



Tillbridge Solar

PEI Report Volume I Chapter 16: Other Environmental Topics
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16. Other Environmental Topics

16.1 Introduction

16.1.1 The purpose of this PEI Report chapter is to collate the assessment of other environmental topics that do not warrant individual chapters, due to the small impact associated with the Scheme.

16.1.2 This chapter describes and assesses the potential effects of the Scheme on:

- Glint and Glare (Section 16.3);
- Ground Conditions (Section 16.4);
- Major Accidents and Disasters (Section 16.5);
- Telecommunications, Television Reception and Utilities (Section 16.6); and
- Waste (Section 16.7).

16.1.3 Where relevant, the legislation and guidance, baseline conditions, assessment methodology and mitigation measures are outlined in the following sections for each topic.

16.1.4 This chapter is supported by the following reports:

- Glint and Glare Assessment (**PEI Report Volume II Appendix 16-1**);
- Ground Conditions Preliminary Risk Assessment (PRA) for Principal Site (**PEI Report Volume II Appendix 16-2**); and
- Ground Conditions PRA for the Cable Route Corridor (**PEI Report Volume II Appendix 16-3**).

16.2 Development Parameters Assessed

16.2.1 **PEI Report Volume I Chapter 3: Scheme Description** describes the development parameters for the Scheme, against which the effects covered in this chapter have been assessed. The assessment has been based on likely worst-case parameters, in accordance with the Rochdale Envelope approach. The actual impacts of the Scheme may therefore be less than anticipated, if the Scheme is built to a lesser scale.

16.3 Glint and Glare

Introduction

16.3.1 This section summarises the potential effects of the Scheme on glint and glare for surrounding road users, railway operations, dwellings, PRow, bridleways and aviation activity.

16.3.2 The definition of glint and glare can vary; however, the definition used within this assessment is taken from the Federal Aviation Authority and is widely accepted (Ref. 16-1). The definitions are as follows:

- ‘Glint’ refers to a momentary flash of bright light typically received by moving receptors or from moving reflectors; and
- ‘Glare’ refers to a continuous source of bright light typically received by static receptors or from large reflective surfaces.

16.3.3 The full Glint and Glare Assessment undertaken for the Scheme is available in **PEI Report Volume II Appendix 16-1**.

Consultation

16.3.4 A request for an EIA Scoping Opinion was sought from the Secretary of State as part of the EIA Scoping Process. Consultation responses in relation to Glint and Glare are presented in **PEI Report Volume II Appendix 1-2**.

Legislation and Policy

National Legislation

16.3.5 There is no legislation relating specifically to the assessment of glint and glare from solar farm developments.

National Policy

Overarching National Policy Statement for Energy (EN-1)

16.3.6 Section 5.6 of EN-1 (Ref. 16-2) provides the following commentary in relation to the assessment of “emissions ofand artificial light to have a detrimental impact on amenity, as part of the Environmental Statement.

In particular, the assessment provided by the applicant should describe:

- *the type, quantity and timing of emissions;*
- *aspects of the development which may give rise to emissions;*
- *premises or locations that may be affected by the emissions;*
- *effects of the emission on identified premises or locations; and*
- *measures to be employed in preventing or mitigating the emissions.”*

Draft Overarching National Policy Statement for Energy

16.3.7 Section 5.7 of the Draft EN-1 (Ref. 16-3) provides similar commentary in relation to the assessment of “emissions ofand artificial light to have a detrimental impact on amenity, as part of the ES.

In particular, the assessment provided by the applicant should describe:

- *the type, quantity and timing of emissions;*
- *aspects of the development which may give rise to emissions;*
- *premises or locations that may be affected by the emissions;*
- *effects of the emission on identified premises or locations; and*

- *measures to be employed in preventing or mitigating the emissions.”*

National Policy Statement for Renewable Energy Infrastructure (EN-3)

- 16.3.8 Section 2.4 of EN-3 (Ref. 16-4) provides policy on Criteria for “good design” for energy infrastructure. Paragraph 2.4.1 of this section refers back to the criteria for good design in NPS EN-1. Paragraph 2.4.2 of EN-3 goes on to state that: *“Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity”*.

Draft National Policy Statement for Renewable Energy Infrastructure

- 16.3.9 Section 3.10.149 and 3.10.150 of the Draft EN-3 (Ref. 16-5) provides the following commentary in relation to the Secretary of State’s decision making:

“Solar PV panels are designed to absorb, not reflect, irradiation. However, the Secretary of State should assess the potential impact of glint and glare on nearby homes, motorists, public rights of way, and aviation infrastructure (including aircraft departure and arrival flight paths).”

“Whilst there is some evidence that glint and glare from solar farms can be experienced by pilots and air traffic controllers in certain conditions, there is no evidence that glint and glare from solar farms results in significant impairment on aircraft safety. Therefore, unless a significant impairment can be demonstrated, the Secretary of State is unlikely to give any more than limited weight to claims of aviation interference because of glint and glare from solar farms.”

National Guidance

National Planning Policy Guidance (NPPG) on Renewable and Low Carbon Energy

- 16.3.10 This NPPG (Ref. 16-6) sets out planning considerations that relate to large scale ground-mounted solar PV farms. It determines that the deployment of large-scale solar farms can have a negative impact on the rural environment, particularly in undulating landscapes. However, it is recognised that the visual impact of a well-planned and well-screened solar farm can be properly addressed within the landscape if planned sensitively. Considerations to be taken into account by local planning authorities are:

- *“The proposal’s visual impact, the effect on landscape of glint and glare and on neighbouring uses and aircraft safety;*
- *The extent to which there may be additional impacts if solar arrays follow the daily movement of the sun.”*

Planning Guidance for the Development of Large-Scale Ground Mounted Solar PV Systems

- 16.3.11 The Planning Guidance for the Development of Large-Scale Ground Mounted Solar PV Systems (Ref. 16-7) outlines how glint and glare are produced by solar PV panels, the potential receptors that could be impacted by glint and glare from ground mounted solar PV systems and when assessments of glint and glare should be carried out.

Local Planning Policy

16.3.12 There is no local planning policy which specifically discusses glint and glare.

Other Policy and Guidance

Interim Civil Aviation Authority (CAA) Guidance – Solar Photovoltaic Systems

16.3.13 The interim guidance (Ref. 16-8) identifies the key safety issues with regards to aviation, including “*glare, dazzling pilots leading them to confuse reflections with aeronautical lights.*” It is outlined that solar farm developers should be aware of the requirements to comply with the Air Navigation Order (ANO), published in 2016 (Ref. 16-9) and amended in 2022 (Ref. 16-10). In particular, developers should be cognisant of the following articles of the ANO, including:

- Article 240 – Endangering safety of an aircraft – “*A person must not recklessly or negligently act in a manner likely to endanger an aircraft, or any person in an aircraft.*”
- Article 224 - Lights liable to endanger – “*A person must not exhibit in the United Kingdom any light which:*
 - *a) by reason of its glare is liable to endanger aircraft taking off or from landing at an aerodrome; or*
 - *b) by reason of its liability to be mistaken for an aeronautical ground light liable to endanger aircraft*”
- Article 225 – Lights which dazzle or distract – “*A person must not in the United Kingdom direct or shine any light at any aircraft in flight so as to dazzle or distract the pilot of the aircraft.*”

Technical Guidance for Evaluating Selected Solar Technologies on Airports

16.3.14 This technical guidance (Ref. 16-11) provided by the United States of America’s Federal Aviation Authority (FAA) incorporates a chapter on the impact and assessment of glint from solar panels. It concludes that (although subject to revision):

“...evidence suggests that either significant glare is not occurring during times of operation or if glare is occurring, it is not a negative effect and is a minor part of the landscape to which pilots and tower personnel are exposed.”

16.3.15 Further detail on guidance provided by the CAA, FAA and others is described in **PEI Report Volume II Appendix 16-1**.

Assessment Methodology

16.3.16 The glint and glare assessment methodology for the Scheme has been defined with reference to consultation from stakeholders and review of available guidance and studies. This is detailed further in **PEI Report Volume II Appendix 16-1**. The approach is to determine whether a reflection from the proposed solar development is geometrically possible and then to compare the results against the relevant guidance and studies to determine whether the reflection is significant.

16.3.17 In summary, the assessment methodology adopted for the Scheme includes the following:

- Considering the visibility of the panels from the receptor's location. If the panels are not visible from the receptor, then no reflection can occur.
- Identifying receptors in the study area surrounding the Scheme. Receptors are identified with the following groups:
 - Ground-based receptors, including residential, road and railway, within 1km of the Scheme Boundary; and
 - Aviation receptors within 30km, with detailed assessment for large international aerodromes within 20km, military aerodromes within 10km and 5km for small aerodromes;
- Considering direct solar reflections from the Scheme towards the identified receptors by undertaking geometric calculations.
- Based on the results of the geometric calculations, determining whether a reflection can occur, and if so, at what time it will occur.
- Considering both the solar reflection from the Scheme and the location of the direct sunlight with respect to the receptor's position.
- Considering the solar reflection with respect to published studies and guidance – including intensity calculations where appropriate.
- Determining whether a significant adverse effect is expected in line with the significance criteria.

16.3.18 The Scheme and relevant receptor locations are defined within the assessment model. From this information, a chart is produced that states whether a reflection can occur, the duration, and the part of the Scheme that can produce the solar reflection towards the relevant receptor.

16.3.19 There is no specific guidance set out to identify the magnitude of impact from solar reflections, however, the following criteria has been set out for the purposes of this report:

- **High** – Solar reflections impacts of over 30 hours per year or over 30 minutes per day;
- **Medium** – Solar reflections impacts above 20 hours but below 30 hours per year or above 20 minutes but below 30 minutes per day;
- **Low** – Solar reflections impacts up to and including 20 hours per year or up to 20 minutes per day; and
- **None** – Effects not geometrically possible or no visibility of reflective surfaces likely due to high levels of intervening screening

16.3.20 The assessment of glint and glare has focussed on operational phase effects because it presents a worst-case scenario. By the nature of the other phases, there will be the same or fewer panels during construction and decommissioning. As described in **PEI Report Volume I Chapter 3: Scheme Description**.

16.3.21 Further detail on assessment methodology and assessment limitations is provided in **PEI Report Volume II Appendix 16-1**.

Baseline Conditions

Ground Based Receptor Reflection Zones

16.3.22 Based on the relatively flat topography in the area, solar reflections between five degrees below the horizontal plane to five degrees above it are described as near horizontal. Reflections from the Scheme's solar PV panels within this arc have the potential to be seen by receptors at or near ground level.

16.3.23 Further analysis was conducted, and it was shown that reflections will only occur between the azimuth of 251.24 degrees and 290.92 degrees in the western direction (late day reflections) and 72.61 degrees and 111.57 degrees in the eastern direction (morning reflections) and therefore any ground-based receptor outside these arcs will not have any impact from solar reflections.

16.3.24 Further detail on Ground Based Receptor Reflection Zones is provided in **PEI Report Volume II Appendix 16-1**.

Residential Receptors

16.3.25 Residential receptors located within 1km of the Principal Site have been considered in the assessment.

16.3.26 Glint is assumed to be possible if the receptor is located within the ground-based receptor zones. 87 residential receptors were identified within 1km of the Principal Site, which is a reasonable study area for solar farms based on experience of modelling other projects (and confirmed by the findings of this study).

16.3.27 There are two residential receptors that could not experience glint and glare effects because they are located within no reflection zones, as described above.

16.3.28 Further detail on Residential Receptors is provided in **PEI Report Volume II Appendix 16-1**.

Road and Rail Receptors

16.3.29 Roads that are within 1km of the Principal Site and have potential views of the panels are considered in the assessment.

16.3.30 There are 11 roads within the 1km study area that required a detailed glint and glare assessment, which were: the A631, B1398, Common Lane, Coachroad Hill, Gainsborough Road, School Lane, Springthorpe Road, Hill Road, Cow Lane, Kexby Road and Northlands Road. In total, 162 receptor points along these roads were identified.

16.3.31 There are some minor roads that serve dwellings; however, these have been scoped out of the assessment as vehicle users of these roads will likely be travelling at low speeds, meaning there is a negligible risk of safety impacts resulting from glint and glare from the Scheme.

16.3.32 There are no railway lines within 1km of the Principal Site.

16.3.33 Further detail on Road and Rail Receptors is provided in **PEI Report Volume II Appendix 16-1**.

Aviation Receptors

16.3.34 Glint is only considered to be an issue with regards to aviation safety when the solar farm lies within close proximity to a runway, particularly when the aircraft is descending to land. This is outlined within the FAA guidance as being the key aviation receptors to assess and is considered best practice in the absence of UK guidance.

16.3.35 There are 14 aerodromes within 30km of the Principal Site. However, only Sturgate Airfield, RAF Scampton and Wickenby Airfield require a detailed assessment as the Principal Site is located within their safeguarding buffer zone. RAF Scampton and Wickenby Airfield both have ATCTs.

16.3.36 The other 11 aerodromes do not require detailed assessments due to their location in relation to the Principal Site falling outside of their respective safeguarding buffer zones.

16.3.37 Further detail on Aviation Receptors is provided in **PEI Report Volume II Appendix 16-1**.

Embedded Mitigation Measures

16.3.38 The design of the Scheme includes embedded design mitigation for glint and glare, including landscaping to screen the Scheme from view of receptors to glint and glare, as well as landscape and visual impacts. This is described in detail in **PEI Report Volume I Chapter 12: Landscape and Visual Amenity**.

16.3.39 The embedded mitigation measures include:

- Careful siting of the Scheme in the landscape with offsets from existing residential areas, vegetation patterns and road networks;
- Conserving existing vegetation patterns; and
- Creating new Green Infrastructure (i.e., vegetation planting) within the Principal Site with extensive planting proposals.

Assessment of Potential Effects

16.3.40 As outlined within the British Research Establishment (BRE) document 'Planning Guidance for the Development of Large-Scale Ground Mounted Solar PV Systems' (Ref. 16-7), Solar PV panels are designed to absorb, not reflect, irradiation. Relevant studies generally agree that there is potential for glint and glare from photovoltaic panels to cause a hazard or nuisance for surrounding receptors, but that the intensity of such reflections is similar to that emanating from still water. This is considerably lower than for other manmade materials such as glass, steel or white concrete (Ref. 16-12).

16.3.41 The US Federal Aviation Administration (FAA) in their Solar Guide (Ref. 16-11) incorporates a chapter on the impact and assessment of glint from solar panels and provides a quantitative threshold which is lacking in the English guidance. It concludes that:

“...evidence suggests that either significant glare is not occurring during times of operation or if glare is occurring, it is not a negative effect and is a minor part of the landscape to which pilots and tower personnel are exposed.”

16.3.42 As such it is unlikely that adverse effects will be experienced from glint and glare due to the nature of the solar PV panels. This is discussed further in the following paragraphs.

16.3.43 A geometrical analysis comparing the azimuth and horizontal angle of the receptors from the Scheme and the solar reflection was conducted. The assessment did not take into account obstructions such as vegetation and buildings, and therefore presents a worst-case scenario. Discussion on the potentially impacted receptors is provided where necessary.

16.3.44 Glint and glare effects are only derived from the operational phase of the development.

Residential Receptors

16.3.45 Solar reflections are possible at none of the 85 residential receptors within the 1km study area, based on a theoretical modelled impact without consideration of local vegetation or other obstacles and assuming no cloud at any point in the year. Therefore, overall impacts on residential receptors are considered to be **None**.

Road Receptors

16.3.46 Solar reflections are possible at two of the 161 road receptors assessed within the 1km study area. However, upon reviewing the actual visibility of the receptors using Google Earth imagery, glint and glare impacts reduce to None for all road receptors as there are hedgerows that interrupt the line of sight to the solar PV panels. Therefore, overall impacts are **None**. One receptor was excluded from this analysis as it is located with the no-reflection zone.

Aviation Receptors

16.3.47 Eight runway approach paths and two ATCTs were assessed in detailed at Sturgate Airfield, RAF Scampton and Wickenby Airfield. Only Green Glare impacts were predicted for Runway 27 at Sturgate Airfield, which is an acceptable impact upon runways according to FAA guidance. Overall aviation impacts are **Low**.

Mitigation Measures

16.3.48 No Mitigation is required due to the no impacts found for the residential and road receptors. Also, no mitigation is required for aviation receptors as there is only a Low impact.

Cumulative Effects

16.3.49 Due to the absence of any noticeable effects, there is considered no potential for cumulative glint and glare effects with other nearby solar schemes.

16.4 Ground Conditions

Introduction

16.4.1 Preliminary Risk Assessments (PRAs) have been completed for both the Principal Site and Cable Route Corridor to assess the land condition within the Scheme Boundary to identify potential environmental land quality liabilities and constraints prior to the Scheme development. The PRAs have been developed based on desk-top studies and site walkovers. The PRA for the Principal Site is included in within **PEI Report Volume II Appendix 16-2** and the PRA for the Cable Route Corridor is provided in **PEI Report Volume II Appendix 16-3**.

Legislation and Policy

National Policy

16.4.2 There are six key legislative drivers for dealing with risks to human health and the environment from ground conditions, namely:

- Part 2A of the Environmental Protection Act (EPA) 1990 (the Contaminated Land Regime) (Ref. 16-13);
- The Water Resources Act 1991 (Ref. 16-14) and the Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 (Ref. 16-15);
- Water Act 2003 (Ref. 16-16);
- Building Act 1984 (Ref. 16-17); and
- The Building Regulations & c (Amendment) Regulations 2015 (Ref. 16-18).

16.4.3 In the UK, Part 2A of the EPA, as introduced by Section 57 of the Environment Act 1995 (Ref. 16-20) provides the legislative framework within which site data is to be assessed. Under Part 2A, sites are identified as 'contaminated land' if they are: causing harm to human health; if there is a significant possibility of causing significant harm to human health; if the site is causing significant harm, or there is a significant possibility that it causes harm to non-human receptors; or there is pollution of controlled waters (i.e. both surface and groundwaters).

16.4.4 The Water Act 2003 introduced a revision to the wording of the EPA, which requires that if a site is causing or could cause significant pollution of controlled waters, it may be determined as contaminated land.

16.4.5 Once a site is determined to be "contaminated land" then remediation is required to render significant pollutant linkages insignificant (i.e. the source pathway-receptor relationships that are associated with significant harm to human health and/or significant pollution of controlled waters), subject to a test of reasonableness.

16.4.6 The Water Resources Act 1991 provides statutory protection for controlled waters (streams, rivers, canals, marine environment and groundwater) and makes it an offence to discharge to controlled waters without the permission or consent of the regulators of these areas.

16.4.7 The Building Act 1984 and the Building Regulations & c (Amendment) Regulations 2015 are the two key legislative drivers when considering structural and design aspects of a development in terms of geotechnical properties of the ground. The Building Act 1984 requires that buildings are constructed so that ground movement caused by swelling, shrinkage, freezing, landslip or subsidence of the sub-soils will not impair the stability of any part of the building.

16.4.8 Other legislation of relevance to this topic includes:

- Environmental Permitting (England and Wales) Regulations 2016 (Ref. 16-21) (as amended);
- Hazardous Waste (England and Wales) (Amendment) Regulations 2016 (Ref. 16-22);
- Contaminated Land (England) (Amendment) Regulations 2012 (Ref. 16-23);
- Environmental Damage (Prevention and Remediation) Regulations 2015 (Ref. 16-24); and
- Anti-Pollution Works Regulations 1999 (Ref. 16-25).

National Guidance

16.4.9 As outlined in Section 1.4 of **PEI Report Volume I Chapter 1: Introduction**, the EIA for the Scheme must have regard to the relevant policies of the NPPF and relevant NPSs. Key aspects of the NPPF and relevant NPSs, which have been considered during the development of this chapter, are outlined below.

- NPS EN-1 (). With reference to section 4.10 Pollution Control and Other Environmental Regulatory Regimes: and paragraph 5.10.8 “*applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed. For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination*”.
- NPS EN-5 (Ref. 16-26). No section relevant to ground conditions.
- Draft NPS EN-1 (**Error! Reference source not found.**) Section 5.11 states:

“Applicants should also identify any effects and seek to minimise impacts on soil health and protect and improve soil quality taking into account any mitigation measures proposed.”

“Applicants are encouraged to develop and implement a Soil Management Plan which could help minimise potential land contamination. The sustainable reuse of soils needs to be carefully considered in line with good practice guidance where large quantities of soils are surplus to requirements or are affected by contamination.”

“Developments should contribute to and enhance the natural and local environment by preventing new and existing developments from contributing to, being put at unacceptable

risk from, or being adversely affected by, unacceptable levels of soil.....pollution or land instability.”

- Draft NPS EN-3 (**Error! Reference source not found.**) Paragraph 2.10.14 states:

“Solar is a highly flexible technology and as such can be deployed on a wide variety of land types. While land type should not be a predominating factor in determining the suitability of the site location applicants should, where possible, utilise previously developed land, brownfield land, contaminated land and industrial land.”

- NPPF (Ref. 16-27). With particular reference to Section 15, paragraph 170 of the NPPF states that:

“planning policies and decisions should contribute to and enhance the natural and local environment by:

a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);

b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate”.

- In Section 15, paragraph 178 also states that:

“Planning policies and decisions should ensure that:

a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);

b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and

c) adequate site investigation information, prepared by a competent person, is available to inform these assessments”.

- Paragraph 179 states:

“where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner”.

- Paragraph 180 states:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development”.

Consultation

16.4.10 A request for an EIA Scoping Opinion was sought from the Secretary of State as part of the EIA Scoping Process. Consultation responses in relation to Ground Conditions are presented in **PEI Report Volume II Appendix 1-2**.

Assessment Methodology

16.4.11 The assessment involved a desk-based review of the Scheme Boundary to identify historic land uses and the geological, hydrological, hydrogeological and ecological setting of land within the Scheme Boundary. A walkover was undertaken to inspect any stormwater, foul and off-site effluent discharges and to check the external building fabric of structures. The study area for the desk-based review and walkover has been defined as the Scheme Boundary plus a 250m radius, which is the distance over which significant effects of human health and controlled water receptors can reasonably have a potential to occur.

16.4.12 A preliminary ground model was then prepared, followed by a Conceptual Site Model (CSM) with a view to identifying any potentially significant source-pathway-receptor linkages. This was followed by a qualitative risk assessment.

Baseline Conditions

Principal Site

16.4.13 The Principal Site comprises agricultural fields, with a tributary of the River Till flowing across the south-western part of the Principal Site, the River Eau at the north-eastern edge, and Fillingham Beck across the southern part of the Principal Site.

- 16.4.14 The permeability of superficial and bedrock geology is relevant to the assessment of ground conditions as it determines how far contamination may be able to spread from source. The anticipated geology includes quaternary deposits over sedimentary bedrock of mudstone, limestone and sandstone formations. The superficial deposits and the bedrock are classified as Secondary Aquifers, except for Lincolnshire Limestone Formation, bordering the Principal Site to the east, which is classified as a Principal Aquifer.
- 16.4.15 Flood Zones are relevant to the assessment of ground conditions as it determines how potential sources of contamination may interact with fluvial floodplains. The indicative floodplain map for the area, published by the Environment Agency, shows that the risk of surface water flooding at the Principal Site is generally very low (annual chance of flooding of less than 0.1%); with isolated patches of low (chance of flooding of between 0.1% and 1%), medium (chance of flooding of between 1% and 3%) and high risk (chance of flooding of greater than 3.3%) generally associated with the rivers located on the Principal Site.
- 16.4.16 Based on a review of historical maps, the Principal Site was undeveloped land/agricultural fields since the earliest available historical maps (late 1800s). Areas formerly associated with Sturgate Airfield (currently located 600m south-west of the Principal Site) extend across the south-western part of the Principal Site. Areas formerly associated with airfield also adjoin the Principal Site to the west, north of Common Lane.
- 16.4.17 Potential contaminative sources identified on-site include the historical use of the south-western part of the Principal Site as an airfield and an area characterised by a vegetated mound of unknown material, tyres and an abandoned vehicle (south-eastern part of the Principal Site). Small areas of potentially infilled land may be present on the Principal Site associated with pits and former ponds, which may have been filled with a variety of (potentially unlicensed) waste materials. A Pre-desk Study Assessment from Zetica indicates that a British bomber aircraft crashed on the Principal Site.
- 16.4.18 Off-site sources may include farmland, with farm buildings and yards where fuel and agricultural materials were/are stored, shown at various locations adjacent to the Principal Site; an active IGas Energy Plc. oil well, located adjacent south-east of the Principal Site; a former brick yard (adjacent north of the eastern part of the Principal Site); and a former metal recycling site/vehicle dismantler, adjacent west of the Principal Site, south-east of Sturgate and north of Common Lane. The former metal recycling site is located within areas formerly associated with the Sturgate Airfield.

Cable Route Corridor

- 16.4.19 The Cable Route Corridor comprises of agricultural fields and sits across seven Water Framework Directive (WFD) surface water bodies, including Fillingham Beck, Skellingthorpe Main Drain, River Till, Tributary of Till, Marton Drain Catchment, Trent from Carlton-on-Trent to Laughton Drain and Seymour Drain Catchment.

- 16.4.20 The anticipated geology comprises superficial Quaternary deposits over sedimentary bedrock of mudstone and limestone formations. The superficial deposits are classified as Secondary A Aquifers and Secondary Undifferentiated Aquifers and the bedrock is classified as Secondary B and Secondary Undifferentiated Aquifers.
- 16.4.21 The Cable Route Corridor passes through several areas of fluvial Flood Zone 3 associated with tributaries of the River Till; and associated with the River Trent and Skellingthorpe Main Drain water body, between Marton and Cottam Power Station.
- 16.4.22 Based on a review of historical maps, the Cable Route Corridor was undeveloped land/agricultural fields since the earliest available historical maps (late 1800's). Areas formerly associated with Sturgate Airfield extend across the northern edge of the Site at Cow Lane and borders the Cable Route Corridor to the west and north. Cottam Power Station extends across the south-western edge of the Site since the 1970's.
- 16.4.23 Potential contaminative sources identified on-site also include small areas of infilled land (associated with former pits/ground working) which may have been filled with a variety of (potentially unlicensed) waste materials; railway land (Great Northern and Great Eastern Joint Railway and Leverton Branch Railway); a former hospital and pumping station. Potential sources of land contamination adjacent to the Cable Route Corridor include (inter alia) current and historical landfill sites.
- 16.4.24 The regional unexploded bomb (UXB) mapping published by Zetica shows that the Cable Route Corridor lies within a zone that experiences a low risk of UXB. However, part of the Cable Route Corridor extends across/adjacent to areas formerly occupied by a currently operative airfield, which is considered a wartime site of interest.
- 16.4.25 The potential risks identified have been assessed by the preliminary risk assessment as being very low to low, considering the proposed use of the Cable Route Corridor.

Assessment of Potential Effects

- 16.4.26 A risk assessment of the identified plausible contaminated linkages has been undertaken for the study area in line with current legislation. The assessment takes into consideration the sources of possible contaminant risks and the presence of any plausible pathways or receptors as outlined in the Environmental Protection Act 1990 (Part 2A). The following contaminant linkages were assessed:
- Hazards to human health: inhalation, ingestion or contact with made ground or groundwater contaminated by metal, inorganic and organic chemicals;
 - Hazards to controlled waters: leaching of contaminants from soils, lateral groundwater migration, or discharge to watercourses or made ground or groundwater contaminated by metal, inorganic and organic chemicals;

- Hazards to ecological receptors: impacts from metal, inorganic and organic chemical contaminants within the made ground and groundwater through lateral groundwater migration, discharge to watercourses, sedimentation/dust deposition, physical damage to habitat, and increased human disturbance during construction;
- Hazards to properties: impacts to crops or grazing animals from contaminated soils or contamination of ground gas to any on-site buildings; and
- Impact on mining/mineral sites: loss of resource.

16.4.27 An assessment of the potential severity, likelihood of occurrence and potential risk associated with each contaminant linkage is included in **PEI Report Volume II Appendix 16-2** and **Appendix 16-3**. All were assessed to result in Very Low to Low risk.

Mitigation Measures

16.4.28 Intrusive site investigation is proposed by the Applicant at the post-consent stage to provide geo-environmental data to evaluate soil and groundwater quality and verify the conceptual site model. It will also verify the proposed mitigation measures so that unacceptable pollutant linkages do not exist on completion of the Scheme. The geo-environmental investigation will be designed with due consideration of the requirements of BS 10175:2011: +A2 2017: Investigation of Potentially Contaminated Sites – Codes of Practice (BSI). The requirement for an intrusive investigation is expected to be secured through a requirement of the DCO.

16.4.29 The construction works will be undertaken in compliance with Construction Design and Management (CDM) 2015 Regulations (Ref. 16-29).

16.4.30 Prior to work commencing, a health and safety risk assessment will be carried out in accordance with current health and safety regulations and based on ground investigation findings. This assessment will cover potential risks to both site staff and the local population. Based on the findings of this risk assessment, appropriate mitigation measures will be implemented during the course of any temporary works. Measures will be presented within the ES, however they could include, for example, the following:

- Use of appropriate Personal Protective Equipment (PPE) for construction workers - including gloves and, where appropriate, dust masks, use of ground gas monitoring equipment and hygiene facilities; and
- Use of appropriate site control measures to minimise the migration of contaminated dusts and soils from the Site to adjacent areas.

16.4.31 During the period before ES submission, a number of bespoke design mitigation measures will be developed, they are anticipated to comprise similar to the following:

- Plant: all plant (i.e. inverters, transformers and switchgear) will be installed on concrete bases with suitable bunding where appropriate;

- **Surface water drainage:** the detailed operational drainage design will be carried out pre-construction with the objective of ensuring that drainage of the land to the present level is maintained. It will follow either the design of a new drainage system taking into account the proposed new infrastructure (access tracks, cable trenches, structure foundations) to be constructed, or, if during the construction of any of the infrastructure, there is any interruption to existing schemes of land drainage, then new sections of drainage will be constructed. The surface water drainage strategy will be submitted with the DCO application. Infiltration drainage design will be in accordance with BRE 365 and infrastructure will be placed at least 10m away from watercourses;
- **Operational Activities:** during the operational phase, on-site activity will be minimal and would be restricted principally to vegetation management, equipment maintenance and servicing, replacement of any components that fail, and monitoring to ensure the continued effective operation of the Scheme. It is anticipated that there could be 10 to 20 visits per year with four-wheel drive vehicles or transit vans. There will be no permanent staffing or on-site office.

16.4.32 A Construction Environmental Management Plan (CEMP) (Framework CEMP included in **PEI Report Volume III Appendix 3-1**) will be provided prior to construction, with the aim of (amongst other things) reducing nuisance impacts from dust generation, soil removal and waste generation. The CEMP will be secured via a Requirement in the DCO.

Cumulative Effects

16.4.33 The shortlisted cumulative schemes located in close proximity to the Scheme Boundary are residential developments, solar farms and battery storage.

16.4.34 There are other development schemes (referred to as cumulative schemes) in the vicinity of the Scheme which have the potential to result in cumulative effects (further details are provided in **PEI Report Volume I Chapter 17: Cumulative Effects**).

16.4.35 Provided that the requirements of relevant policy and legislation relating to land contamination and remediation are integrated within the design and appropriate mitigation measures are applied during the demolition and construction phases of each cumulative scheme, it is considered that the cumulative effect on ground conditions will be negligible.

16.4.36 It is considered that there would be a beneficial cumulative effect to the local environment as any identified contamination within each cumulative scheme will be managed as part of the development works. In addition, should any remediation work, or the removal of contaminated soils associated with the preparatory ground works, basement and foundation excavations, be carried out on these sites as part of their redevelopment, this would be expected to result in a moderate to major beneficial effect to the local environment.

16.5 Major Accidents and Disasters

Introduction

- 16.5.1 This section summarises the potential effects of the Scheme on the risks of major accidents or disasters occurring.
- 16.5.2 ‘Accidents’ are an occurrence resulting from uncontrolled developments in the course of construction, operation and decommissioning (e.g. major emission, fire or explosion).
- 16.5.3 ‘Disasters’ are naturally occurring extreme weather events or ground related hazard events (e.g. subsidence, landslide, earthquake).

Legislation and Policy

National Policy

- 16.5.4 The EIA Regulations (Ref. 16-30) require consideration to be given to the risks of major accidents and disasters. The Directive and domestic Regulations cite two specific directives as examples of risk assessments to be considered within EIA. These are the Directive 2012/18/EU of the European Parliament and of the European Council (which deals with major accident hazard registered sites) (Ref. 16-31) and the Council Directive 2009/71/Euratom (which deals with nuclear sites) (Ref. 16-32). Neither of these Directives is relevant to the Scheme.

Overarching National Policy Statement for Energy (EN-1)

- 16.5.5 Section 4.11.3 of EN-1 (**Error! Reference source not found.**) provides the following commentary in relation to the assessment of Major Accidents and disasters: *“Some energy infrastructure will be subject to the Control of Major Accident Hazards (COMAH) Regulations 1999. These Regulations aim to prevent major accidents involving dangerous substances and limit the consequences to people and the environment of any that do occur. COMAH regulations apply throughout the life cycle of the facility, i.e. from the design and build stage through to decommissioning. They are enforced by the Competent Authority comprising HSE and the EA acting jointly in England and Wales (and by the HSE and Scottish Environment Protection Agency acting jointly in Scotland). The same principles apply here as for those set out in the previous section on pollution control and other environmental permitting regimes.”*

Draft Overarching National Policy Statement for Energy (EN-1)

- 16.5.6 Section 4.12.3 of the draft EN-1 (**Error! Reference source not found.**) provides the following commentary in relation to Major Accidents and disasters: *“Some energy infrastructure will be subject to the Control of Major Accident Hazards (COMAH) Regulations 2015. These Regulations aim to prevent major accidents involving dangerous substances and limit the consequences to people and the environment of any that do occur. COMAH regulations apply throughout the life cycle of the facility, i.e. from the design and build stage through to decommissioning. They are enforced by the Competent Authority comprising HSE....and the EA acting jointly in England*

and by the HSE and NRW acting jointly in Wales, and the HSE and Scottish Environment Protection Agency (SEPA) acting jointly in Scotland. The same principles apply here as for those set out in the previous section on pollution control and other environmental permitting regimes.”

National Guidance

16.5.7 There is no national guidance relating to the assessment of major accidents and disasters.

Local Planning Policy

16.5.8 There is no local guidance relating to the assessment of major accidents and disasters.

Assessment Methodology

16.5.9 In general, major accidents or disasters, as they relate to the Scheme, fall into three categories:

- Events that could not realistically occur, due to the nature of the Scheme or its location;
- Events that could realistically occur, but for which the Scheme, and associated receptors, are no more vulnerable than any other development; and
- Events that could occur, and to which the Scheme is particularly vulnerable, or which the Scheme has a particular capacity to exacerbate.

16.5.10 An exercise was undertaken to identify all possible major accidents or disasters that could be relevant to the Scheme. This list was drawn from several sources, including the UK Government's Risk Register of Civil Emergencies (Ref. 16-33). Major accidents or disasters with little relevance in the UK were not included, such as volcanic eruptions for example.

Table 16-1: Major Accidents or Disasters Shortlisted for Further Consideration

Major accident or disaster	Potential receptor	Comments	Relevant Chapter or Appendix of the PEI Report
Floods	Property and people in areas of increased flood risk.	Both the vulnerability of the people in Scheme to flooding, and its potential to exacerbate flooding, will be addressed in the Flood Risk Assessment, and also reported in ES, both in terms of the risk to the Scheme and increased risk caused by the Scheme.	PEI Report Volume I Chapter 10: Flood Risk, Drainage and Surface Water PEI Report Volume II Appendix 10-2: Preliminary Flood Risk Assessment
Fire	Local residents, habitats and species.	There may be some potential for fire as a result of the battery storage element of the Scheme. However, the battery energy storage system will include cooling systems, which are designed to regulate temperatures to within safe conditions to minimise the risk of fire. An outline battery fire safety management plan has been prepared and will be updated as part of the DCO application.	PEI Report Volume II Appendix 3-3: Outline Battery Fire Safety Management Plan This section of this chapter.
Road accidents	Aquatic environment Road users	The risk posed by spillage from hazardous loads as a result of a road traffic accident during construction or decommissioning will be considered in the Flood Risk, Drainage and Water Resources chapter of the ES. The potential for glint and glare to affect road users will be considered within a technical appendix to the ES if any risks are identified. Mitigation will be considered and, where necessary, incorporated into the Scheme design.	PEI Report Volume I Chapter 10: Flood Risk, Drainage and Surface Water PEI Report Volume I Chapter 15: Transport and Access PEI Report Volume II Appendix 16-1: Glint and Glare Assessment
Rail accidents	Rail users	The Cable Route Corridor connecting Gainsborough to Saxilby and Lincoln. The	This section of this chapter.

Major accident or disaster	Potential receptor	Comments	Relevant Chapter or Appendix of the PEI Report
		crossing will be designed to meet the specific requirements of Network Rail and therefore the risk of a rail accident as a result of the crossing will be minimised.	
Aircraft disasters	Pilots and aircraft	The glint and glare assessment demonstrated there is Low potential for glint and glare to affect aircraft, meaning there is no need for mitigation.	PEI Report Volume II Appendix 16-1: Glint and Glare Assessment
Flood Failure	Defence Employees	This will be covered in the Flood Risk Assessment and will also be reported in ES, both in terms of the risk to the Scheme and increased risk caused by the Scheme.	PEI Report Volume I Chapter 10: Flood Risk, Drainage and Surface Water PEI Report Volume II Appendix 10-2: Preliminary Flood Risk Assessment
Utilities failure (gas, electricity, water, sewage, oil, communications)	Employees and local residents	The Scheme has the potential to affect existing utility infrastructure below ground. To identify any existing infrastructure constraints, both consultation and a desk-based study will be undertaken.	Section 16.6 Telecommunications, Television Reception and Utilities of this chapter.
Mining Extractive Industry	/ Employees	There is the potential for current or past quarrying activity in the vicinity to lead to unstable ground conditions. However, the risk will be considered as part of the geotechnical design, ensuring that the risk is designed out.	Section 16.4 Ground Conditions of this chapter.
Plant disease	Habitats and species	New planting may be susceptible to biosecurity issues, such as the increased prevalence of pests and diseases, due to climate change. The planting design will take account of biosecurity risks through a wider mix of species including some non-natives.	PEI Report Volume I Chapter 9: Ecology and Nature Conservation

16.5.11 Those major accidents and disasters listed in Table 16-1 that are not being considered within another technical assessment (fire and rail accidents) are being reviewed by the design team to ensure risks are addressed through the design as necessary. These events are assessed below.

16.5.12 An effect is considered significant if there is a significantly increased risk of an accident or a disaster occurring as a result of the Scheme. Details on appropriate prevention measures and mitigation for significant effects on the environment from such events are either provided in the sections below or within the referenced topic chapters.

Baseline Conditions

16.5.13 A number of receptors are present in the vicinity of the Scheme which could be vulnerable to major accidents or disasters, either because of their proximity to the Scheme or their importance to the surrounding area. These include:

- Towns, villages, farms and residential homes;
- Commercial sites and buildings;
- Roads;
- Railways;
- Designated ecological sites, woodland, farmland, and waterbodies; and
- Underground infrastructure services including electricity, water, communications, and gas.

16.5.14 Details of the specific receptors that fall into the above categories are provided in **PEI Report Volume I Chapter 3: Scheme Description**. These receptors have been considered in this assessment.

Assessment of Potential Effects

16.5.15 Risks of major accidents and disasters occurring during construction and decommissioning are assessed in the relevant chapters outlined in Table 16-1. All works will be subject to risk assessments as required by the Framework CEMP. Mitigation measures will be listed within the CEMP, which will be secured in the DCO.

Construction Phase

Criminal Damage

16.5.16 The Scheme Boundary would be managed by the contractor during construction and decommissioning to mitigate the risk of criminal activity. The design will include fencing, CCTV cameras and lighting in critical areas to prevent/deter criminal activity. Therefore, the Scheme is not expected to have an effect on the environment due to the risk of a major accident occurring as a result of criminal damage during construction and decommissioning.

Bird strike

16.5.17 The construction and decommissioning of the Scheme would not have any effect on the numbers and frequency of bird flights overhead. Research commissioned by Natural England (Ref. 16-34) suggests that risk of bird collision with solar panels is very low.

16.5.18 The Scheme is not located along any migratory corridors for birds, within a valley or headland, or in close proximity to large water bodies which may attract large flocks of birds. This is discussed further in **PEI Report Volume I Chapter 9: Ecology and Nature Conservation**. Therefore, the Scheme is not expected to have an effect on the risk of a major accident occurring as a result of bird strike during construction and decommissioning.

Fire

16.5.19 Health and Safety on-site would be managed by the contractor during construction and decommissioning to mitigate the risk of fire. Therefore, the Scheme is not expected to have an effect on the risk of a major accident occurring as a fire during construction and decommissioning; however, an Outline Battery Fire Safety Management Plan has been prepared for the Scheme and is included in **PEI Report Volume II Appendix 3-3**, which discusses the construction risks such as handling and transporting batteries. This will be secured through a DCO Requirement.

Rail Accidents

16.5.20 The Cable Route Corridor crosses the railway line connecting Gainsborough to Saxilby and Lincoln. The construction and decommissioning of the crossing will be managed to the specific requirements of, and in consultation with, Network Rail and therefore the Scheme is not expected to have an effect on the risk of a rail accident as a result of the crossing during construction and decommissioning.

Operational Phase

Criminal Damage

16.5.21 If the Scheme were to be damaged through pre-planned criminal activity, the risk of a major accident occurring on-site may increase. However, the Scheme design will ensure that the compounds and solar equipment are secure to minimise the potential for damage to occur through criminal activity. Embedded mitigation will include fencing, CCTV cameras and lighting in critical areas. These are described in further detail in **PEI Report Volume I Chapter 3: Scheme Description**. Furthermore, the Scheme does not process or include large scale chemicals and criminal damage to the infrastructure is unlikely to lead to a large-scale leak, explosion, or other major event. Therefore, the Scheme is not expected to have an effect on the risk of a major accident occurring as a result of criminal activity during operation.

Bird Strike

16.5.22 Birds are unlikely to be attracted to the panels. This is discussed further in **PEI Report Volume I Chapter 9: Ecology and Nature Conservation**. The Scheme falls within the statutory bird strike safeguarding zones surrounding RAF Scampton however It is considered highly unlikely that the Scheme would have any effect on the numbers and frequency of bird flights overhead due to

the reasons outlined above. The tracking of the panels will not have a noticeable influence effect on birds due to the slow movement incurred. The Operational Phase effects will be no worse than those of the Construction Phase.

16.5.23 Therefore, the Scheme is not expected to have an effect on the risk of a major accidents occurring as a result of bird strike to overhead aircraft.

Fire

16.5.24 There is a potential fire risk associated with certain types of batteries such as lithium ion. The Scheme design includes cooling systems for the batteries, which are designed to regulate temperatures to within safe conditions to minimise the risk of fire. Further details are included in **PEI Report Volume II Appendix 3-3**.

16.5.25 A summary of the anticipated safety provision provided in **PEI Report Volume II Appendix 3-3** include:

- BESS enclosures should be reasonably close to a site vehicle entrance suitable for emergency vehicles. Additionally, there shall be suitable access roads for emergency services vehicles with safe routes to BESS sites and appropriate fire service infrastructure.
- A fire detection and alarm system using coincidence detection in accordance with BS 7273-1 and incorporating aspirating smoke detection and carbon monoxide (CO) detection within the BESS enclosure for early detection of gases produced during off-gassing and prior to thermal runaway.
- At area level, in each BESS cluster area hydrants shall be located with adequate suppression pressure and flow for extinguishing operations. Following BS 9990, the capacity of the water supply should be such as to maintain a flow of water capable of supplying two fire-fighting jets for 45 min when water is being used at a total rate of 1500 L/min.
- All process water used in the system shall be prevented from contaminating potable water sources in accordance with local regulations through the use of check valves or other means as part of the system design.
- An extra layer of protection will be provided for containment of firewater external of the BESS enclosure in case of rupture or overflow of contaminants.
- Each BESS enclosure will be provided with a sump and drain valve to allow extraction of contaminated fire water and / or electrolyte spill without having to open the door of the enclosure and will prevent contamination of surrounding environment with the extracted liquid being taken off site for treatment.

16.5.26 With the above embedded mitigation, significant effects on the risk of fire would be unlikely. The above measures will be secured through the Outline Battery Fire Safety Management Plan that has been produced for the Scheme (**PEI Report Volume II Appendix 3-3**). This will be secured through a DCO Requirement.

Rail Accidents

16.5.27 The Cable Route Corridor crosses the railway line connecting Gainsborough to Saxilby and Lincoln. The operation of the crossing will be managed to the specific requirements of Network Rail and therefore the risk of a rail accident as a result of the crossing will be minimised. Significant effects on rail accidents are not anticipated.

Decommissioning Phase

16.5.28 The potential effects during the decommissioning phase are the same as those during the construction phase.

Mitigation Measures

16.5.29 Minimising the risk of major accidents during construction and decommissioning will be addressed through appropriate risk assessments as required in the CEMP.

Cumulative Effects

16.5.30 The shortlisted cumulative schemes located in close proximity to the Scheme Boundary are residential developments, solar farms and battery storage around Cottam National Grid sub-station.

16.5.31 Increased traffic during construction and decommissioning phases of the Scheme in combination with other developments could result in a greater risk of road accidents. This is assessed in **PEI Report Volume I Chapter 15: Transport and Access**, with appropriate mitigation presented where applicable.

16.5.32 With mitigation listed above to reduce the risk of fire, no significant effects are expected from the Scheme.

16.5.33 In addition to the above, the possibility of a major accident or disaster occurring is low, and any such disaster (in the unlikely event that one did occur) would be short term and infrequent. As such, the likelihood for concurrent events on other cumulative schemes is very low. For these reasons, it is concluded that no significant cumulative effects would arise from the Scheme in terms of increased risk of a major accident or disaster occurring.

16.6 Telecommunications, Television Reception and Utilities

Introduction

16.6.1 This section evaluates the effects of the Scheme on telecommunication infrastructure, television reception and existing utilities.

Legislation and Policy

16.6.2 Effects relating to existing infrastructure are not environmental effects and there is no requirement to include an assessment of these effects under the

EIA Regulations. However, given the nature of solar farm developments, they have the potential to affect existing utility infrastructure above and below ground.

- 16.6.3 In addition, there is no national policy or guidance or local policy concerning telecommunications, television reception or utilities that is relevant to the Scheme.

Assessment Methodology

- 16.6.4 To identify any existing infrastructure constraints, both consultation and a desk-based study have been undertaken. Consultation with relevant telecommunication and utilities providers is a routine part of solar development, and will continue over the course of the DCO preparation and examination process.
- 16.6.5 Consultees include water, gas and electricity utilities providers and telecommunications providers. Telecommunications and television providers are unlikely to be affected by Electromagnetic Interference (EMI) unless transmitters are near electrical infrastructure associated with the solar PV array.
- 16.6.6 A desk-based search has been undertaken for the presence of telecommunications, television reception and utilities infrastructure within the DCO Site and within the vicinity. A qualitative approach undertaken by competent experts is used to assess the likelihood of significant effects on telecommunications, television reception and utilities.

Assessment of Potential Effects

Construction and Decommissioning Phase

Telecommunications

- 16.6.7 The Scheme is unlikely to interfere with telecommunications infrastructure as typically structures need to be more than 5m in height to interfere with telecommunication signals. No such effects are anticipated in the construction and decommissioning phases.

Television Reception

- 16.6.8 The Scheme consists of fixed low-lying infrastructure and is therefore unlikely to interfere with digital television signals and therefore no effects are anticipated in the construction and decommissioning phase.

Utilities

- 16.6.9 The potential exists for utilities to be affected during the construction and decommissioning of the Scheme through inadvertent damage caused as a result of excavation and engineering operations. Without any precautionary measures to avoid damage to utilities, this could lead to a short-term adverse effect.
- 16.6.10 Precautionary measures will be included as part of the embedded mitigation for the Scheme to prevent such damage from occurring, including:

- Locating the Scheme outside of utilities protected zones;
- The use of ground penetrating radar before excavation to identify any unknown utilities; and
- Consultation and agreement with relevant utility operators regarding construction/demobilisation methods prior to works commencing.

16.6.11 These measures, along with those listed within the CEMP, will reduce the likelihood of effects on utilities during construction and decommissioning. Therefore, no adverse effects are expected during construction and decommissioning.

Operational Phase

Telecommunications

16.6.12 The vast majority of the Scheme consists of fixed low-lying infrastructure <5m from ground level and is therefore unlikely to interfere with telecommunications infrastructure, therefore no effects are anticipated in the operation phase.

Television Reception

16.6.13 The Scheme consists of fixed low-lying infrastructure and is therefore unlikely to interfere with digital television signals and therefore no effects are anticipated in the operation phase.

Utilities

16.6.14 No effects on utilities are predicted as a result of the operational phase of the Scheme because no below-ground works will be required during operation.

Mitigation Measures

16.6.15 The risk of damage to utilities during construction would be minimised through embedded mitigation, which would involve those measures listed above and mapping infrastructure that crosses the Scheme and avoiding it through the design. No further mitigation would be required.

Cumulative Effects

16.6.16 The Scheme has been assessed to have no effect on telecommunication, television reception or utilities. It is expected that the other solar developments included within the cumulative schemes shortlist would also have no effect on telecommunications and television reception and would adhere to the same mitigation as set out above to reduce the risk of damaging utilities. All developments will need to be managed through a CEMP and would include mitigation measures to reduce the risk of damaging utilities during construction. Therefore, no cumulative effects are expected on telecommunications, television reception, or utilities.

16.7 Waste

Introduction

- 16.7.1 This section discusses the expected waste streams during each phase of the Scheme. The legal definition of waste as defined in the Environmental Protection Act 1990 is “*any substance or object which the producer discards or intends or is required to discard*”.
- 16.7.2 The legal definition of waste also covers substances or objects which fall outside of the commercial cycle or out of the chain of utility. In particular, most items that are sold or taken off site for recycling are wastes, as they require treatment before they can be resold or reused.
- 16.7.3 In practical terms, wastes include surplus spoil, scrap, recovered spills, unwanted surplus materials, packaging, office waste, wastewater, broken, worn-out, contaminated or otherwise spoiled plant, equipment and materials.

Legislation and Policy

Waste (England and Wales) Regulations 2011 (as amended)

- 16.7.4 The Waste Framework Directive 2008/98/EC (Ref. 16-35) provides a framework for the management of waste across the European community. The revised Directive (2018) (Ref. 16-36) introduces new provisions in order to boost waste prevention and recycling as part of the Waste Hierarchy. All Member States are required to adopt this approach.
- 16.7.5 The UK is no longer a member of the European Union, however, some types of EU legislation such as Regulations and Decisions, are directly applicable as law in an EU Member State. This meant that, as a Member State, these types of legislation applied automatically in the UK, under section 2(1) of the European Communities Act 1972 (c.68), without any further action required by the UK. These types of legislation are published by the Publications Office of the European Union on the EUR-Lex website. This legislation is now published on legislation.gov.uk as ‘legislation originating from the EU’.
- 16.7.6 Other types of EU legislation, such as Directives, are indirectly applicable, which means they require a Member State to make domestic implementing legislation before becoming law in that State. Legislation as it applied to the UK on 31st December 2020 is now a part of UK domestic legislation, under the control of the UK’s Parliaments and Assemblies.
- 16.7.7 The Waste (England and Wales) Regulations 2011 (as amended) (Ref. 16-37) transpose the Waste Framework Directive 2008/98/EC in England and Wales and require waste prevention programmes and waste management plans that apply the Waste Hierarchy.
- 16.7.8 The Waste Hierarchy will be adopted throughout the construction, operation and decommissioning phases of the Scheme.

16.7.9 Section 34 of the Environmental Protection Act 1990 and in the Waste (England and Wales) Regulations 2011 (Amended 2014) places a duty on producers and holders of waste to:

- Prevent illegal disposal, treatment or storage of waste;
- Handle their waste safely;
- Know whether the waste is hazardous or non-hazardous;
- Store waste securely in a manner that prevents release of the waste;
- Provide an accurate written description of the waste in order to facilitate the compliance of others with the duty and avoidance of the offences under Section 33 of the Environmental Protection Act 1990: via a compulsory system of Controlled Waste Transfer Notes (WTNs), which controls the transfer of waste between parties; and
- Ensure anyone dealing with their waste has the necessary authorisation.

16.7.10 The Hazardous Waste Regulations (England and Wales) 2005 (amended in 2016) (Ref. 16-38) places a requirement on producer of hazardous waste to:

- Classify the waste;
- Separate hazardous waste from other general waste streams;
- Use authorised businesses to collect, recycle or dispose of your waste; and
- Complete relevant hazardous waste consignment note.

16.7.11 Under the Control of Pollution (Amendment) Act 1989 (Ref. 16-39), it is a criminal offence for anyone not registered as a carrier to transport Controlled Waste.

16.7.12 Once appointed, details of the waste carriers and contractors will be included in the Construction Resource Management Plan (CRMP) including copies of appropriate licences. Waste carrier licences will be reviewed prior to works commencing.

16.7.13 From January 2014, anyone undertaking the following activities as part of their business must register as a waste carrier, broker or dealer to:

- Transport their own waste;
- Transport or dispose of waste for someone else;
- Buy or sell waste; or
- Act as a waste broker (arrange for someone to handle other people's waste).

Waste Management Plan for England (2021)

16.7.14 The Waste Management Plan for England 2021 (Ref. 16-40) fulfils the requirements of the Waste Regulations. The Plan provides an analysis of current waste management practices in England and evaluates the implementation of the objectives and provisions of the Waste Regulations.

Our Waste, Our Resources: A Strategy for England (2018)

16.7.15 This strategy (Ref. 16-41) “sets out how we will preserve our stock of material resources by minimising waste, promoting resource efficiency and moving towards a circular economy. At the same time we will minimise the damage caused to our natural environment by reducing and managing waste safely and carefully, and by tackling waste crime.” The strategy combines actions to be taken now and commitments for the coming years.

Assessment Methodology

16.7.16 Waste streams have been established based on activities, material requirements and staff requirements during the construction, operation, and decommissioning phases.

Baseline Conditions

16.7.17 The waste carriers and landfill sites used will be determined by the contractor pre-construction. There are no authorised landfill sites adjacent to the Scheme.

Assessment of Potential Effects

16.7.18 Given the nature of the Scheme, significant quantities of waste are not anticipated. Expected waste streams during the construction, operation and decommissioning phases are discussed below.

Construction Phase

16.7.19 The majority of construction equipment will be delivered to site for assembly and installation (mounting structures) and connection (solar panels). The PV modules, racks, inverters and other supporting equipment will be manufactured off-site to the specified sizes, and wastage during installation is expected to be minimal.

16.7.20 Large-scale earthworks are not expected, and therefore there is not expected to be either a large surplus or shortfall of fill material requiring either export or import. At this stage the potential for generation of some surplus excavated material cannot be ruled out: but the quantities involved would be very small in comparison with regional inert waste landfill capacity, and would only be disposed of to landfill as a last resort, with reuse or deposit for recovery being preferred options.

16.7.21 The types of waste streams and vehicles associated with the removal of waste material during construction is summarised in Table 16-2 below.

Table 16-2: Waste arisings during construction

Waste	Destination
Metals (iron steel)	Recycling or recovery of metals and metal components
Mixed construction / demolition wastes that do not contain hazardous substances	Recycling plant/ Landfill for construction and demolition waste

Waste	Destination
Plastic	Recycling plant
Paper and cardboard containers	Recycling plant
Wood	Recycling plant
Absorbents, cleaning cloths	Authorised recycling plant or authorised landfill for hazardous waste
Aerosol sprays	Authorised recycling plant or authorised landfill for hazardous waste
Land and stones containing hazardous substances	Authorised recycling plant or authorised landfill for hazardous waste
Empty containers of contaminated metal or plastics	Authorised recycling plant or authorised landfill for hazardous waste
Used oils	Authorised recycling plant or authorised landfill for hazardous waste
Oil filters	Authorised recycling plant or authorised landfill for hazardous waste

16.7.22 All waste transported off-site will be delivered to the appropriately licenced receivers of such materials. Operators receiving any waste materials resulting from the Scheme will be subject to their own consenting procedures.

16.7.23 Prior to construction, opportunities to minimise waste produced through the construction phase as far as possible will be explored. Possibilities to reuse or recycle materials will be explored before resorting to landfill options.

16.7.24 Re-usable waste includes soil excavated for trenches, roads, compound areas and foundations. These will be re-used on-site where possible.

16.7.25 Toxic and / or hazardous waste must be treated by an authorised operator. Transportation of hazardous waste will also require an authorised carrier. Materials are to be dealt with in accordance with the CEMP which will be secured through a DCO Requirement, and a CRMP will be produced. With these in place and the appropriate control measures followed, no significant effects in terms of waste are anticipated.

Operational Phase

16.7.26 For the operational Scheme, there will be relatively little waste produced from the operation of the Scheme since solar PV panels do not generate any waste as part of the energy production process. There is relatively little waste associated with office/administrative activities.

16.7.27 During the operational phase of the Scheme there will be up to 12 permanent staff, although given the scale of the Scheme maintenance personnel would be expected to be present on-site most days.

16.7.28 Assessment of wastewater and sewerage is presented in **PEI Report Volume I Chapter 10: Flood Risk, Drainage and Surface Water**. Solid wastes are expected to minimal, and would include:

- Welfare facility waste;
- Equipment needing replacing;
- Waste metals; and
- General waste (paper, cardboard, wood, etc.).

16.7.29 During the operational life of the Scheme, it is expected that there will be requirement for periodic replacement of some or all of the Principal Site elements such as the solar PV panels, which could generate an additional waste stream. As such, the ES will include an assessment of the likely carbon impact of component replacement (e.g. panels, batteries, inverters, transformers).

16.7.30 During the operational phase of the Scheme, waste arisings are expected to be minimal. No significant effects in terms of waste are anticipated.

Decommissioning Phase

16.7.31 It is expected that waste streams during decommissioning could include:

- Solar panels and mounts;
- Waste materials from foundations;
- Electrical equipment;
- Batteries;
- Cables;
- Welfare facility waste;
- Waste chemicals, fuels and oils; and
- Waste metals.

16.7.32 Wastewater from dewatering of excavations and cleaning activities (e.g. wheel wash) is assessed in **PEI Report Volume I Chapter 10: Flood Risk, Drainage and Surface Water**.

16.7.33 In the future the recycling industry will likely have developed additional methods to further utilise the materials from decommissioning.

16.7.34 All waste transported off-site will be delivered to the appropriately licenced receivers of such materials. Operators receiving any waste materials resulting from the Scheme will be subject to their own consenting procedures. It is worth noting that it is not possible to forecast the capacity of the landfill sites for decommissioning at this stage due to potential change in waste generation and operators at that time.

16.7.35 Prior to decommissioning, opportunities to minimise waste as far as possible will be explored. Possibilities to re-use or recycle materials will be explored before resorting to landfill options. There is a new industry emerging for recycling solar panels. This would be explored, in addition to any resale of any operational panels. Waste during the decommissioning phase will be dealt with as part of a decommissioning CRMP which will be prepared as part of a Framework Decommissioning Environmental Management Plan (FDEMP) to

be prepared as part of the ES and in line with relevant legislation and guidance at that time. Therefore, no significant effects in terms of waste are anticipated.

Cumulative Effects

- 16.7.36 There are a number of potential schemes that, depending on construction dates, may have cumulative effects with the Scheme. These include a number of new residential developments within the local area, other solar schemes, and new battery storage facilities.
- 16.7.37 Cumulative volumes of waste may put pressure on the capacity of local recycling plants or landfill sites. This would be managed through the CRMP and consultation with waste providers, therefore effects from cumulative volumes are not expected to be significant.
- 16.7.38 Additionally, cumulative effects may occur from increased HGVs transporting waste to recycling plants and landfill. This is assessed in **PEI Report Volume I Chapter 15: Transport and Access**, along with any proposed mitigation to minimise effects.
- 16.7.39 Cumulative effects on waste will be considered in more detail in the ES and will focus on minimisation of waste from the Scheme alongside liaison with other developers who are constructing scheme in the area at the same time to avoid pressure on the capacity of local recycling plants or landfill sites.

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