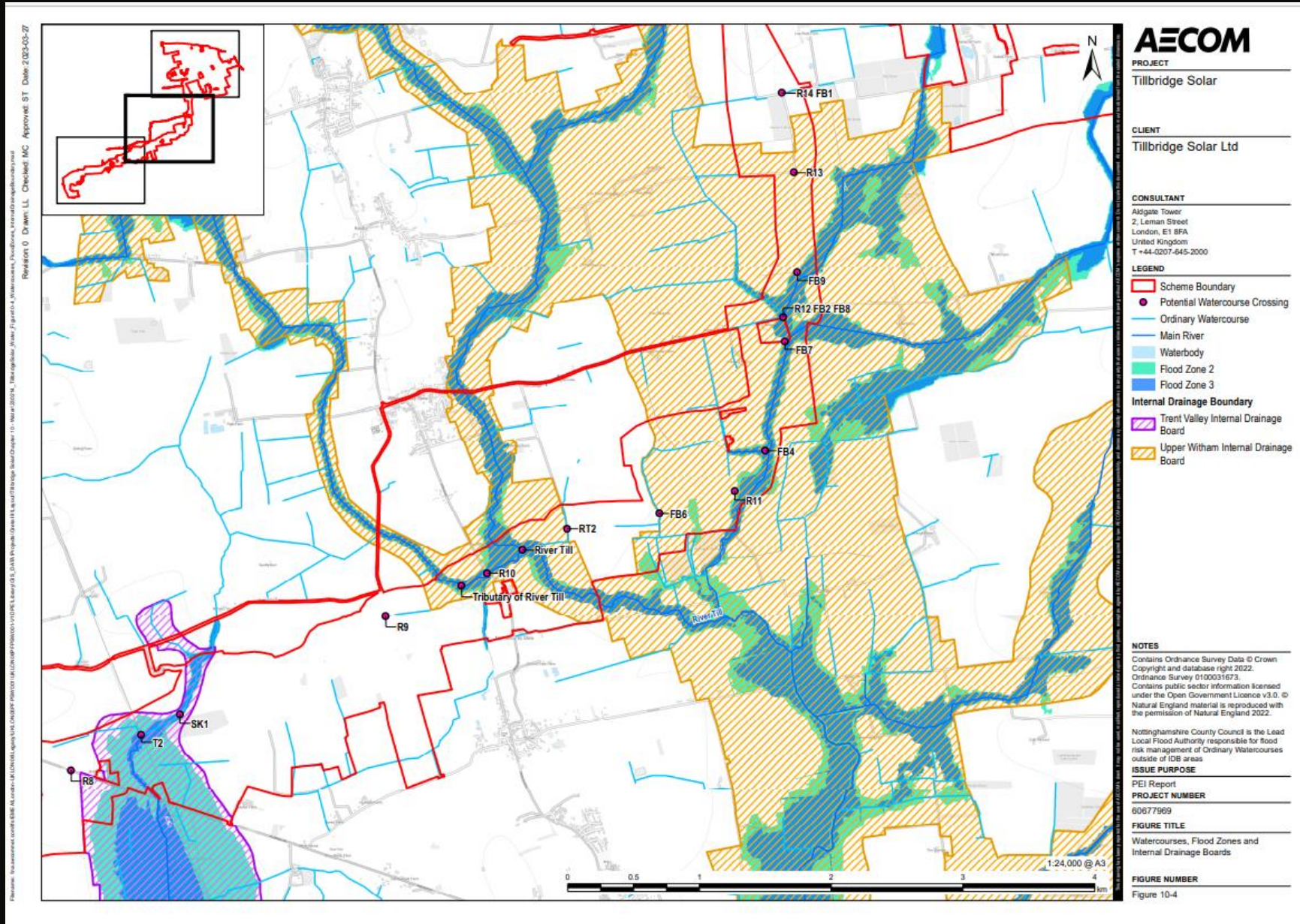
- Flood Zone 2 – Pink
- Flood Zone 3 – Blue
- 4 areas of fluvial risk within Principal Site Boundary (PV panels proposed in areas “1” and “2” only)
- No ground level raising proposed across Scheme



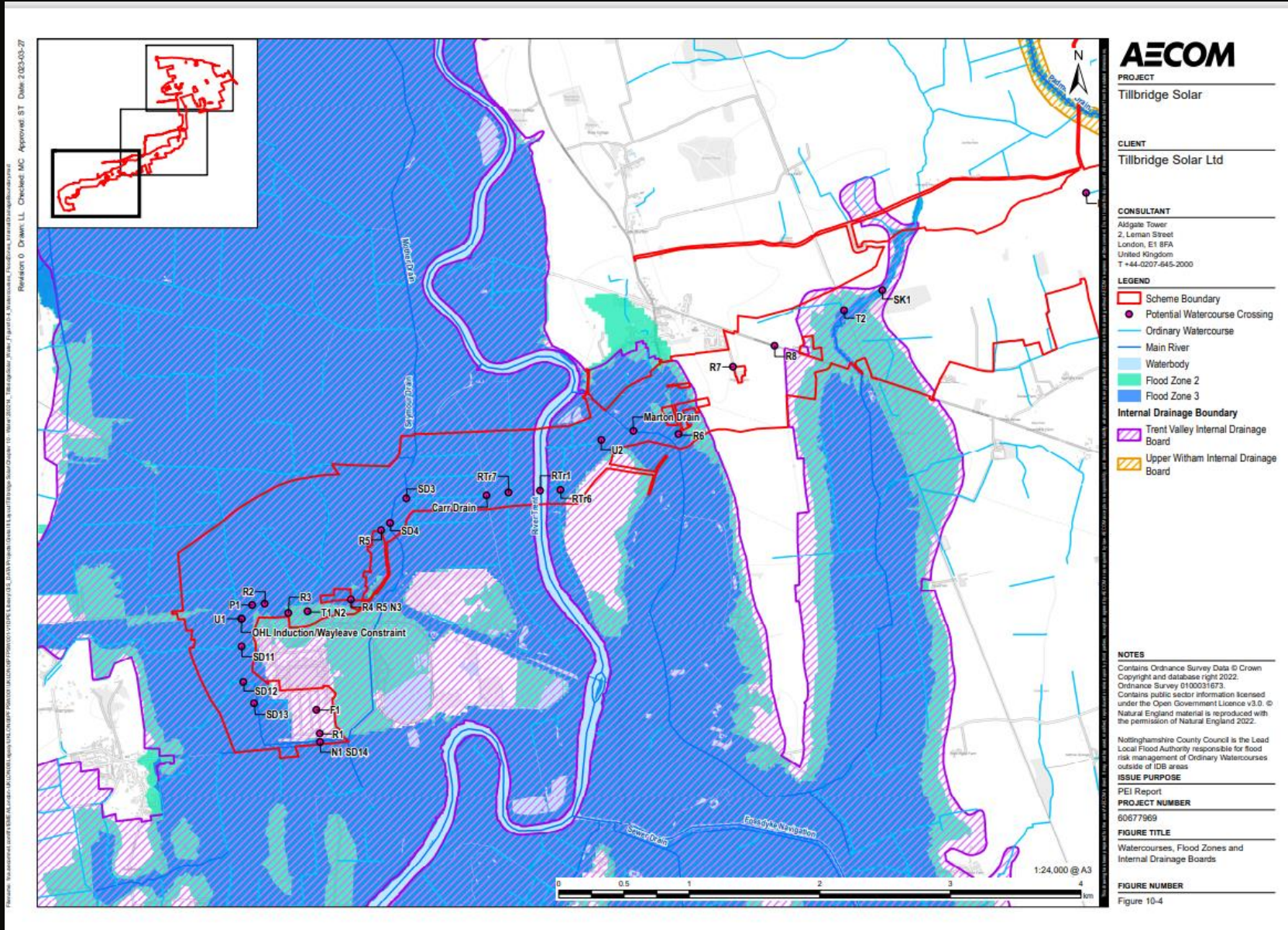
Principal Site Internal Drainage Boards Locations



Principal Site Internal Drainage Boards Locations



Principal Site Internal Drainage Boards Locations



TILLBRIDGE SOLAR FARM

– PEI Report Summary

Incl:

Flood Risk Assessment

Drainage Strategy

Sea Level Calculation discussion

WFDa and Watercourse crossing methodologies

BUILD.

OWN.

OPERATE.

MAINTAIN.

Potential Construction Impacts – with No mitigation measures:

- Pollution of surface water or groundwater (and any designated ecology sites that are water dependent) due to deposition or spillage of soils, sediments, oils, fuels, or other construction chemicals, or through uncontrolled site run-off including dewatering of excavations or piling;
- Temporary impacts on the hydromorphology of watercourses from open-cut watercourse crossings or temporary vehicle accesses as may be required;
- Temporary changes in flood risk from changes in surface water runoff (e.g. disruption of stream flows during any potential culvert construction works) and exacerbation of localised flooding, due to deposition of silt, sediment in drains, ditches; and
- Potential impacts on groundwater resources and local water supplies (licenced and unlicenced abstractions) and potentially the baseflow to watercourses from temporary dewatering of excavations or changes in hydrology.



Construction Stage Mitigation

- Detailed Construction Environmental Management Plan (CEMP) – manage risk of pollution to surface water and groundwater, plus management of activities in floodplain areas. Framework CEMP was provided within PEI Report and will be updated as part of DCO submission.
- Grid Connection Corridor: Crossings of WFD monitored reaches to be trenchless (HDD or similar). For smaller HDD crossings a minimum of 1.5m-2m below the bed. Dewatering of launch/receive pit may be required.
- Where open-cut required, water flow to be maintained by over-pumping, watercourses to be reinstated as found (with reference to pre-works morphological survey), water quality monitoring undertaken (pre, during and post) - this may comprise visual and onsite monitoring such as for sediments. Once construction is complete, initially use silt fences, geotextile matting or straw bales to capture mobilised sediment until settled.
- Minimum buffer of 10m around watercourses and ponds is proposed. The point of measurement to be agreed. Proposed that for small channel watercourses/agricultural drainage channels that are approximately less than 3 m in width (from bank top to bank top) this would be measured from the centre line of the watercourse as determined from standard Ordnance Survey mapping. For larger watercourses with channel widths typically greater than 3 m (such as the River Trent), this would be measured from the water's edge / channel extents under normal flow.

Construction Stage Mitigation

Access Tracks:

- Locations still to be determined for temporary and any permanent crossing locations.
- Will adhere to the appropriate 10 m buffer from watercourses and ponds as outlined above, except where crossings are required.
- Existing crossings will be used where feasible, and strengthening or improving existing culverted crossings may be undertaken.
- For the purposes of assessment new crossings are assumed to be culverted so that the worst-case scenario is being assessed.
- Consents required – Water Activity Permits, Abstraction Licenses, Flood Risk Activity Permit (FRAP) for crossings of Main Rivers. Land Drainage Consent to works to ordinary watercourses. Discussions on disapplication through the DCO process will be ongoing.

Potential Operational Impacts – with no Mitigation measures:

- Impacts on water quality in watercourses and groundwater from run-off and the potential for accidental spillages from new permanent hardstanding and maintenance activities, assuming surface water run-off does ultimately drain to a surface watercourse rather than simply to ground;
- Potential for impact on groundwater or surface water from firewater runoff in the event of a fire in the battery storage areas;
- Potential for permanent physical impacts to watercourses if crossings are required for access and depending on the design of the structure used;
- Potential impacts on the rate and volumes of surface water run-off entering local watercourses and increasing the risk of flooding; and
- The current arable fields are treated with fertiliser and pesticides. During the life of the project the use of such chemicals will be reduced which will lead to beneficial impacts on the water environment.
- A Framework Operational Environmental Management Plan will be included with the DCO application to mitigate potential risk.



Operation Stage Mitigation – BFSMP

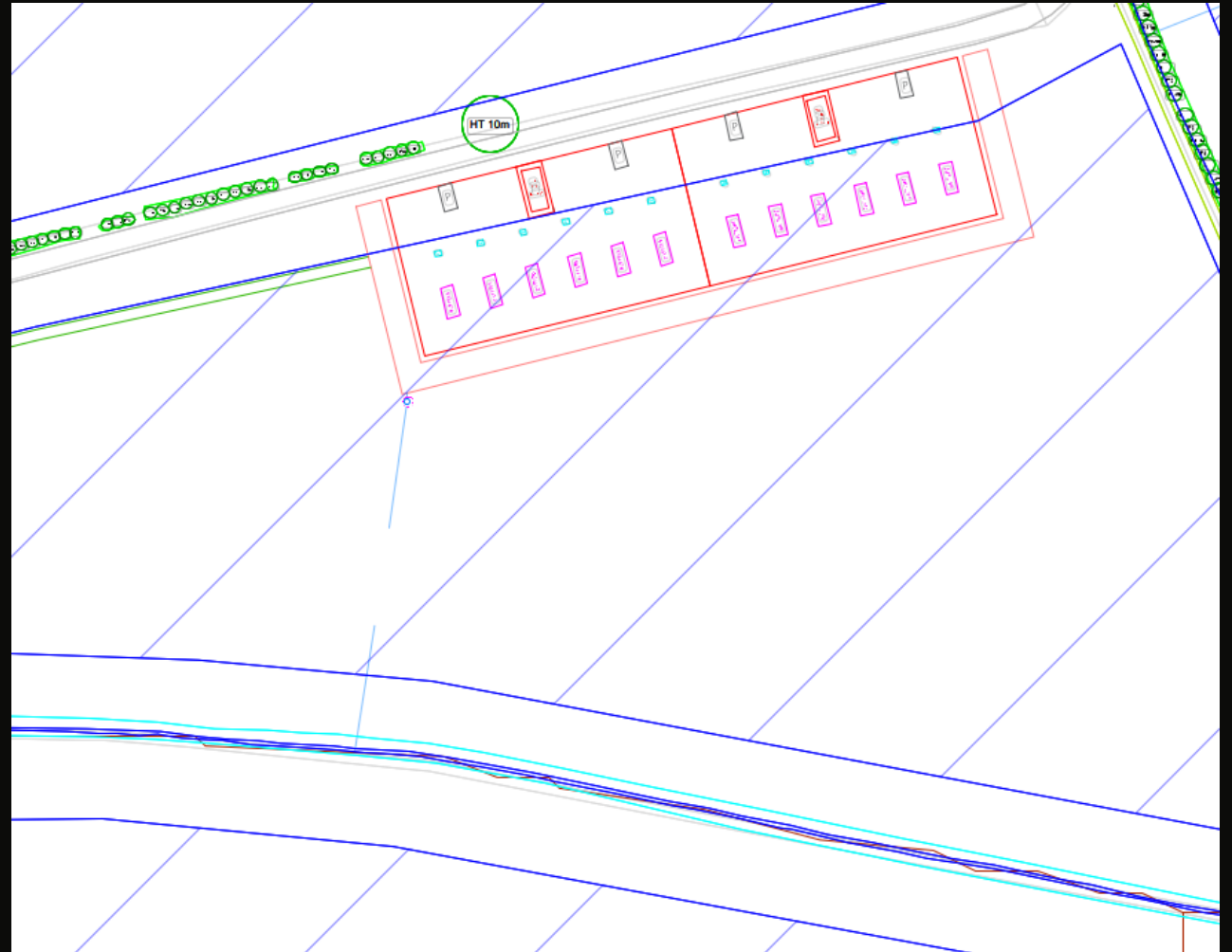
- Outline Battery Fire Safety Management Plan (OBFSMP) is under development to be submitted with DCO application. Consultation with Lincolnshire Fire and Rescue Services being undertaken.
- In the unlikely event of a malfunction to one of the battery arrays, there are a range of integrated controls that will activate depending on the extent and severity of the event. For example, the battery containers for the BESS will have built-in fire detection and chemical fire suppressant (internal sump collects this). In case the malfunction progresses to a catastrophic fire event and so long as there are no lives under threat, the fire brigade would ensure surrounding elements and structures (intact battery arrays nearby, other electrical equipment, trees etc.) are kept adequately wet and cool to prevent the fire from expanding any further but the battery infrastructure would be allowed to burn within the controlled area.
- The drainage design will allow for fire water runoff containment in order that it is prevented from draining to water until it has been appropriately tested. If contamination is present the water may need to be pumped out for disposal off-site at a suitable wastewater facility.
- It is anticipated that fire water supply will be stored on site.

Operation Stage Mitigation – Outline Drainage Strategy

- An outline drainage strategy will be submitted with the DCO Application – providing attenuation of surface water runoff from the operational Solar PV Site impermeable areas, whilst not increasing flood risk to the Site and surrounding areas.
- Drainage only considered in the principal site (Lincolnshire LLFA only)
- Solar PV panels are raised from the ground, allowing water to infiltrate below. They will therefore not contribute additional impermeable area
- New gravel access roads are permeable, will therefore not contribute additional impermeable area, in line with NPS EN-3
- BESS areas and substations are considered 100% impermeable with CV of 1.
- Drainage system for new impermeable areas to accommodate the 100 year plus 40% event.
- SuDS to control any increase in the rate of flow from impermeable areas towards receiving watercourses, and to provide treatment for any contaminants collected on areas of hardstanding or containerised equipment (such as BESS areas)
- Exceedance flows from drainage systems managed by perimeter swales on edges of certain fields
- Foul water: Proposed as private cess pit at compound areas – no formal public connection proposed

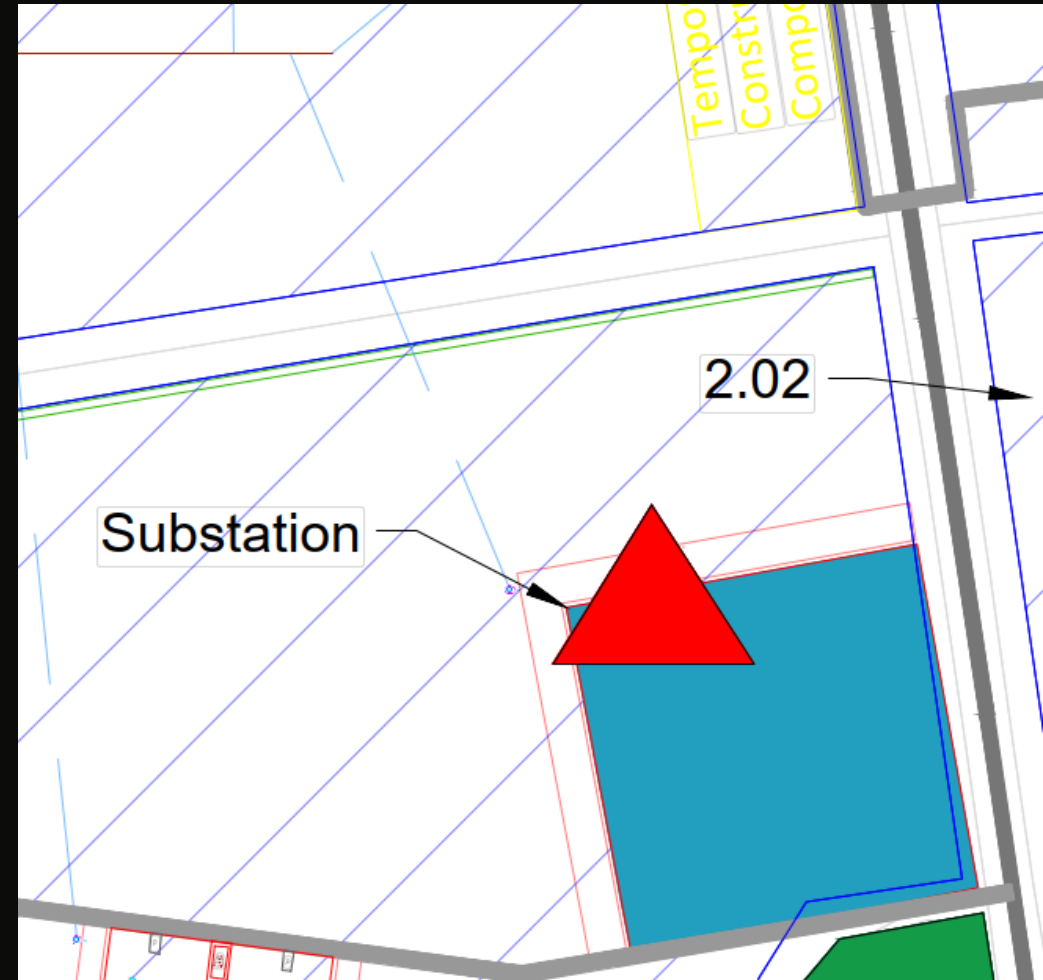
Outline Drainage Strategy – BESS Areas

- Swale around edge of BESS to accept surface water runoff (panels may be installed above swale)
- Discharge to nearest watercourse restricted to QBAR for all events
- Swale will also store fire water runoff in the event of a fire
- Swale will need to contain the 1 in 1 year event plus the fire water storage runoff or the 1 in 100 year + 40% event, whichever is greater
- Impermeable liner and penstock valve to prevent fire water runoff entering ground/watercourse.

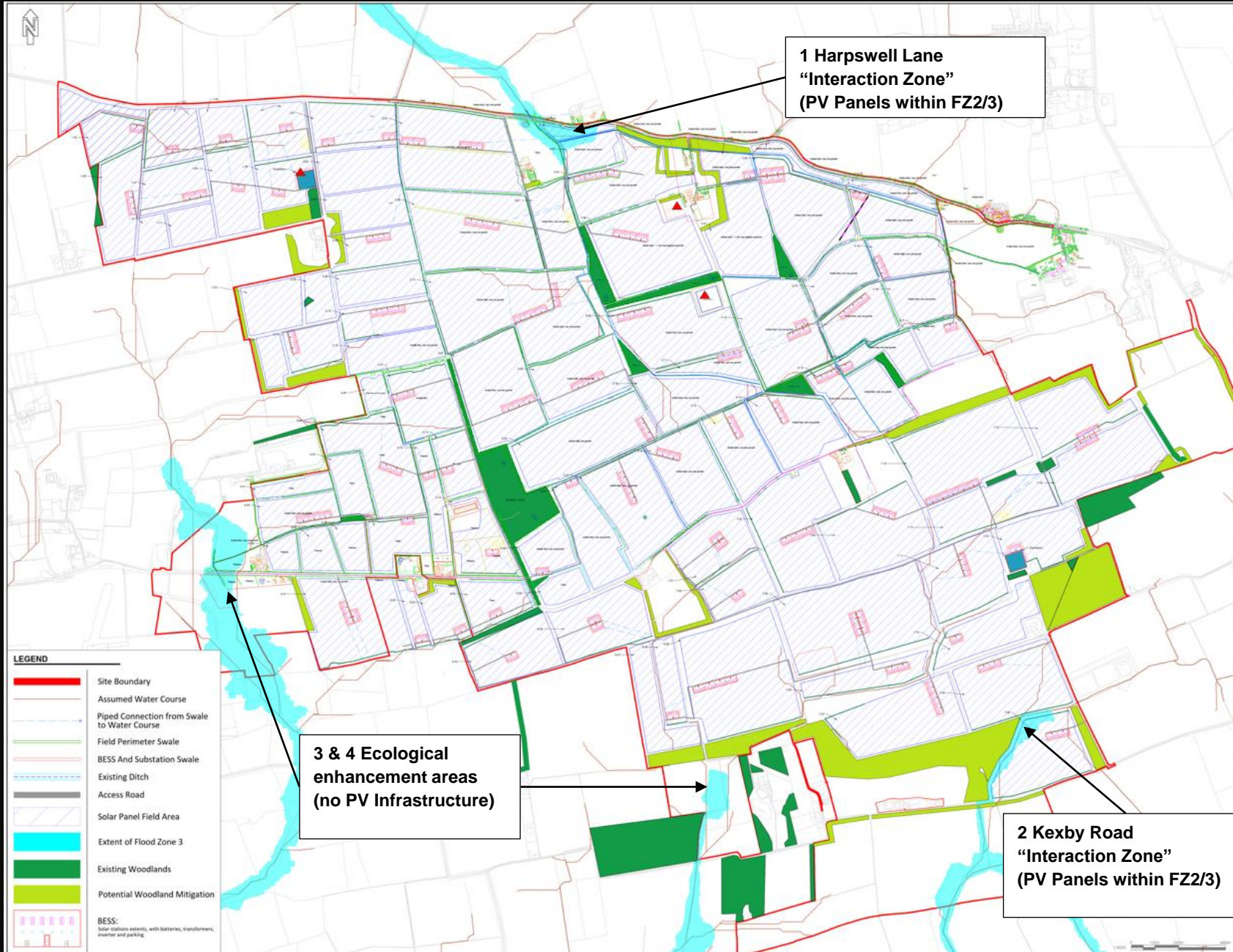


Outline Drainage Strategy – Substation Areas

- Swale around edge of substation to accept surface water runoff
- Discharge to nearest watercourse restricted to QBAR for all events up to the 1 in 100 + 40%



Fluvial Flood Risk



- PV Panels installed with gaps in between - rainwater drains and is intercepted straight to ground
- PV Panels not considered to contribute to loss of floodplain (pile driven legs <100mm dia)
- All increases in impermeable areas from BESS/substation infrastructure are located within FZ 1
- Increased runoff from FZ 1 areas to be attenuated via onsite swales and restricted to greenfield rates discharging to watercourses onsite (no change to offsite fluvial risk as a result of the Scheme)
- Fluvial risk to PV Panels in FZ 2/3 extents ("Interaction Zones") assessed in Fluvial Flood Level Analysis Technical Note (FRA Annex B)

FRA ANNEX B - Fluvial Flood Level Technical Note

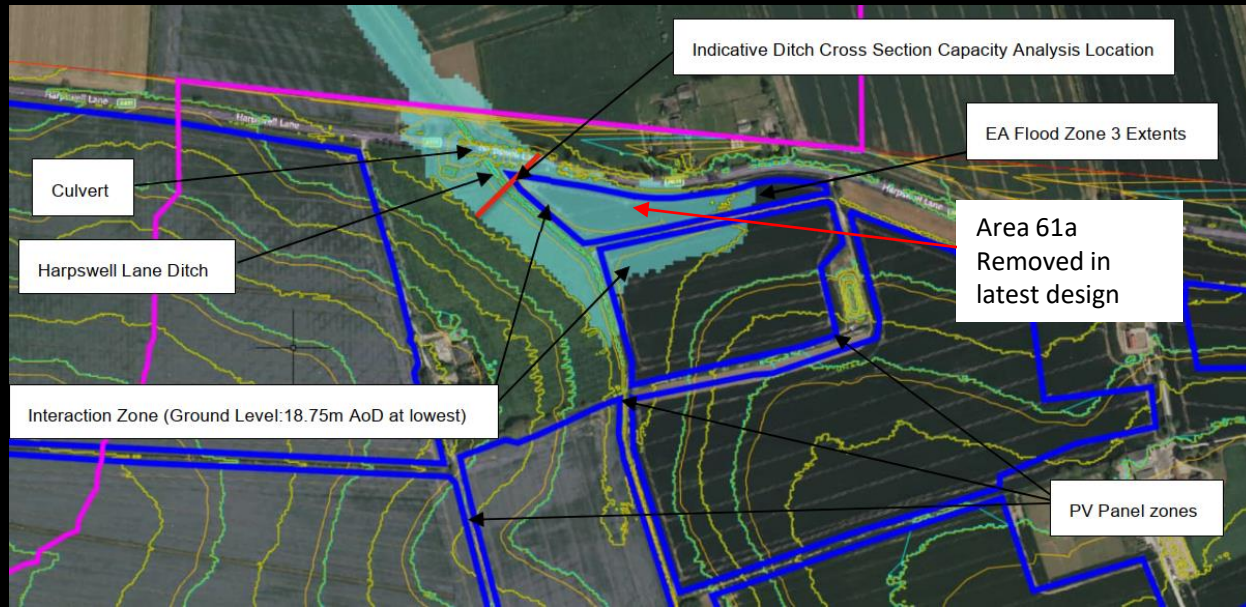


Figure 5 - Downstream google street view of ditch from Harpswell Lane (October 2009)

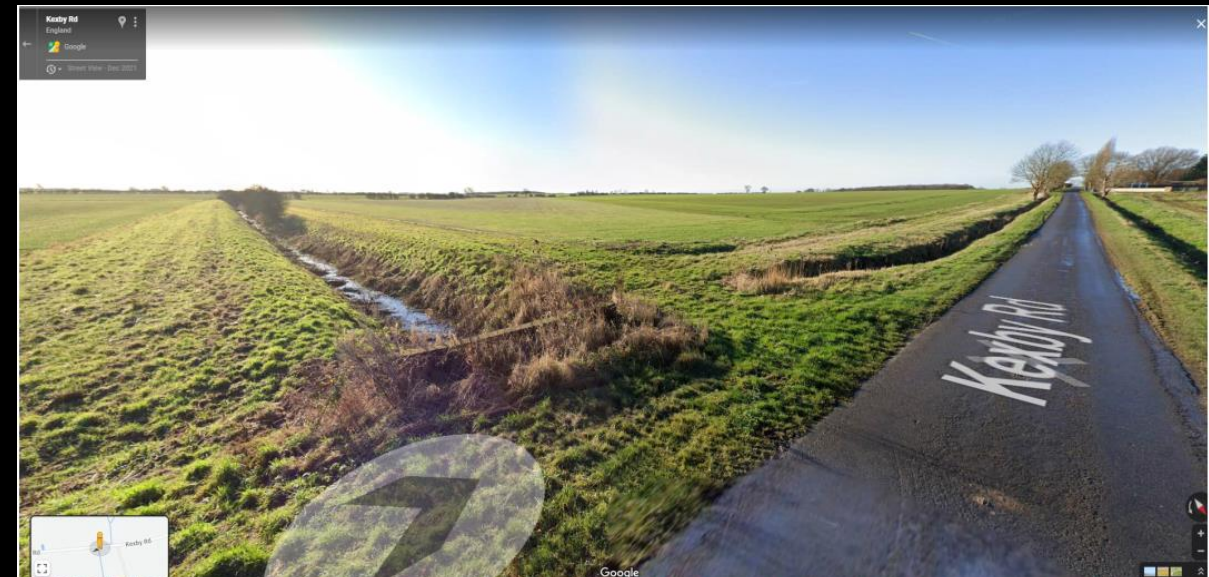
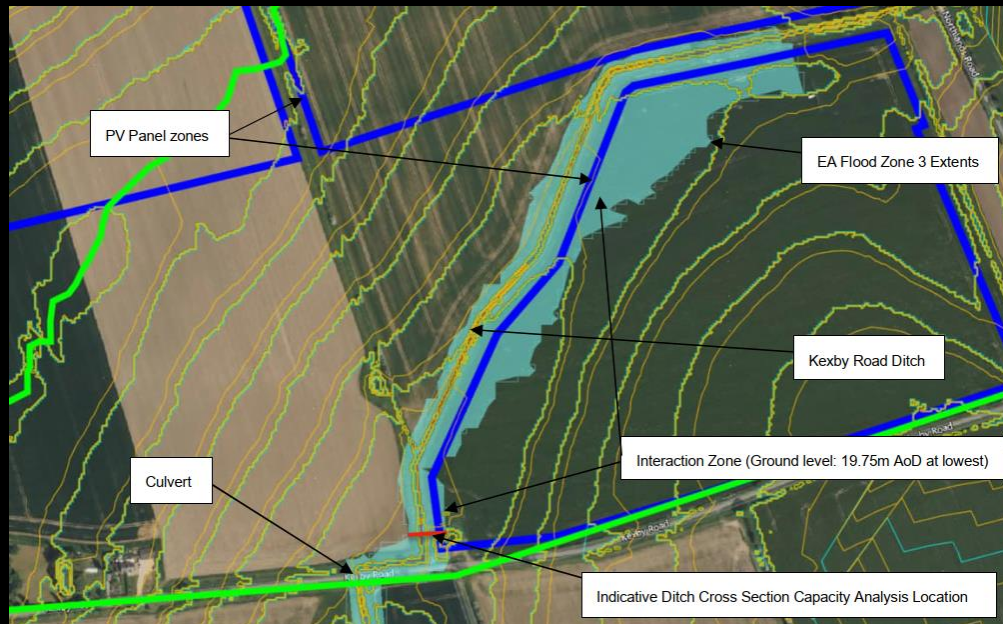
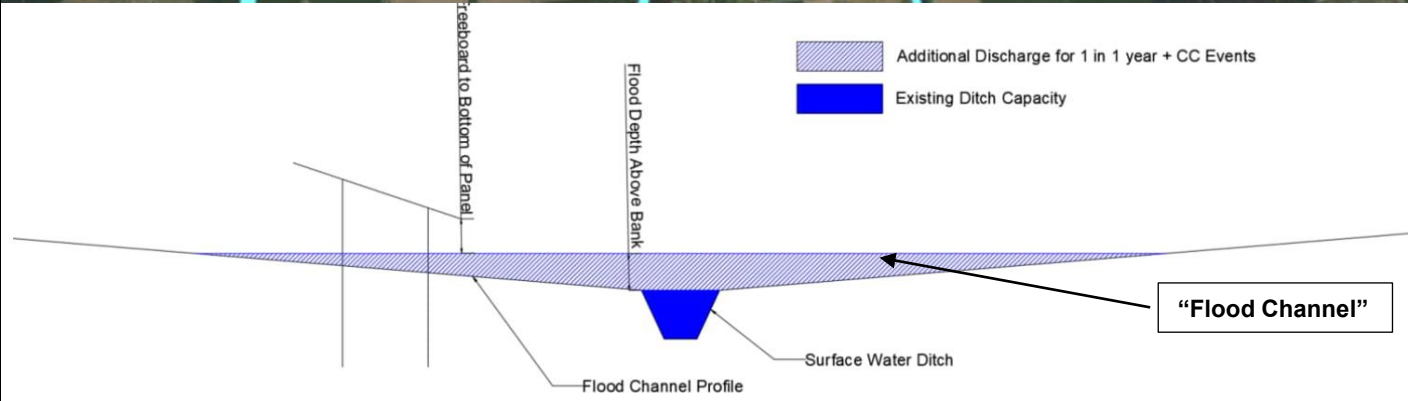


Figure 6 - Downstream google street view of ditch from Kexby Road (December 2021)

Fluvial Flood Level Technical Note Methodology



- Open channel flow calculations provided the capacity of each ditch (assumption that downstream culverts are no smaller than ditch channels)
- The difference between the Greenfield Discharge Rate + CC for each catchment and the open channel ditch capacity provides the additional discharge above bank level and subsequently the depth of "flood channel" for the 1 in 100 year + cc events.

Fluvial Flood Level Technical Note Methodology

- No fluvial hydraulic model data exists for the Ordinary Watercourses, 2004 depth data has been acquired but required further analysis by GIS resource
- LiDAR Data downloaded to form a 3D surface and establish watersheds for Harpswell Lane Ditch Catchment and Kexby Road Ditch Catchment
 - To be updated followed recent topographical survey (August 23)
- The 3D surface provided level data to estimate long and cross sectional profiles for each ditch in downstream corner of “interaction zones”
- Levels surrounding each of the “Interaction Zones” shown to be relatively flat. The average widths and gradients of adjacent fields taken from 3D surface to provide cross sectional profile of “flood channels” above bank into surrounding fields.
- Greenfield Runoff Rates established for both ditches using the catchment areas (IH124 Method)

Table 1 - Greenfield Runoff Rates

Ditch	Catchment Area (km ²)	QBar (Cumeecs)	1 in 1 year (Cumeecs)	1 in 30 year (Cumeecs)	1 in 100 year (Cumeecs)	1 in 100 year + 50% (Cumeecs) Higher Allowance (Design)	1 in 100 year + 100% (Cumeecs) Upper Allowance (Sensitivity)
Harpswell Lane	8.05	2.4	2.0	4.7	6.1	9.2	12.2
Kexby Road	3.98	1.3	1.1	3.2	4.6	6.9	9.2

Climate Change

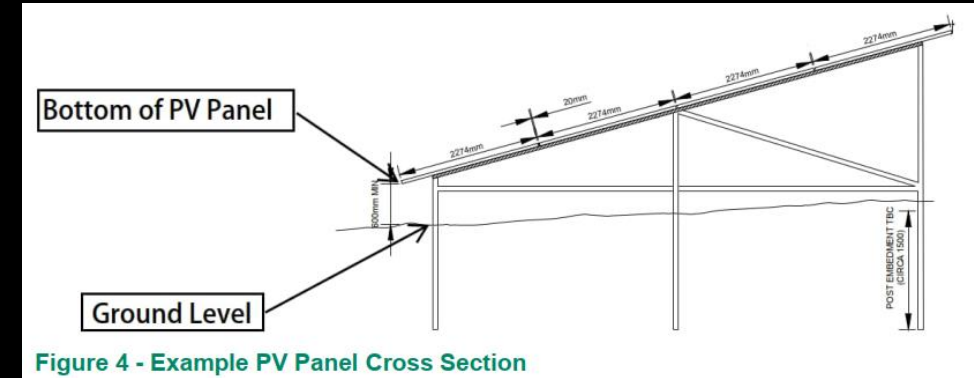
- The site is located over the Lower Trent and Erewash Management Catchment, and the Witham Management Catchment. Following a review of both catchments, the Lower Trent and Erewash Management Catchment is the higher of the two Environment Agency Climate change allowances for peak river flow in England and has been used in the analysis. For the 2080’s Epoch; the “Higher” (design) allowance requires 39% and the “Upper” (sensitivity) allowance requires 62% to be applied.
- The design discharge rates for each ditch are taken as the greenfield 1 in 100 year rate increased by 50% (1.5 x 1 in 100 year), and the sensitivity discharge rates are taken as the greenfield 1 in 100 year rate increased by 100% (2 x 1 in 100 year). Both design (Higher Allowance) and sensitivity (Upper Allowance) climate change allowances for each ditch analysed to ensure robust approach including the credible maximum scenario

Fluvial Flood Level Technical Note Findings

- The 3D surface provided a lowest ground level of each interaction zone and therefore a lowest level of standard (non-raised) PV Panels

Table 3 - Lowest Ground and Bottom of PV Panel Levels

Ditch	Lowest Ground Level (m AoD)	Lowest Bottom of Standard PV Panel Level (m AoD)
Harpswell Lane	18.75	19.35
Kexby Road	19.75	20.35



- Using Higher allowance the predicted design flood levels found PV Panels within the Harpswell Lane “Interaction Zone” require raising by 120mm to ensure 300mm of freeboard is maintained. Standard height PV Panels within the Kexby Road “Interaction Zone” would maintain 400mm of freeboard and therefore do not require raising.

Table 4 – Predicted flood levels (1 in 100 year + CC Higher Allowance)

Ditch	Additional Discharge (Cu)	Flood Depth Above Bank (m)	Freeboard to Bottom of Standard PV Panel (mm)	Required Raising of PV Panels (mm)	Freeboard to Bottom of Raised PV Panel (mm)
Harpswell Lane	10.0	0.42 (19.17 mAoD)	180	120	300
Kexby Road	5.6	0.20 (19.95 m AoD)	400	0	Raising not required

- A sensitivity check using the Upper Allowance found the raised PV Panels within the Harpswell Lane “Interaction Zone” would maintain 240 mm of freeboard and the standard height PV Panels within the Kexby Road “Interaction Zone” would maintain 240mm of freeboard.

Table 5 – Predicted flood levels (1 in 100 year + CC Upper Allowance)

Ditch	Additional Discharge (Cu)	Flood Depth Above Bank (m)	Freeboard to Bottom of PV Standard Panel (mm)	Freeboard to Bottom of Raised PV Panel (mm)
Harpswell Lane	13.6	0.48 (19.23 m AoD)	120	240
Kexby Road	7.9	0.36 (20.11 m AoD)	240	Raising not required

Sea Level Rise Calculation

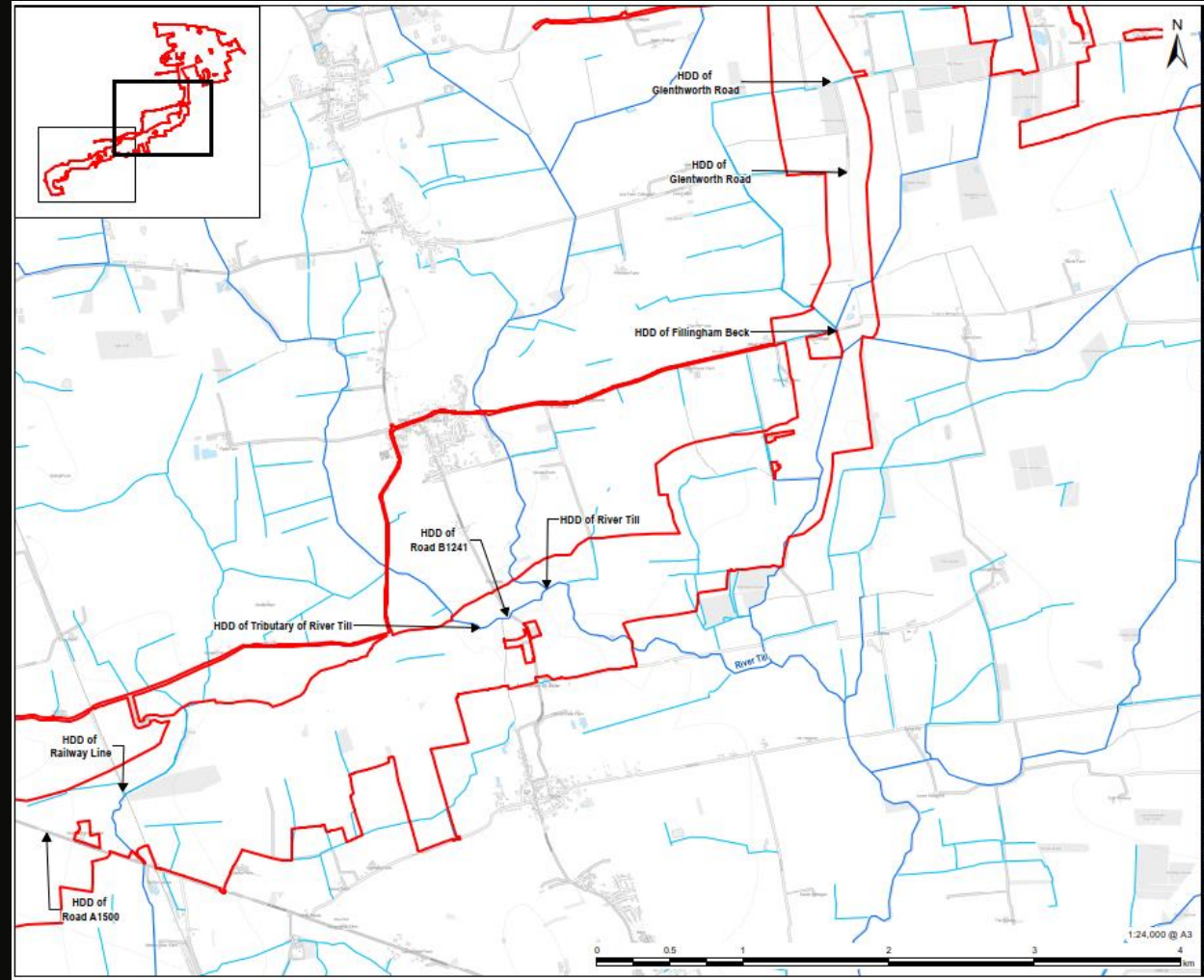
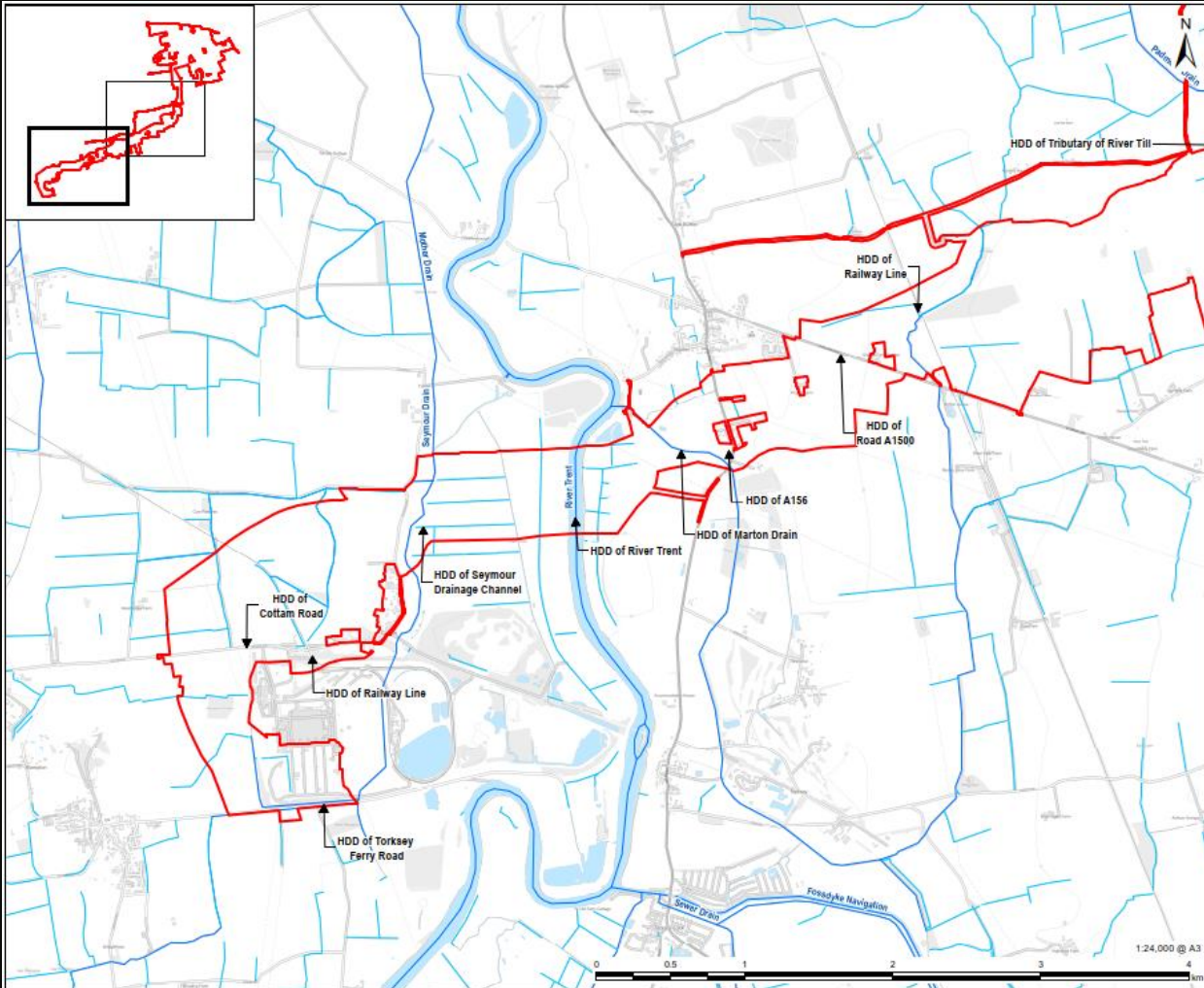
Sea Level Rise Assessment Parameters								
Location	Design Life (yrs)	Estimated Year of First Operation	Baseline Sea Level (mAOD) (1 in 100 year 97.5% Percentile - C2_T100 - Design Worst Case)	Lowest Site Level - Tillbridge Solar (mAOD)				
Tillbridge Solar (Chainage 3888, FID 29 Coastal Node)	40	2028	5.19	13.13				
Sea Level Rise Levels (Table 2)								
End Life (Predicted Worst Case)	River basin District	Higher Central 2000-2035 Total (mm)	Upper 2000-2035 Total (mm)	Higher Central 2036-2065 Total (mm)	Upper 2036-2065 Total (mm)	Higher Central 2066-2095 mm/yr	Upper 2066-2095 mm/yr	Years from 2066 to end life
2068	Humber	193	235	252	330	11.1	15.3	2
Assessment								
	Sea Level Rise (mm)	Level Adjusted to site (mAOD)	Comment					
TOTAL Rise (mm) Upper	595.6	5.79	Design Level based on Essential Infrastructure					
H++ Scenario (mm)	1900	7.09	Sensitivity Level					
	Design Site Level Check Against Sea Level Rise		Scheme Passes Design Assessment against lowest Scheme ground level					
	H++ Sensitivity Test		Scheme Passes Sensitivity Assessment					

- Assessment based on published calculation steps as set out on Gov.uk website
- It has been estimated, using the Environment Agency's online sea level rise data for the Humber River basin management area, sea level could rise by up to approximately 596mm by the year 2068 (with a 40 year design life plus one year for a cautionary approach); assessed by accumulating the mm/yr increase in sea level depth in each epoch up to the year 2068.
- Calculation takes into account 1.9m H++ Scenario with no risk of sea level rise occurring during this event on the PV area site.
- The River Trent tidal flood risk mapping in the WLDC SFRA indicates tidal flood risk limited to the western extent of the Cable Route Corridor, with no impact on the Principal Site.
- Tidal defences are in place along the River Trent; however, the calculations have been undertaken assuming these are not in place.

Water Framework Directive

- WFD screening assessment took place and it was recommended that an WFD scoping assessment was to be performed to determine the level of risk posed by the Scheme to specific WFD biological, hydromorphological and chemical receptors.
- Study area WFD water bodies:
 - Eau from Source to Northorpe Beck - GB104028057970
 - Marton Drain Catchment (trib of Trent) - GB104028057840
 - Seymour Drain Catchment (trib of Trent) - GB104028058340
 - Trent from Carlton-on-Trent to Laughton Drain - GB104028058480
 - Fillingham Beck - GB105030062490
 - River Till - GB105030062411
 - Skellingthorpe Main Drain - GB105030062390
 - Tributary of Till - GB105030062480
- An initial precautionary WFD screening assessment concluded that the Scheme has the potential – without mitigation - to impact on the WFD status or objectives of those surface water and groundwater bodies in the study area.
- It is recommended that all WFD monitored reaches of watercourses are non-intrusively crossed (HDD).
- Consultation Response from Trent Valley IDB it was requested that non intrusive crossings would be used for their watercourses – with a depth of greater than 2m below bed of watercourse.

Potential Horizontal Directional Drilling Crossings



NEXT STEPS / DISCUSSION / QUESTIONS

- Agreement on location of measurement of the buffer
- Agreement on the crossing of WFD monitored reaches by HDD or similar
- Location of the Trent Valley IDB channels which required HDD
- Agreement of Sea Level Assessment for FRA – no further work required
- Agreement to Drainage Strategy approach
- Agreement to Flood Risk Tech Note assessment approach – agree fluvial modelling not required for FRA

BUILD.

OWN.

OPERATE.

MAINTAIN.