Frodsham Solar

Environmental Statement: Volume 1
Chapter 10: Ground Conditions

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Revision	Date	Prepared By	Reviewed / Approved By
P01	May 2025	L Stock	D Wayland A Russell

Prepared For:
Frodsham Solar Ltd

Prepared By:

Well House Barns, Chester Road, Bretton, Chester, CH4 0DH
1st Floor, Barfield House, Alderley Road, Wilmslow, SK9 1PL
Maling Exchange, Studio 307, Hoults Yard, Walker Road, Newcastle Upon Tyne, NE6 2HL

T: 0344 8700 007
enquiries@axis.co.uk
www.axis.co.uk

CONTENTS

TABLES

APPENDICES

10.0 GROUND CONDITIONS

10.1 Introduction

10.1.1 This chapter of the Environmental Statement (ES) presents the findings of an assessment of the likely significant effects of the Proposed Development in relation to existing ground conditions, including impacts related to contaminated land and land instability. The chapter includes an assessment of how the Proposed Development could be impacted by, or could impact, existing ground conditions on the Site and in the surrounding area.

10.1.2 This chapter is accompanied by the following appendices:

i) **ES Vol 2 – Technical Appendices, Appendix 10-1: Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2].**
ii) **ES Vol 2 – Technical Appendices, Appendix 10-2: Remediation Technical Concept Note – Cell 3 [EN010153/DR/6.2].**

10.1.3 This chapter should be read in conjunction with the following chapters:

i) **ES Vol 1 Chapter 7: Terrestrial Ecology [EN010153/DR/6.1]**
ii) **ES Vol 1 Chapter 8: Ornithology [EN010153/DR/6.1]**
iii) **ES Vol 1 Chapter 9: Flood Risk, Drainage and Surface Water Quality [EN010153/DR/6.1]**
iv) **ES Vol 1 Chapter 5: Climate Change [EN010153/DR/6.1]**

Study Area

10.1.4 The Site location is illustrated on **ES Vol 3 Figure 1-1 [EN010153/DR/6.3]**, with all existing features relevant to this chapter shown on Drawing D01 ‘Site Features Plan’ provided within **ES Vol 2 Appendix 10-1 [EN010153/DR/6.2]**. The study area is the area located within the Order Limits. Where contamination sources outside of the Order Limits may have the potential to affect the Site, these have also been considered.

10.1.5 The Solar Array Development Area (SADA) covers an area of approximately 250 ha. From the perspective of this chapter the SADA is formed of two main land uses:

i) The former Manchester Ship Canal Dredging Deposit Ground (MSCDDG) cells (the western half of the SADA); and,
ii) Agricultural land and former agricultural land which is now managed as rough grassland to encourage use by wildfowl (the eastern half of the SADA), referred to as the 'Frodsham and Helsby Marshes' area of the Site within this chapter.

10.1.6 These areas are shown on **ES Vol 3 Figures 1-4 (Solar Array Development Area Site Context Plan) [EN010153/DR/6.3].**

10.1.7 The MSCDDG comprises several 'cells' where dredgings from the Manchester Ship Canal (MSC) have been deposited historically. Cells 1-5 have been drained and now comprise agricultural land or reedbed. Cell 6, to the south of the Site, is an active cell where dredgings are still deposited and the area comprises reedbeds and ponds.

10.1.8 The Non-Breeding Birds Mitigation Area (NBBMA) is located across the MSCDDG Cell 3 plus the area to the immediate north of MSCDDG Cell 3, some of the area to the north of Cell 3 forms part of the Mersey Estuary Special Scientific Interest (SSSI).

10.1.9 The Private Wire Connection is located to the west of the SADA and is approximately 4km long. The proposed alignment for the Private Wire Connection, and the Main Site Access, follows existing access roads associated with Frodsham Wind Farm, including sections of the public right of way (PRoW) Frodsham RB98, part of Lordship Lane (PRoW Frodsham RB97) and part of Marsh Lane (PRoW RB40). No major construction works are anticipated along the Main Access Road, with only minimal improvements required e.g. repair of potholes. On this basis the Main Access Road is not included within the Study Area for this topic, other than associated with the

works to undertake the Private Wire Connection described above. Similarly, no construction is proposed along the private access road leading to the SPEN Frodsham Substation to the north of the River Weaver and so is not included within the Study Area for this topic.

10.1.10 Further detail on the Proposed Development is provided within **ES Vol 1 Chapter 2.0 [EN010153/DR/6.1]**. For the purposes of this ground conditions Chapter, it is, however important to note that two options are currently proposed for the NBBMA as follows:

- NBBMA Option 1: Infilling the 4no. ponds located to the north of Cell 3 with arisings generated from engineering works planned within Cell 3.
- NBBMA Option 2: All arisings from ground disturbance within Cell 3 to be reused within Cell 3 to sculpt resultant landform.

10.1.11 Further details on optionality is provided in **ES Vol 1 Chapter 3.0: Alternatives and Design Evolution [EN010153/DR/6.1]**.

10.1.12 For both options, the associated reuse of materials is proposed to be undertaken by means of using a Materials Management Plan (MMP)[1] under the Definition of Waste Code of Practice (DoWCoP)[i]. NBBMA Option 1 would be undertaken via a hub and cluster arrangement with NBBMA Option 2 to be undertaken via Site of Origin. Both options would be undertaken following soils remediation to be completed under a Remedial Strategy that would be approved by statutory consultees prior to undertaking the works. If for any reason it is not possible to undertake the works using the MMP, then a Deposit for Recovery (DfR) Permit would be obtained and the works undertaken under the requirements of that permit.

10.1.13 Due to the known presence of New Zealand Pygmy weed (NZPW) within the ponds to the north of Cell 3, the NZPM would be managed in accordance with an Invasive Non-Native Species Management Plan (INNSMP), the

[1] *Use of an MMP is in preference to a Deposit for Recovery Permit.*

requirement for which is set out in the **outline Construction Environmental Management Plan (oCEMP) [EN010153/DR/7.5]**. NZPW would be managed by the controlled draining of the ponds and filtration of water to prevent the spread of the NZPW. Once drained the base and sides of the ponds would be treated with herbicide and the surface materials scraped and either buried within Cell 3 to a depth of at least 20cm . Further details regarding the proposed Development and associated construction methodologies are provided within **Chapter 2.0 ES Vol 1 [EN010153/DR/6.1]**.

10.1.14 The BESS and Frodsham Substation will be sited within MSCDDG Cell 5 and there are two options that have been considered. Further detail is provided within **Chapter 2.0 ES Vol 1 [EN010153/DR/6.1]**.

Summary of Competency

10.1.15 The chapter has been prepared by Smith Grant LLP, an environmental consultancy specialising in contaminated land (and air quality) matters.

10.1.16 The author is an environmental scientist with over 20 years' experience in the field of environmental risk management. The author regularly provides contaminated land consultancy input to planning applications for a wide range of developments including housing, light and heavy industrial development, waste management and treatment facilities and energy infrastructure. The author is a Chartered Scientist and a full Member of the Institute of Environmental Sciences (IES).

10.1.17 The chapter has also been reviewed by a Chartered Member of the Chartered Institute of Water and Environmental Management and is an Associate Member of the Chartered Institution of Wastes Management.

10.2 Legislation, Policy and Guidance

Legislation

10.2.1 Land contamination can harm human health, groundwaters, surface waters, soils, ecosystems and property. As such it is controlled, either directly or indirectly, through a range of legislation, including, but not limited to:

i) Part IIA of the Environmental Protection Act 1990[ii] (Part IIA): establishes a system for identifying and remediating statutorily defined 'contaminated land'; and focuses on addressing contaminated land that meets the specific legal definition and cannot be dealt with via other means, including planning;

ii) Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009[iii]: These regulations amend certain provisions of the Water Resources Act 1991[iv] in order to implement requirements of the Water Framework Directive to improve the water quality of water bodies by, in particular, the control of diffuse pollution.

iii) Environment Act 1995[v]: Part IIA (as indicated above) is inserted into the Environment Act as Section 57;

iv) Contaminated Land (England) Regulations 2006[vi]: Provides provisions for the identification and remediation of contaminated land under Part IIA of the Environmental Protection Act 1990.

v) The Control of Asbestos Regulations (CAR) 2012[vii]: require duty holders (being any person who is responsible for maintenance or repair) of non-domestic properties to identify and manage asbestos containing materials (ACMs) within their buildings.

vi) The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[viii]: replaces previous legislation and outlines duties of regulators in relation to characterisation and classification of water bodies, environmental permitting, abstraction and impoundment of water; and,

vii) Environmental Permitting (England and Wales) Regulations 2016[ix]: impose provisions to prevent ground and water contamination from

operations requiring an Environmental Permit to operate; and implement controls for operations relating to the treatment or handling of contaminated soils.

10.2.2 Similarly, when dealing with land that may be unstable, the planning system works alongside a number of other regimes including Building Regulations.

National Planning Policy

10.2.3 The following National Policy Statements set out national planning policies in relation to nationally significant solar photovoltaic generation developments:

- Overarching National Policy Statement for Energy (EN-1)[x]; and
- National Policy Statement (NPS) for Renewable Energy Infrastructure (EN-3)[xi].

10.2.4 Furthermore, although it is relevant to the Proposed Development, there are no specific policies within EN-5[xii] which relate to contaminated land.

10.2.5 Relevant sections of these policies in relation to ground conditions are summarised in Table 10-1.

10.2.6 The policies of the *National Planning Policy Framework* (NPPF)[xiii] are also important and relevant considerations.

10.2.7 Relevant policies from the above documents are summarised in Table 10-1.

Table 10-1: Summary of National Planning Policy

Document	Paragraph Reference	Policy / Paragraph	Where addressed in the ES
NPS EN-1	5.11.13	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.	Section 8 and Sections 9 of this ES Chapter provide an assessment of impacts on soils relating to contaminated land, including mitigation to prevent further contamination of soils. An **outline Soil Management Plan [EN010153/APP/7.10]** is provided setting out the measures that would be adopted to manage soils on the Site.

Document	Paragraph Reference	Policy / Paragraph	Where addressed in the ES
			Environmental management plans have also been produced which apply to the construction, operational and decommissioning phases, and these contain measures to protect soil quality. Further information is provided within Section 10.7 and **oCEMP: [EN010153/DR/7.5] oOEMP: [EN010153/DR/7.6]** and **oDEMP: [EN010153/DR/7.7]**
	5.11.4 & 5.11.5	Development of land will affect soil resources, including physical loss of and damage to soil resources, through land contamination and structural damage. Indirect impacts may also arise from changes in the local water regime, organic matter content, soil biodiversity and soil process. Where pre-existing land contamination is being considered within a development, the objective is to ensure that the Site is suitable for its intended use. Risks would require consideration in accordance with the contaminated land statutory guidance as a minimum.	The assessment detailed within the ES Chapter and the supporting **ES Vol 2 Appendix 10-1 Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2]**, follow the LCRM guidance to assess the risks presented from Contaminated Land and land stability as set out in Section 10.3.1 and 10.3.2. Mitigation measures proposed within section 10.8 and 10.9 alongside Tables 10-14 and 10-15 detail mitigation measures for removing significant contaminant linkages. The **oCEMP: [EN010153/DR/7.5]** details the requirement for a Groundwater and Surface Water Management Plan (GWSWMP) and reducing runoff of silty or otherwise contaminated run off during construction.
	5.11.8	For developments on previously developed land, the risk posed by land contamination must be considered alongside how it is proposed to be addressed.	The assessment detailed within the ES Chapter and the supporting **ES Vol 2 Appendix 10-1 Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2]**, **f**ollow the LCRM guidance to assess the risks presented from Contaminated Land and land stability as set out in Section 10.3.1 and 10.3.2.

Document	Paragraph Reference	Policy / Paragraph	Where addressed in the ES
	5.11.14	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.	An **outline Soil Management Plan** [**EN010153/APP/7.10**] has been prepared to support the application.
	5.11.15	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, air, water or noise pollution or land instability.	The assessment detailed within the ES Chapter and the supporting **ES Vol 2 Appendix 10-1 Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2]**, **f**ollow the LCRM guidance to assess the risks presented from Contaminated Land and land stability as set out in Section 10.3.1 and 10.3.2. Environmental management plans have also been produced which apply to the construction, operational and decommissioning phases, and these contain measures to protect soil quality. Further information is provided within Section 10.7 and **oCEMP: [EN010153/DR/7.5] oOEMP: [EN010153/DR/7.6]** and **oDEMP: [EN010153/DR/7.7]**
	5.11.17 & 5.11.18	Applicants should ensure that a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination. Where contamination is present. applicants should consider	A land contamination assessment has been undertaken within this Chapter and is detailed within the supporting **ES Vol 2 Appendix 10-1 Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2]**. This assessment also discusses the engagement undertaken with the Environment Agency on this matter. Recommendations for further assessment and remediation alongside other appropriate

Document	Paragraph Reference	Policy / Paragraph	Where addressed in the ES
		opportunities for remediation where possible. It is important to do this as early as possible and engagement with the relevant bodies before the official pre-application stage.	mitigation measures are provided within Tables 10-14 and 10-15. A Remedial Strategy will be provided following DCO approval as detailed in the **oCEMP: [EN010153/DR/7.5]**.
NPS EN-3	2.10.29	While land type should not be a predominating factor in determining the suitability of the site location applicants should, where possible, utilise suitable previously developed land, brownfield land, contaminated land and industrial land.	The Applicant notes this and further details with respect to the previously developed land within the Order Limits are provided within ES **Vol 1 – Chapter 1.0 Introduction [EN010153/DR/6.1]**
	2.10.34	Applicants are encouraged to develop and implement a Soil Resources and Management Plan which could help to use and manage soils sustainably and minimise adverse impacts on soil health and potential land contamination. This should be in line with the ambition set out in the Environmental Improvement Plan to bring at least 40% of England's agricultural soils into sustainable management by 2028 and increase this up to 60% by 2030.	An **outline Soil Management Plan** [**EN010153/APP/7.10**] has been prepared to support the application.

Document	Paragraph Reference	Policy / Paragraph	Where addressed in the ES
NPPF	187	"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); 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; and, f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate."	The assessment detailed within this ES chapter alongside the supporting **ES Vol 2 Appendix 10-1 Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2]**. follows the LCRM guidance to assess the risks presented from Contaminated Land and land stability. Assessment of likely effects alongside proposed mitigation is provided within Tables 10-14 and 10-15.
NPPF	196	"Planning policies and decisions should ensure that: 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 measures including land remediation (as well as potential impacts on the natural environment arising from that remediation); 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, adequate site investigation information, prepared by a competent person, is available to inform these assessments."	The assessment detailed within this ES chapter alongside the supporting **ES Vol 2 Appendix 10-1 Stage 1 Geo-Environmental Assessment EN010153/DR/6.2]**. follows the LCRM guidance to assess the risks presented from Contaminated Land and land stability. Assessment of likely effects alongside proposed mitigation is provided within Tables 10-14 and 10-15. A Remedial Strategy will be provided following DCO approval as detailed in the **oCEMP: [EN010153/DR/7.5]**. The assessment provided in this chapter has been prepared by a competed person as set out in 10.1.11 – 10.1.13

Document	Paragraph Reference	Policy / Paragraph	Where addressed in the ES
NPPF	197	Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.	The Applicant agrees with this policy and is working to secure a safe development.

Local Planning Policy

10.2.8 Cheshire West and Chester Council (CWaCC) has adopted policies as specified within their Local Plan. Neighbourhood Plans for Ince and Frodsham have been prepared as supporting documentation.

i) Cheshire West and Chester Local Plan (Part One) Strategic Policies (January 2015)[xiv]
ii) Cheshire West and Chester Local Plan (Part Two) Land Allocations and Detailed Policies (January 2019)[xv]
iii) Ince Neighbourhood Plan (Adopted 2023)[xvi]
iv) Frodsham Neighbourhood Plan[xvii] (2024)

10.2.9 Further details of policies that are specific to Ground Conditions are provided in Table 10.2 below.

Table 10-2 – Summary of local planning policy and guidance

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES
CWaCC Local Plan (Part One)	Policy SOC5 Health and Well-Being	Development that gives rise to significant adverse impacts on health and quality of life (e.g. soil, noise, water, air or light pollution, and land instability including residential amenity, will not be allowed.	Assessment of likely effects is provided at Section 10.8 and mitigation is described in tables 10-14 and 10-15. The chapter supported by a **Stage 1 geo-environmental assessment: ES Vol 2 Appendix 10-1 [EN010153/DR/6.2]**

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES
CWaCC Local Plan (Part Two)	DM 32	In line with Local Plan (Part One) policy SOC5 and ENV4, development proposals on land known or suspected to be unstable or contaminated must demonstrate that they will not give rise to significant adverse impacts on health, controlled waters, ecological receptors, property and quality of life. Contamination: Development on previously developed sites or on land known or suspected to be contaminated must be supported by an appropriate contamination assessment which clearly demonstrates that the risk from contamination can be successfully mitigated and managed over the lifetime of the development… Instability: In areas of potential land instability, an assessment should be made to ensure that the land is suitable for the proposed development, and that development can be undertaken, occupied and used without risk to people and property resulting from underground conditions. Areas of potential land instability will include those of vulnerable topography or geology […]	Assessment of likely effects is provided at Section 10.8 and mitigation is described in tables 10-14 and 10-15. The chapter supported by a **Stage 1 Geo-environmental assessment: ES Vol 2 Appendix 10-1 [EN010153/DR/6.2].** The assessment considers effects relating to contamination and ground instability. **Measures to** ensure these matters are managed during construction are included within the **oCEMP: [EN010153/DR/7.5]**.
Ince Neighbourhood Plan		No specific policies addressing contaminated land referenced	N/A
Frodsham Neighbourhood Plan		No specific policies addressing contaminated land referenced	N/A

National Best Practice and Guidance

10.2.10 This assessment provided in this chapter has also been undertaken with reference to the following guidance.

10.2.11 The Environment Agency (EA) Land Contamination: Risk Management Guidance (LCRM)[xviii] provides an overarching framework for the assessment

and investigation of land contamination. It replaces the previous Contaminated Land Report 11: Model Procedures for the Management of Contaminated Land 2004.

10.2.12 It is designed to be used in a range of regulatory and management contexts such as voluntary remediation, planning, assessing liabilities or under the Part 2A contaminated land regime. The guidance sets out a phased approach to the assessment of land contamination and specifies requirements for reports produced as part of the process, including Preliminary Risk Assessments and Generic and Detailed Quantitative Risk Assessments (GQRAs and DQRAs).

10.2.13 The EA Guidance is supported by, and cross-refers to, an extensive range of additional statutory and non-statutory guidance relating to aspects such as site investigations, protection of groundwater, understanding and managing asbestos (for example, reference to CAR Soil[xix], definition of waste and the specific investigation and assessment procedures under Part IIA).

10.2.14 The Contaminated Land Statutory Guidance (April 2012)[xx] guidance document provides guidance to local authorities on how to determine whether a site is contaminated under Part IIA of the Environmental Protection Act 1990.

10.2.15 Further guidance is provided in the Planning Practice Guidance on Land Affected by Contamination[xxi] which provides guiding principles on how planning can deal with land affected by contamination. The guidance sets out when contamination may be present, the role of planning when dealing with land which may be contaminated, what a contamination risk assessment may contain and how to determine unacceptable risk. The guidance states that where there is a reason to believe contamination could be an issue, proportionate but sufficient site investigation information (including both desk based and ground investigation) should be prepared by a competent person to determine the existing or otherwise of contamination. This is set out in this chapter and **Stage 1 Geo-environmental assessment: ES Vol 2 Appendix 10-1 [EN010153/DR/6.2]**

10.2.16 Further guidance is also provided in the Planning Practice Guidance on Land Stability[xxii] which provides guiding principles on how planning can deal with land stability. The effects of land instability may result in landslides, subsidence or ground heave. Failing to deal with this issue could cause harm to human health, local property and associated infrastructure, and the wider environment. The guidance sets out steps to be taken when land stability is suspected to be an issue for a planning application, what a land stability risk assessment should include and measures to be taken to mitigate the risk of subsidence. The guidance also sets out the role of the Mining Remediation Authority (previously The Coal Authority) in the planning system to prevent land instability. Our approach to dealing with land stability has been to undertake a desk-based risk assessment to identify areas of potential land instability such as issues with slope instability, landslides and mining hazards. Such constraints have been applied to the outline design, and a geotechnical assessment will be completed following DCO approval, to inform detailed design and to mitigate any significant risks identified to the development from land instability.

10.3 Assumptions and Limitations

10.3.1 Assessments of ground conditions are inherently reliant on the data available. This assessment has been based on intrusive ground investigation data available over the Site. It is considered that investigation has been undertaken to a level sufficient to inform an assessment at the planning phase of a project. It is acknowledged that as with any ground investigations, conditions reported are specific to each intrusive location and that conditions may vary in between entries, however it is considered that there is sufficient information to characterise the existing ground conditions and to identify likely significant effects and likely required mitigation measures.

10.3.2 The LCRM[xvii] framework provides reasonable worst-case scenarios and previous sampling results have been compared to human health critical values (HCVs) for initial screening purposes. Given the Proposed Development is proposed for electricity generation to be occupied by construction workers and maintenance workers, commercial HCVs have been used. PRoW will be present within the Proposed Development and as such, HCVs derived for a public open space park (public open space 2) setting without plant uptake, primarily from the Suitable for Use Levels (S4ULs)[xxiii], have been utilised for members of the public using the PRoW. Reference is made to the S4ULs for a soil with 2.5% soil organic matter which is a typical value recorded on Site. These are very conservative values and provide the worst-case scenario for human receptors.

Assumptions

10.3.3 For a detailed description of the Proposed Development, refer to **ES Vol 1 – Main Report Chapter 2.0: The Proposed Development [EN010153/DR/6.1]**. For the purposes of this ground conditions assessment, the following information is assumed:

i) Photovoltaic (PV) modules within the Solar Array would be mounted on frames that would either have spread foundations or be piled into the

ground (via driven pile mechanism or screw/helical piles) to depths of between 1.5 and 5.0 metres below ground level (m bgl);

ii) The BESS, inverters, transformers and switch gear would be placed on a raft or strip footings, or pile foundations to a depth of 4.0m;

iii) The finalised design of the proposed BESS units would be confirmed at detailed design however the indicative design comprises the placement of containers above ground (on either a concrete slab foundation or a concrete pile foundation, depending on ground conditions). There will be a ventilated void space beneath the container and ventilation in terms of vents and caged wall panels incorporated within the container (refer to: Image 2-3 and 2-4).

iv) Both of the BESS / Frodsham Solar Substation options have been considered in the assessment – both would be located on Cell 5 of the MSCDDG and would be located on similar ground conditions.

v) Roads are constructed above ground level (following the removal of any shallow topsoil, organic soils, vegetation etc.), utilising appropriate geotextiles, geogrid and engineered fill.

vi) A development stand-off (buffer) of a minimum of 10m in plan from the toe of existing earth bunds surrounding the MSCDDG cells would be applied to safeguard the stability of these structures during construction, operation and decommissioning of the Proposed Development.

vii) Required stand offs to existing utilities crossing the Site would be applied as required by each relevant utility owner (refer to Table 2-11, Easements applied to Utilities Crossing the Site).

viii) The proposed SPEN electrical wire connection would comprise Trident or H poles constructed of timber. The foundation solution for the poles located within the SADA is likely to be pole brace block and/or steel foundation braces. However, on the land adjacent to the SPEN / National Grid Substation it may be necessary to utilise an alternative foundation depending on the ground conditions identified at the point of detailed design. The foundation solution in this location could be pole brace block and/or steel foundation braces; soil mixing with a cementitious product;

concrete mass foundation (with pole fixed to the foundation block); or piled concrete slab (with pole fixed to the concrete slab).

ix) The construction compounds would be situated upon a semi-permeable hardcore / gravel mix laid on a geomembrane. The buildings associated would be of either a modular or containerised design.

x) Construction of the NBBMA will take the form of the options described at paragraph 10.1.10. The NBBMA will remain insitu following the operational phase.

xi) Disruptions to the existing PRoW on Site would be minimised with PROWs being kept open where possible or closed for a short period of time during construction and decommissioning phases.

xii) The operational areas of the Site e.g. Solar PV Array areas, BESS and Frodsham Solar Substation, would be fenced off and access to the public would be prevented.

xiii) The adjacent Inovyn Deposit Ground and MSC Cell 6 with their associated bunds would not be disturbed during construction, operation and decommissioning of the Proposed Development.

xiv) There are various features located within the Order Limits which will not be subject to disturbance or development. These include: Frodsham Marsh Farm, The Lum, Frodsham Pumping Station, Former Sewage Outfall, the Skylark Mitigation Area and the existing and the operational Frodsham Windfarm. The location of these are shown on the Site Features Plan as Drawing D01 included within **ES Vol 2 – Technical Appendices, Appendix 10-1 [EN010153/DR/6.2]**.

10.4 Consultation and Engagement

10.4.1 A Scoping Report **ES Vol 2 Appendix 1-1 [EN010153/DR/6.2]** was submitted to PINS on the 31 May 2023. The report sets out the findings of the scoping exercise and details the technical guidance, standards, best practice and criteria to be applied in the assessment to identify and evaluate the likely significant effects of the Proposed Development on ground conditions.

10.4.2 A Scoping Opinion was received on 10 July 2023 **ES Vol 2 Appendix 1-2 [EN010153/DR/6.2]**. The feedback received from PINS and stakeholders within the Scoping Opinion, has been reviewed and the points relating to the Ground Conditions are summarised in Table 10-3 below.

10.4.3 Statutory Consultation on the project took place between 7th November and 19th December 2024. This included consultation on the Preliminary Environmental Information Report. The feedback received from statutory consultees is summarised in Table 10-4.

10.4.4 An information request with respect to contamination issues on or within the vicinity of the Site were made to CWaCC and the EA. Responses and details of the information provided have been discussed within the Stage 1 Geo-Environmental Assessment report of **ES Vol 2 Appendix 10-1 [EN010153/DR/6.2]**.

10.4.5 To understand the requirements of the Environment Agency (EA), specifically regarding the re-use of Cell 3 arisings, the technical team has consulted with the EA. Further details are provided below Table 10-4.

Table 10-3: Scoping Responses with Respect to Ground Conditions

Consultee (ID ref)	Comment	Response
Inspectorate (3.4.1)	The Inspectorate, having considered the information provided within the Scoping Report agrees that significant effects on human health from exposure to contamination during operation are unlikely to occur and agrees to scope this matter out from further assessment. However, given the potential for the effects of decommissioning to be similar to those of the construction phase and based on the information available, the Inspectorate does not agree to scope out an assessment of the effects of contamination on human health during decommissioning at present.	An assessment of the effects of contamination on human health during decommissioning phase has been included in Sections 10.7 & 10.9, Tables 10-14 & 10-15. An **outline Decommissioning Environmental Management Plan (oDEMP) [EN010153/DR/7.7]** has been provided and includes details of standard occupational hygiene measures and protocols to deal with unexpected contamination or pollution incidences during decommissioning works.
Inspectorate (3.4.2)	The Inspectorate, having considered the information provided within the Scoping Report agrees that significant effects on human health from UXO during operation and decommissioning are unlikely to occur and agrees to scope this matter out.	The effects of UXO have been considered within at Sections 10.6.29-10.6.30 10.7 and Tables 10-14 & 10-15. An **outline Construction Environmental Management Plan oCEMP is provided [EN010153/DR/7.5]**. This includes measures to deal with risks from UXO.
Inspectorate (3.4.3)	The Inspectorate, having considered the information provided within the Scoping Report agrees that significant effects arising from remobilisation of contaminants in controlled waters during operation are unlikely to occur and agrees to scope this matter out, however, given the baseline conditions, the Inspectorate considers there is potential for contamination events to occur during decommissioning of the Proposed Development. The ES should assess impacts from decommissioning to controlled waters where there is the potential for significant effects to occur. Best practice measures should be employed and secured via the DCO to ensure any potential pollution impacts are minimised.	An assessment of potential contamination effects on Controlled Waters during the decommissioning phase has been included in the Sections 10.7 & 10.9, Tables 10-14 & 10-15. In support of this, the **Outline Decommissioning Environmental Management Plan (oDEMP) [EN010153/DR/7.7]** includes protocols to address unexpected contamination or pollution incidents during decommissioning.
Inspectorate (3.4.4)	The Applicant's attention is drawn to ID 3.4.3. Given the potential for contamination events to controlled waters to occur during construction and decommissioning of the Proposed Development, the Inspectorate considers that this has the potential to impact ecological receptors during these phases. The ES should assess the impacts from decommissioning of the development where there is the potential for significant effects to occur. Cross reference should be made to the biodiversity assessment of the ES.	The ES assesses potential effects on ecological receptors and Controlled Waters during both construction and decommissioning (Sections 10.7 & 10.9, Tables 10-14 & 10-15; see also Section 7.8 in **ES Vol 1 Chapter 7: Terrestrial Ecology [EN010153/DR/6.1]**).

Consultee (ID ref)	Comment	Response
Inspectorate (3.4.5)	The Inspectorate, agrees that considering the location and nature of the Proposed Development, that significant effects on property from the potential for instability/settlement during operation and decommissioning are unlikely to occur and agrees to scope this matter out.	Potential instability or settlement during operation and decommissioning phases has been scoped out of this chapter; however, the assessment does examine potential instability or settlement during construction (Sections 10.7 & 10.9, Tables 10-14 & 10-15).
Inspectorate (3.4.6)	The Inspectorate notes that the Applicant proposes to scope out the effects of the introduction of deeper dredging soils to surface soils on grazing livestock. Given the limited information provided within the Scoping Report regarding known contaminant levels, grazing regimes and mitigation measures, the Inspectorate does not agree to scope this matter out. The ES should assess the impacts from all phases of the development where there is the potential for likely significant effects to occur.	The effects of introducing deeper dredged soils to surface soils on grazing livestock across the construction, operation, and decommissioning phases has been considered in Tables 10-14 & 10-15.
CWaCC & EA	The ES should identify and address known landfill sites in the area, including Manchester Ship Canal Company's Frodsham Marsh Tipping Lagoon, East Clifton Marsh and Kemira Growhow Landfill. Consultation with CWaCC's Environmental Protection and the Environment Agency is recommended in preparing the ES. The EA has provided some additional information on landfill sites in their response to the SR. Consideration of Environmental Permitted sites is also referred to in the EA response (recommending consultation with the Permit Holders).	The Applicant consulted the Environment Agency (EA) and the Cheshire West and Chester Council (CWaCC) Environmental Protection Team for data on known landfill sites in the area. Information from borehole records (installation details, logs, monitoring and chemical data) is incorporated into the baseline including Sections 10.6.20–10.6.23, 10.6.57–10.6.64; Section 5.11 and Table C.6 in the **Stage 1 Geo-Environmental Assessment Report, ES Vol 2 – Technical Appendices [EN010153/DR/6.2**].
CWaCC	The ES should address Policy M 4 - Proposals for exploration, appraisal or production of hydrocarbons in LP2.	Protected areas have also been identified in accordance with the Onshore Hydraulic Fracturing (Protected Area) Regulations 2016[xxiii], although this policy is noted as not relevant to the assessment (Sections 5.14, 5.4.1, Table 7.1, Drawing D01 in the **Stage 1 Geo-Environmental Assessment Report, ES Vol 2 – Technical Appendices [EN010153/DR/6.2**]).
CWaCC	It is important that the ES is accompanied relevant reports as part of the Phase 1 Preliminary Risk Assessment report and Stage 2 Supplementary investigation to be submitted as a technical appendix to the Ground Conditions Chapter of the ES.	Both Phase 1 and Phase 2 geo-environmental data and assessment have been included within this chapter. **ES Vol 2 Appendix 10-1 Stage 1 Geo-Environmental Assessment** (includes assessment of Phase 2 data plus inclusion of Appendix G (assessment of Cell 3) and Appendix H (assessment of Wildfowlers Land) Plus Appendix I (Peat Reconnaissance Survey) **ES Vol 2 - Technical Appendices [EN010153/DR/6.2].**

Consultee (ID ref)	Comment	Response
CWaCC	Frodsham / Ince Marshes passes through an area containing important peat resources. The Site is identified as having deep peaty soils: area covered with a majority of peat greater than 40cm deep. It is understood that there are up to c 20m of post- glacial deposits in the area, made up of interleaved peat and estuarine alluvium. Borehole data on the BGS website may provide further detail. Natural England should be consulted in relation to the impact of the Proposed Development in relation to peat deposits. Natural England's Peat Concerns are documented in their response to the Cheshire West and Chester Local Plan Early Consultation response (16 May 2022) (NE ref: 357941). Appended (Appendix CWaCC SR.4 Natural England letter 16 May 2022). Consultation with Cheshire Wildlife Trust (CWT) is also recommended in preparing the ES, as CWT are undertaking a study in relation to peat deposits, and further information may be available from CWT. Findings in relation to peat should be cross referenced with other Chapters in the ES including biodiversity, cultural heritage, and climate change.	This chapter and associated supporting information includes a summary of baseline conditions with reference to peat and organic deposits in terms of extent and depths across the Site. A Peat Reconnaissance Survey has been included within **ES Vol 2 Appendix 10-1 Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2].** The impact of disturbance and/or removal of peat on climate change and removal of peat resource has also been considered within **ES Vol 1 Chapters 7: Terrestrial Ecology, Chapter 11: Cultural Heritage and Chapter 5: Climate Change. [EN010153/DR/6.1].** Applicant has consulted NE and CWT.
CWaCC	Minerals impacts have not been fully considered within the SR and should be included in the ES. The Site is not covered by Mineral Safeguarding Areas. Do initial ground investigations indicate the presence of sand or gravel in this area? Paragraph 10.4.5 suggests that there may be some areas of sand. Have the deposits made in the former Weaver Navigation Dredging Deposit Ground or any other parts of the Site resulted in any localised sand reserves or areas of potential contamination? If there are significant areas of sand and gravel the potential for prior extraction should be considered.	This chapter has included reference to mineral safeguarding areas and the presence of any sand and gravel through review of desk study and intrusive investigation data. Sections 10.6.37 & 10.6.38, Table 10-10. Ground investigation has been undertaken and reported within the ES with associated assessment. Dredging material within the MSCDDG cells, although granular in places generally contain a silty fraction Contamination of such deposits has been identified (in terms of the leachability) and hence aggregate for extraction may need to be subject to remediation before it can be reused on other Sites. The natural glacio-fluvial sands and gravels within the eastern area of the Site (outside of the dredging cells) is situated at depth hence extraction may not be viable. The former Weaver Navigation Dredging Deposit Ground has been removed from the Proposed Development area i.e. is now located

Consultee (ID ref)	Comment	Response
		outside the Order Limits and so has not been subject to ground investigation.
CWaCC	As it is not possible to scope out potential likely significant effects on human health that may arise from construction or UXO during the construction phase this should be included in the ES.	The effects of human health during construction phase and UXO during construction have been considered within this chapter (Sections 10.6.29-10.6.30 10.7 and Tables 10-14 & 10-15). The **oCEMP [EN010153/DR/7.5]** includes measures to deal with risks from UXO.
CWaCC	As it is not possible to scope out potential likely significant effects on controlled waters from the impacts of contamination being remobilised during construction this should be covered in the scope of the ES.	This chapter has considered the potential likely significant effects on Controlled Waters receptors during construction and decommissioning from the presence of leachable contaminants (Sections 10.7 & 10.9, Tables 10-14 & 10-15). PINS has agreed to scope out the contamination impacts on controlled waters during operation. The **oCEMP [EN010153/DR/7.5]** includes procedures in the event of encountering unexpected contamination or a pollution incidence during construction works. The **oDEMP [EN010153/DR/7.6]** provided with the DCO application and will includes protocols to deal with unexpected contamination or pollution incidences during decommissioning works.
CWaCC	The ES should include an assessment of potential impacts on ecological receptors that may arise from contamination during the construction phase as indicated in the SR.	The potential effects on ecology during the construction and decommissioning Phases have been considered within this chapter (Sections 10.7 & 10.9, Tables 10-14 & 10-15).
CWaCC	CWaCC's Environmental Protection concur with the conclusions and the summary of Assessment Scope contained within Table 10.6. The proposed Phase 1 Preliminary Risk Assessment and Phase 2 Supplementary investigation will assess potential contamination at the Site and will inform the Environmental Statement.	Both Phase 1 and Phase 2 geo-environmental data and assessment have been included within this chapter. **Appendix 10.1 Stage 1 Geo-Environmental Assessment** (includes assessment of Phase 2 data plus inclusion of Appendix G (assessment of Cell 3) and Appendix H (assessment of Wildfowlers Land) Plus Appendix I (Peat Reconnaissance Survey) Provided in **ES Vol 2 - Technical Appendices [EN010153/DR/6.2].**

Table 10-4 – PEIR Consultation Response

Consultee / Respondent	Comment	Response
Natural England	Developments should secure long-term land use, beneficial soil re-use, management, monitoring and restoration. This should cover the lifetime of the development. Any actions which compromise options for the future use of the land, or which undermine its inherent capability should be avoided. Soil health should be protected and enhanced.	The Applicant acknowledges the requirements to secure the long-term land use, beneficial soil re-use, soils management and restoration for the lifetime of the development. An **outline Soil Management Plan [EN010153/DR/7.10]** has been provided with the application to seek to achieve these aims where practicable.
Cheshire West and Chester Council	CWCC's Environmental Protection previous comments (email dated 04/07/2024) relating to the scoping request 23/01780/SCO and the Smith Grant Environmental Consultancy (May 2024) Stage 1 Geo-Environmental Assessment. Frodsham Solar, Frodsham Marshes WA6 SN. Ref: R3091-R01-v3 are noted: "Smith Grant conclude that further detailed investigation and assessment will be required at the detailed design phase which will focus on proposed areas of piling and ground disturbance and the areas of the Site where there is the potential for localised contamination. Design of the buildings onsite will also consider potential gas risk. We concur with this recommendation. The submission of the Phase 2 site investigation report will be a requirement of any DCO application. We also advise that the Environment Agency should be consulted regarding controlled waters." The Stage 1 Geo-Environmental Assessment has now been submitted within the Preliminary Environmental Information Report Appendix 10-1: Stage 1 Geo-Environmental Assessment. The information has been updated to include a letter from Smith Grant Environmental Consultancy (15 July 2024) Re: Frodsham Solar MSCDG Cell 3 – Summary of Chemical Test Results Recorded During Third Party Ground Investigation (February 2024 & June 2024). Environmental Protection has not been able to provide a detailed response to the latest site investigation undertaken by Wardell Armstrong in time for this PEIR response. However, it is expected that this will be reviewed in January 2025 and comments provided prior to the DCO application submission.	The Application notes that the submission of the Phase 2 site investigation report focused on proposed areas of piling and ground disturbance where there is the potential for localised contamination will be produced once DCO approval is received and will be submitted to the LPA and other statutory consultees for their approval and comments. A Site Investigation has been performed upon the footprint area of two options for the BESS within MSCDDG Cell 5. The assessment is provided within **Appendix J of Appendix 10.1 Stage 1 Geo-Environmental Assessment ES Vol 2 - Technical Appendices [EN010153/DR/6.2].** The Stage 1 Geo-Environmental Assessment has also reviewed results from other site investigation across the Site.

Consultee / Respondent	Comment	Response
Cheshire West and Chester Council	Comment summarised below: Following our comments of 04 July 2024, the Environmental Protection Team have no additional comments to make. Such comments were: further detailed investigation and assessment (including ground gas risk assessment) will be required at the detailed design phase which will focus on proposed areas of piling and ground disturbance and the areas of the site where there is the potential for localised contamination. Consultation with the EA regarding controlled waters. Any approval be subject to conditions to ensure contamination is adequately addressed. 1. No development (except demolition and site clearance works) shall take place until a preliminary risk assessment, a detailed scheme of site investigation, a remediation options appraisal and implementation strategy and a verification plan including identifying any requirements for longer-term: - monitoring of pollutant linkages; maintenance, contingency actions and reporting have been submitted to and approved by the Local Planning Authority (LPA). Unsuspected contamination: If encountered during site preparation, demolition or development works, the LPA shall be notified promptly in writing confirming: - the areas affected, the approved investigation, remediation and validation measures to be applied and the anticipated completion timescale. If contaminant is from a different source or - contains a new contaminative substance or - affects a new pathway or receptor then revised proposals for detailed investigation, risk assessment, remediation and verification shall be submitted for the written approval of the LPA prior to all but urgent remediation works necessary to secure the area and control pollution risks. No part of the development site approved by this permission shall be occupied until: a) all components of the pre-approved or revised remediation measures have been completed and b) full written validation has been submitted to and accepted by the LPA.	If unsuspected or unexpected contamination is identified during Site preparation, demolition, clearance and construction then works will stop in the affected area, while further investigation is carried out. The LPA will be notified promptly in writing confirming approved investigation, remediation and validation measures and approval to undertake such measures will be sought. For any new contaminant sources, substances and contaminant linkages, works will stop in the area and the area will be secured until the LPA has agreed the proposed investigation, remediation and associated validation measures. A verification completion report will be provided and subject to approval by the LPA prior to Site occupation A protocol for dealing with unexpected contamination is provided within the **oCEMP [EN010153/DR/7.5]** and **oDEMP [EN010153/DR/7.7]**. A protocol to deal with unsuspected contamination is referenced within Section 10.7.2 and the **oCEMP [EN010153/DR/7.5]**.

Consultee / Respondent	Comment	Response
Canal and River Trust	Respondent noted that there is potential that the Proposed Development could introduce new pathways for contamination migration during construction, operation and decommissioning phases, including through hydraulic continuity. Respondent added that a particular risk of contaminant mobilisation is associated with ground disturbance during foundation works (piles and excavations) across the Solar Array Development Area (SADA) however it is considered that mitigation techniques could reduce the risk to a low or negligible level, with which the Trust concur. The mitigation practices outlined (in chapter 10 for Ground Conditions and in the Outline Construction Environmental Management Plan (oCEMP) including silt traps near to surface watercourses as per a Surface Water management Plan, and dewatering practices, are considered appropriate.	The Applicant notes this comment and appreciates the importance of mitigation of contaminant mobilisation during ground disturbance (as included within Tables 10-14 and 10-15 and the **oCEMP [EN010153/DR/7.5]**). The Incorporated Mitigation set out in this assessment is included within the provisions of the Application via the **oCEMP [EN010153/DR/7.5]**.
Canal and River Trust	Respondent noted additional detailed investigation and assessment is recommended to be undertaken to inform the detailed design, which would focus on proposed areas of piling and ground disturbance. This includes a Foundation Works Risk Assessment, and a Piling Risk Assessment (PRA) to inform the most suitable piling technique to reduce the likelihood of contaminant remobilisation, which the Trust consider to be an appropriate approach.	The Applicant notes this comment and appreciates the importance of mitigation of contaminant mobilisation during areas of piling and ground disturbance which will be provided at Detailed Design and comprise a FWRA which will incorporate a PRA. Such proposals are included within Section 10.9.1 and the **oCEMP [EN010153/DR/7.5]**.
Canal and River Trust	Respondent stated that as the Proposed Development involves work to connect the solar array to the SPEN Frodsham station, there is potential for ground disturbance and foundation works in proximity to the Weaver Navigation on the north bank of the River Weaver. Respondent added that the Trust would seek that appropriate best practice and mitigation measures to safeguard the River Weaver and Weaver Navigation against potential contamination is employed throughout this process.	The Applicant notes this comment and appreciates the importance of mitigation of contaminant mobilisation during areas of piling and ground disturbance which will be provided at detailed Design and comprise a FWRA which will incorporate a PRA. Such proposals are included within Section 10.9.1. Mitigation of contaminant mobilisation during ground disturbance which is included within Section 10.9.1 and the **oCEMP [EN010153/DR/7.5]**.
Canal and River Trust	Respondent stated that it is understood that protective measures for waterways would be employed during all phases of the Proposed	Comment noted.

Consultee / Respondent	Comment	Response
	Development through the guiding documents. If that is the case, the respondent would be reassured that the Navigation should not be adversely affected. The Trust request to be kept informed of mitigation measures and working practices relating to ground conditions, contaminated land and land instability as further detail emerges through the consenting process.	
Environment Agency	Mobilisation of contaminants (PEIR Chapter 10, Section 10.9, Paragraph 10.9.2 and Appendix 10.1, table 9.5) Issue: Further risk assessment and monitoring has not been proposed for the Private Wire Connection and proposed SADA within MSCDDG, although it has been proposed for the NBBMA area of the scheme. Impact: Excavation works across the areas of dredging infill could mobilise contaminants that could migrate into ground and surface waters. Solution: Include risk assessments and monitoring for all areas of the scheme where the dredging infill material will be excavated and disturbed. The proposed monitoring strategy should be submitted to the Environment Agency for approval.	The Applicant confirms that a detailed risk assessment and proposed monitoring strategy to cover all areas of the scheme where dredging infill material is to be excavated and disturbed will be provided at Detailed Design Stage. The Environment Agency will be consulted on the strategy and this is secured within the Requirements of the draft DCO.. Detailed site investigation and development of mitigation measures is secured via the **oCEMP [EN010153/DR/7.5]**.
Environment Agency	Unexpected Contamination Protocol (Chapter 10, Sections 10.7, Paragraphs 10.7.3 (v) and 10.7.7 (iv)) Issue: A discovery strategy protocol for unexpected contamination is proposed to be included in the CEMP and the Decommissioning Environment Management Plan (DEMP). Impact: If works in the affected area continue while the potential contamination is investigated, there is a potential for contamination to be spread further before its extent and severity is identified, and appropriate remediation is agreed. Solution: We request the addition of an unsuspected contamination requirement for the construction works. The unsuspected contamination requirement should mention stopping works in the affected area, while further investigation is carried out. Additional comment The inclusion of this protocol in the DEMP is satisfactory, but we prefer a requirement for the reporting of	An unsuspected contamination protocol (using the required wording as specified by the Environment Agency) has been included within the **oCEMP [EN010153/DR/7.5]** and **oDEMP [EN010153/DR/7.7]**.

Consultee / Respondent	Comment	Response
	unsuspected contamination during the main construction works. Unsuspected Contamination Requirement Wording: (1) In the event that contaminated land, including groundwater, is found at any time when carrying out the authorised development, which was not previously identified in the environmental statement, then no further development (unless otherwise approved in writing by the relevant authorities) shall be carried out within the identifiable perimeters of the area in which the suspected contamination is located. It must be reported as soon as reasonably practicable to the local planning authority, and where necessary, the Environment Agency, and the undertaker must complete a risk assessment of the contamination in consultation with the local planning authority, and where necessary, the Environment Agency. (2) Where the undertaker determines that remediation of the contaminated land is necessary, a written scheme and programme for the remedial measures to be taken to render the land fit for its intended purpose must be submitted to and approved in writing by the local planning authority, following consultation with the Environment Agency. (3) Remediation must be carried out in accordance with the approved scheme under sub paragraph (2). (4) Following the implementation of the remediation strategy approved under subparagraph (2), a verification report, based on the data collected as part of the remediation strategy and demonstrating the completion of the remediation measures must be produced and supplied to the relevant planning authority and the Environment Agency.	
Environment Agency	Risk Assessment Clarity (Chapter 10, section 10.9, Paragraph 10.9.1 (i) & (ii)) Issue: The report mentions that a Foundation Works Risk Assessment (FWRA) will be produced to support the construction phase and will be agreed in consultation with the Environment Agency. It also states that a PRA will be produced and included in the oCEMP. It is not clear how these assessments will differ. Impact: Lack of clarity about the content and scope of these documents. Solution: For the avoidance of confusion, we expect all works relating to foundations and any potential mobilisation of contamination associated with those foundations (including piling), to be covered by	The Applicant confirms that the PRA will be included within the FWRA which will form part of the CEMP once detailed design is finalised. This is secured within the **oCEMP [EN010153/DR/7.5]**.

Consultee / Respondent	Comment	Response
	a FWRA, that will be included in the CEMP, with the EA as a named consultee for approval.	
Environment Agency	Boreholes (Chapter 10, Section 3, Paragraph 10.3.3 (xii), Section 6, Paragraphs 10.6.22 - 58) Issue Two active permitted sites lie adjacent to the site boundary. The INEOS Inovyn Deposit Ground (ref EPR/KC3591CN/V004) and Cell 6 of the MSCDDG (ref WML53719 & EPR/XP3196CU/V003). Both permits have associated leachate and groundwater monitoring boreholes. The locations of these boreholes in relation to the site boundary of the Proposed Development is not made clear in Chapter 10. Impact Lack of clarity around the location of monitoring boreholes could result in them being destroyed or disturbed during development. Solution Provide a plan showing the development boundary with the monitoring boreholes clearly shown.	Locations of the three monitoring wells for the Inovyn Deposit Ground and four monitoring wells surrounding MSCDG Cell have been included within the Site Features Plan (Figure D01 of the **Stage 1 Geo-Environmental Assessment Report which is provided in ES Vol 2 - Technical Appendices [EN010153/DR/6.2]).** All of these monitoring wells are located outside of the Order Limits and won't be disturbed during construction works.
Environment Agency	Construction & Decommissioning: Waste management (Appendix 10-1: Stage 1 Geo-Environmental Assessment waste, and Section 2.8) Issue Material excavated from areas A, B,1,2,C,3,4,5,6,D,E,F,G,H,11,12,13 on the waste and landfill map (page 55) is considered to be waste. Any excavations and reuse of waste material may attract contemporary waste legislation. Any material later identified to be deposited waste must be reported to the environment agency and included in the materials management plan. Impact Waste material can pose a risk of contaminating the surface and groundwater environment, if not managed correctly. Solution Consideration should be given to the following: • a Deposit for Recovery (DfR) permit for waste material that is intended for reuse on site. Waste recovery plans and deposit for recovery permits - GOV.UK. registration of an appropriate waste exemption: Using waste: waste exemptions - GOV.UK • If soils are to be removed offsite as waste, waste classification testing will be required to be compliant with WM3 Waste_classification_technical_guidance_WM3.pdf. • Excavation of waste should not begin until a scheme for lawful reuse	The Applicant has assessed the ground conditions within **ES Vol 1 Chapter 10: Ground Conditions [EN010153/DR/6.1]**. It is considered possible to use a Materials Management Plan under DoWCoP to enable reuse of excavated materials on the Site based on the information gathered within **ES Vol 2 Appendix 10-1: Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2]**. The Applicant has recognised that if the use of a Materials Management Plan (MMP) is not considered possible then a Deposit for Recovery (DfR) permit will be required. This approach is secured within the **Outline Construction Environmental Management Plan (oCEMP) [EN010153/DR/7.5].** The Applicant has consulted with the EA in relation to soils management at the Site, this is detailed within Table 10.5 & **Appendix C.2 of Appendix 10-1 ES Vol 2 - Technical Appendices [EN010153/DR/6.2]).** **ES Vol 1 Appendix 10-2 Remediation Technical Concept Note [EN010153/DR/6.1]** describes the potential outline approach to be adopted for the remediation of soils managed in the creation of the NBBMA. This note recognises the

Consultee / Respondent	Comment	Response
	of the waste material on site has been submitted and agreed by the Environment Agency. Additional comment For information regarding the management, classification, and legislation relevant to waste, please review our response letter XA/2024/100098/01-L01 (dated 05 July 2024).	requirement of relevant licensing and agreements with the regulator.
Environment Agency	Construction & Decommissioning: Dredging Waste Material (Chapter 10, section 10.9, Paragraph 10.9.1 (iv), 10.12.7 and 10.12.8) Issue Much of the Site is underlain by dredging material which may be considered as waste. The movement of it around the Site may therefore require an Environmental Permit or Material Management Plan. Impact: Delays to the Proposed Development. Solution: Please ensure early discussions with the relevant teams at the Environment Agency. Additional comment We are currently discussing with our technical specialists whether your proposal to manage dredging deposit soils using DoWCoP, and a material management plan are appropriate (as per your email dated 26 November 2024). We will respond in due course.	The has been ongoing engagement between the Applicant and the EA regarding the proposed route for materials management. The correspondence is provided within Table 10.5 of **ES Vol 1 Chapter 10: Ground Conditions [EN010153/DR/6.1**] & **Appendix C.2 of Appendix 10-1 ES Vol 2 - Technical Appendices [EN010153/DR/6.2]).** As set out previously it is considered possible to use a Materials Management Plan under DoWCoP to enable reuse of excavated materials on the Site.

10.4.6 The Applicant has been engaging with the Environment Agency throughout the pre-application period via their pre-application advice service. Prior to the statutory consultation on the PEIR the Applicant provided a draft copy of the Stage 1 Geo-Environmental assessment for review. The EA responded in July 2024, *XA 2024 100098 01 Stage 1 Geo-environmental draft review Frodsham Solar Project (dated 05 July 2024),* this response is provided in Appendix **D.2 of . Appendix 10-1 ES Vol 2 - Technical Appendices [EN010153/DR/6.2].** The response confirmed that the EA were "*largely satisfied with the conceptual site model presented within table 9.5, and the recommendations for further works in relation to assessing risks from identified contamination*". Te EA requested measures to deal with unexpected contamination were dealt within the DCO, and raised some points that the assessment needed to consider in relation the management, classification, and legislation relevant to waste management.

10.4.7 To further understand the requirements of the EA, specifically regarding the re-use of Cell 3 arisings within both above options, the Applicant undertook further consultation with the EA.

10.4.8 Smith Grant LLP (SGP) produced a letter (R3091-L20240913-v2) outlining the position that it was considered that the work could be undertaken using the Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste Code of Practice (DoWCoP) under a Materials Management Plan (MMP). This letter is contained within **Appendix D.2 of Appendix 10-1 ES Vol 2 - Technical Appendices [EN010153/DR/6.2]).**

10.4.9 A formal response was received by the EA on 07 January 2025 (ref. XA/2024/100216/02-L01) which concluded that the EA do not agree with the use of an MMP for the reuse of Cell 3 arisings outside of Cell 3 and that it would be a requirement to carry out remediation works on the soil for reuse, otherwise a groundwater activity permit will be required. This letter is contained within **Appendix D.2 of Appendix 10-1 ES Vol 2 - Technical Appendices [EN010153/DR/6.2]).**

10.4.10 Further to this response the Applicant provided technical commentary (ref. 409.010217.00001; 20 February 2025) to the points raised by the EA. This technical commentary outlined a proposed methodology for the intended works based on the interpretation of the EA's requirements and confirms from the outset that there is an intention that the material will be remediated prior to permanent reuse at the Site. This letter is contained within **Appendix D.2 of Appendix 10-1 ES Vol 2 - Technical Appendices [EN010153/DR/6.2]).**

10.4.11 The EA responded, EA reference: XA 2024 100216 03 Frodsham Waste Classification (dated 19 March 2025) as contained within **Appendix D.2 of Appendix 10-1 ES Vol 2 - Technical Appendices [EN010153/DR/6.2].** The EA set out their position which stated:

'It is up to you to establish which way forward is best for the site, and whether a qualified person would be agreeable that it the material can be used under DoWCoP. If you don't think that you meet the DoWCoP requirements, then you will need to apply for a DfR permit. There isn't enough information for us to tell them which option you should go with, and either could be suitable depending on the finer details.

10.4.12 The assessment provided within this chapter and the supporting desk study supports the approach of using the DoWCoP for reuse of soils within the site of origin and a hub and cluster set up for reuse of soils within the Site but outside of their Site of Origin (e.g. placement of soils into the ponds to the north of Cell 3). A Materials Management Plan will be provided at Detailed Design following submission and approval of any remedial options appraisal, remedial strategy, remediation and verification implementation plan.

10.4.13 This will enable to manage the soils in a sustainable manner which would not cause harm to human health or the environment. **ES Vol 2 Appendix 10-2: Remediation Technical Concept Note – Cell 3 [EN010153/DR/6.2]** provides an outline of how the works to create the NBBMA would be undertaken. The **Outline Construction Environmental Management Plan [EN010153/DR/7.5]** requires the contractor to prepare groundwater risk

assessments, prepare a MMP and obtain an agreement under DoWCoP prior to undertaking the works.

10.5 Assessment Methodology

10.5.1 This assessment has been undertaken in accordance with the framework outlined for a Preliminary Risk Assessment (PRA) in the EA LCRM[xvii] The full assessments are presented in the supporting Phase 1 Geo-Environmental Assessment Report produced by Smith Grant LLP (SGP) which is provided in **ES Vol 2 - Technical Appendices [EN010153/DR/6.2].**

10.5.2 This chapter considers the existing ground conditions, particularly contaminated land which can impose constraints on land use, construction and decommissioning works.

Preliminary Risk Assessment

10.5.3 The information has been used to determine:

i) the potential for any ground contamination to be present within the study area i.e. on or near to the Site, due to historical and current land uses; and,
II) the potential for any such contamination to pose a constraint to the proposed use of the Site and/or impact the surrounding environment.

10.5.4 The information has been used to inform the expected baseline conditions at the Site with regards to ground and contamination status. The assessment considers the potential for impacts on receptors as a consequence of encountering contaminated land (soils, groundwater, ground gases and vapours) during the Construction, Operational and Decommissioning Phases of the Proposed Development and land instability during the construction phase. The assessment identifies the likely source-pathway-target relationships that may exist at the Site during and following the Proposed Development. Principal factors that determine potential sources of contaminants at the Site, receptor vulnerability and potential pathways have been identified and each assessed in turn to derive a Conceptual Site Model (CSM).

10.5.5 The approach to the risk assessment and CSM follows the methodology presented within CIRIA C552 'Contaminated Land Risk Assessment A Guide to Good Practice'[xxiv] further details of which, are provided below.

Conceptual Site Model

10.5.6 Within the contaminated land risk assessment framework, a CSM is developed which identifies the following three components:

- **Source of Contamination:** contaminant: hazardous substance that has the potential to cause adverse impacts;
- **Receptor**: target that may be affected by contamination: e.g. human health of existing or future site users whether they be residents, construction workers etc., occupants/users of site, water resources (rivers or groundwater), or structures;
- **Migratory Pathway**: a viable route whereby a hazardous substance may come into contact with the receptor.

Contaminant Linkage

10.5.7 A contaminant linkage is identified when there is a potential contaminant source, receptor and pathway linkage between the two. The absence of one or more of each component (contaminant, pathway, receptor) would prevent a contaminant linkage being established.

10.5.8 During the contaminated land assessment, the potential 'significance' of this contaminant linkage is established within a risk assessment framework.

Assessment Criteria

Risk Assessment Framework

10.5.9 A "risk" is defined as:

"The probability, or frequency, or occurrence of a defined hazard; and the severity or magnitude (including the seriousness) of the consequences."

10.5.10 The UK's approach to the assessment of environmental risk is set out in by CIRIA C552. This has been adapted and is presented within Tables 10-6 to 10-9, below.

10.5.11 The sensitivity of the receptor associated with the contaminant linkage must first be established. Examples of the various scales of receptor sensitivity are presented within Table 10-6.

Table 10-6: Examples of Receptor Sensitivity

Sensitivity	Type	*Criteria*
High	Human Health	*Construction workers: extensive earthworks e.g. extensive ground disturbance and soils movement, deep excavations* *Future end use of a Site: Residential, allotments, Children's play areas*
	Controlled Waters	*Groundwater: Principal Aquifer, Zone I Source Protection Zones (SPZ), drinking water abstractions located within zone of influence of the Site.* *Surface Waters: River Quality – High to Good.*
	Ecology	*Internationally / nationally Designated Nature Conservation Sites*
	Buildings / Property / Services	*High historical value or other sensitivity (Listed Buildings), World Heritage Sites, services of national or regional importance (gas, oil, electricity, telecommunication).*
Medium	Human Health	*Construction workers: limited earthworks, ground disturbance and movement of Site soils, shallow excavations only* *Future end use: Public Open Space, landscaping*
	Controlled Waters	*Groundwaters: Secondary aquifers, Zone II & III SPZ, industrial water abstractions located within zone of influence of the Site*
	Ecology	*Nature conservation sites of local importance*
	Buildings / Property / Services	*No buildings of historical value or importance. Services of Site importance (gas, oil, electricity, telecommunication).*
Low	Human Health	*Construction workers: minimal / no ground disturbance* *Future End use: Industrial/commercial, hardscaping (e.g. significant areas of hardstanding/buildings) & users of PRoW.*

	Controlled Waters	*Groundwater: Unproductive aquifers, outside of SPZ, no water abstraction nearby.*
	Ecology	*Soft landscaping and other areas of green space that do not have any habitat designation and are not of local importance.*
	Buildings / Property / Services	*Aboveground infrastructure only. No belowground services*

10.5.12 Example criteria for the determination of the magnitude of impact from the presence of a contaminant linkage are set out below:

Table 10-7: Risk Assessment Methodology Magnitude of Impact

Magnitude of Impact	
Large	Acute risks to human health. Catastrophic damage to buildings/property (e.g. by explosion). Direct pollution of sensitive water receptors (or serious pollution of other controlled waters (Designated Main Rivers or Principal /Secondary A groundwater aquifers bodies). Acute effects on sensitive ecosystems or species
Medium	Harm to human health from chronic (long-term) exposure. Pollution of sensitive watercourses (controlled watercourses other than Main Rivers) (Secondary B aquifers) or pollution of other water bodies. Chronic effects on sensitive ecosystems or species. Significant damage to buildings or infrastructure.
Small	No significant harm to human health in either short or long term. No pollution of sensitive controlled waters, no more than slight pollution of non-sensitive waters. Damage to non-sensitive ecosystems or species. Minor damage to buildings or infrastructure.
Negligible	No harm to human health, ecosystems, buildings and infrastructure or pollution of water.

10.5.13 An overall evaluation of the level of effect of impact is gained from a comparison of the magnitude of impact and receptor sensitivity as shown in Table 10-8 below.

Table 10-8: Risk Assessment Methodology Level of Effect

Comparison of Magnitude and Receptor Sensitivity				
		Receptor Sensitivity		
		High	Medium	Low
Magnitude of Impact	Large	Major	Moderate	Minor
	Medium	Moderate	Moderate	Minor
	Small	Minor	Minor	Negligible
	Negligible	Minor	Negligible	Negligible

10.5.14 Where the resultant contaminant linkage that has as *minor* or *negligible* effect, it is considered likely to be **not significant,** whereas where the contaminant linkage has a perceived *moderate* or *major* effect, it is considered likely to be **significant.**

10.5.15 The significance of the effect for each contaminant linkage, however, is ultimately subject to professional judgement whereby it is possible that some moderate levels of effect may be deemed insignificant depending upon the specific circumstances or minor levels of effects could be deemed significant. In such instances an explanation of this judgement is provided.

10.5.16 The various evaluated effect rankings provide guidance for recommended actions as detailed in Table 10-9 below.

Table 10-9: Risk Assessment Methodology Description of the Classified Level of Effect and Likely Action Required

Description of the Classified Level of Effect and Likely Action Required	
Evaluated Effect	**Recommended Actions**
Major	Severe harm to a receptor may already be occurring, or there is a high likelihood that severe harm could occur from an identified hazard. Urgent investigation and remedial works / mitigation in the short term is likely to be required.
Moderate	It is possible that harm could arise to a receptor from a hazard. However, it is relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Limited investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Minor	It is possible that harm could arise to a receptor from a hazard, but there is a low likelihood of this hazard occurring and if realised, harm would at worst normally be mild.
Negligible	There is a negligible possibility that harm could arise to a receptor. In the event of such harm being realised, it is likely to be mild or negligible.

10.6 Baseline Conditions

Site Description and Context

10.6.1 Full details on the Site setting and surroundings are set out in **ES Vol 1 Chapter 1.0 [EN010153/DR/6.1]** and within the **Stage 1 Geo-Environmental Assessment in ES Vol 2 Appendix 10-1 [EN010153/DR/6.2]**. A 'Site Features Plan' is provided as Drawing D01 within the **Stage 1 Geo-Environmental Risk Assessment in ES Vol 2 Appendix 10-1 [EN010153/DR/6.2]**. Only the key aspects of relevance are summarised below.

Information Sources Available for the Site

10.6.2 In undertaking this assessment, the following activities have been carried out:

- walkover to view the existing Site and its setting;
- Purchase and review of comprehensive historical mapping information;
- Purchase and review of comprehensive environmental setting information (geology, hydrology, hydrogeology, industrial land uses, mineral excavation/extraction, landfilling/waste management activities);
- Purchase and review of information relating to potential unexploded ordnance (UXO);
- review of third-party site investigation reports;
- review of third-party reports with consideration of peat reconnaissance and geotechnical properties (stability) of the ground;
- Contamination Assessment on Cell 3 and wider NBBMA contained within **Appendix G, Stage 1 Geo-Environmental Risk Assessment in ES Vol 2 Appendix 10-1 [EN010153/DR/6.2]**.
- Completion of Site Investigation within two proposed areas for siting of the BESS and Frodsham Solar Substation, contained within **Appendix J, Stage 1 Geo-Environmental Risk Assessment in ES Vol 2 Appendix 10-1 [EN010153/DR/6.2]**.

- Review of development proposals, further detail is provided within **Chapter 2.0 ES Vol 1 [EN010153/DR/6.1]**;
- Review of environmental information received from both CWaCC and the EA, further detail is provided within **Appendix D of the Stage 1 Geo-Environmental Risk Assessment in ES Vol 2 Appendix 10-1 [EN010153/DR/6.2]**;
- development of preliminary conceptual site model (CSM) with regards to ground contamination; and,
- provision of recommendations for further investigations and mitigation, where deemed necessary.

10.6.3 The information used to identify the baseline conditions has been used from publicly available information and purchased information sources.

Development History

10.6.4 A summary of significant changes to the Site and the surrounding area is detailed below.

Solar Array Development Area (SADA)

10.6.5 Many of the roads/trackways on Site are present from earliest mapping. The western half of the Site was developed as four bunded cells (Cell 1, Cell 2, Cell 3 and Cell 5) of the MSCDDG with Cells 1, 2 and 3 having been developed from between 1938 and 1949 and Cell 5 from some point between 1968 and 1982. Frodsham Marsh Farm and outbuildings were constructed between Cells 1 and 2 of the MSCDDG between the mid-1950s and 1960s. Frodsham Marsh Farm is included within the Order Limits but is not subject to redevelopment.

10.6.6 The eastern part of the SADA (to the east of Brook Furlong) has been used for arable agriculture since 1960s (refer to area indicated as ‘Agricultural Land’ within **Figure 1-4 ES Vol 3 – Illustrative Figures, [EN010153/DR/6.3]**. Some of this agricultural land is now managed as rough grassland by the Frodsham Wildfowlers to encourage use by wildfowl.

10.6.7 Other than construction of a sewage outfall by the late 1800s (which is no longer in operation), the northern central part of the Frodsham and Helsby Marshes has not been subject to significant changes and has been used for arable farming and stock grazing.

Private Wire Connection and Main Site Access

10.6.8 The connection will follow existing roads, the majority of which, have been present since the late 1800s although a number have been extended between 1930s to 1960s and some of the accesses will follow tracks created during construction of the Frodsham Wind Farm in 2015.

10.6.9 The Main Site Access and Private Wire Connection will follow existing roads as constructed for the Frodsham Windfarm. During a walkover of the Site, a very small informal burning ground alongside two open skips was observed within the vicinity of the Private Wire Connection and Main Access Road at the corner of where the Cross Lane (Frodsham RB103) intercepts the southwestern corner of Cell 3. During the site investigation of Cell 3 of June 2024, this area was investigated and there was no evidence of the burning ground as previously observed nor any associated skips at the time.

SPEN Grid Connection

10.6.10 The SPEN/National Grid electrical substation, located on the northern bank of the River Weaver, was developed in the early 1970s. The configuration has not changed significantly since it was developed, with the exception of some extensions of additional equipment bays in the early 2000's.

Non-Breeding Bird Mitigation Area (NBBMA)

10.6.11 The NBBMA covers Cell 3 of the MSCDDG and land to its immediate north. This cell was formed between the 1930s and 1940s. It was originally part of the Frodsham Marsh Huts and associated railway/tramway in late 1800s and possibly used for a time as a World War One Prisoner of War (WWI POW) camp. The dredging infill has been placed over the ground hence will have

covered any remaining foundations should they have been left in-situ. Lagoons and ponds have been present along the northern boundary of Cell 3 since the late 1960s and have extended westwards in early 2000s. It is understood that these have historically been used for recreational fishing.

Current Status

The SADA

10.6.12 MSCDDG: The western half of the SADA forms three cells (Cell 1, Cell 2 and Cell 5) of a dredging ground that formerly accepted sediment dredged from the lower reaches of the MSC which was, and still is, left to drain and dewater. The cells and associated raised earth bunds are almost fully covered in vegetation. Most of the surface of the cells is grassland that is grazed by sheep and cattle, the bunds have become vegetated with scrub and woodland. The existing bund located in between former MSCDDG Cells 2 and 3 was noted as spalling in one discrete area. Part of MSCDDG Cell 1 and 5 has been developed as the Frodsham Wind Farm, which is operational and comprises six wind turbines with bases plus an associated electrical substation, access roads and a network of underground cabling. The MSCDDG Cells are used as grazing land and are separated by field drains, an access road to Marsh Farm and PRoW. Frodsham Marsh Farm is sited just north of MSCDDG Cell 2 which is included within the Order Limits, but which is not to be developed as part of the Proposed Development. The land in the area of the MSCDDG is relatively level and lies between approximately 9.5 m and 12.5 m above ordnance datum (AOD).

10.6.13 Frodsham and Helsby Marshes (land to the east of Brook Furlong): This is predominantly an area of former marshland which has been drained and is bound with roads, farm tracks and the River Weaver. The area, which is relatively level and resides at around 6.0m AOD comprises arable land, primarily located in the east and southeast, and an area now managed as rough grassland by the Frodsham Wildfowlers to encourage use by wildfowl, primarily in the west and northwest. The SADA forms part of the Frodsham

and Helsby and Ince Marshes Local Wildlife Site. A pumping station is present within the eastern part of the SADA (to the east of Brook Furlong) which is under control of the Environment Agency and has an outfall to the River Weaver. This will remain operational during construction, operation (and most likely, decommissioning) of the Proposed Development. Various drainage ditches cross the Site which ultimately flow into the River Weaver via the pumping station on the northern boundary of the Site.

SPEN Grid Connection

10.6.14 The SPEN Frodsham Substation, which Frodsham Solar will connect into, is located to the east of the SADA, on the northern bank of the River Weaver. The grid connection route passes through an area of scrub located on the northwest boundary of the SPEN Frodsham Substation The area of scrub (including stands of Himalayan Balsam) to the northwest appeared to comprise made ground developed from mainly reworked natural soils, most likely as a result of developing the substation compound and the associated high voltage pylons located adjacent to the substation.

NBBMA

10.6.15 This part of the Site covers Cell 3 of the MSCDDG plus the land directly north. Four rectangular ponds are located in the land to the north of Cell 3 and span much of Cell 3's northern boundary. The ponds which partially fall within the Mersey Estuary SSSI are used for recreational fishing and are colonised with New Zealand Pygmy Weed, a non-native species listed under Schedule 9 of the Wildlife and Countryside Act 1981. Further details of this SSSI designation is provided within **Chapter 7.0 – Terrestrial Ecology ES Vol 1 – Main report [EN010153/DR/6.1].** Land surrounding the ponds comprises grassland used for grazing of cattle, this area is raised above the MSC located to the north to provide flood defence to the area. A larger pond (known as the BPAW Manchester Ship Canal Pool) is shown along the western boundary of Cell 3.

10.6.16 Cell 3 forms part of the existing Frodsham Wind Farm ecological mitigation area and in addition to grassland used for grazing cattle, includes several manmade scrapes, formed following the construction of the wind farm in 2015. A series of drains also cross Cell 3 which are understood to eventually drain into the Hoolpool Gutter which then confluences with the River Mersey. The Proposed Development includes plans to enhance the ecological value of this area to provide increased habitat for non-breeding birds and their invertebrate food sources. Proposed works will include the reworking of existing site materials to lower ground levels in the centre of the cell, providing more wetland fringe habitat, islands and wet grassland areas. The Proposed Development may include infilling of the existing ponds to the north of Cell 3 and developing a new balancing pond which would be used to control water levels in the created wetland areas. Further information is provided within Chapters 2.0, 7.0 and 8.0 **ES Vol 1 – Main Report [EN010153/DR/6.1].**

Site Surroundings

10.6.17 The Manchester Ship Canal is located to the north and northwest, with the Mersey Estuary located on and beyond its northern bank. The Mersey Estuary is of ecological importance and is designated as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and RAMSAR site. The whole Site is located within a SSSI impact risk zone of the Mersey Estuary SSSI and the northernmost part of the Site (i.e. part of the NBBMA) is classed as part of the Mersey Estuary SSSI.

10.6.18 Other surface watercourses adjacent to the Site include:

- Hoolpool Gutter to the west of the private Wire Connection and Access Road (which is understood to drain the MSCDDG Cells);
- River Weaver to north and east of SADA and between SADA and SPEN Grid Substation.

10.6.19 All the above-named watercourses are classed under the Water Framework Directive as having a moderate ecological classification and fail for specific priority hazardous substances.

10.6.20 The Site area has not been identified as being in a nitrate vulnerable zone although is directly adjacent to two surface water courses that are designated as such: the River Weaver (Frodsham to Dane Stretch) and the Hoolpool Gutter.

10.6.21 An Island known as Weston Point upon which Weston Lagoons 1 and 2 are sited has been used historically, and is still currently used, for the deposition of dredgings from the River Weaver. This area is located between the River Weaver and Weaver Navigation and is around 100m north of the SPEN Grid Connection. There is a British Geological Survey (BGS) recorded historical landfill shown on Site (BGS ref: 2032). As this record is entitled Weston Lagoon 2, it is considered that it has been incorrectly mapped and that the location should be positioned to the north of the Site.

10.6.22 The Weaver Navigation (a canal) located beyond is located beyond the River Weaver and Weston Point. The INEOS Inovyn Runcorn Site is located on the opposite bank of the Weaver Navigation.

10.6.23 The INEOS Inovyn Deposit Ground with its surrounding earth bund is located directly northeast of the Frodsham and Helsby Marshes and lies adjacent to but outside the Order Limits. The Deposit Ground became active in 1961 with permitting of the facility commencing in 1977 to take dredging deposits from the Weaver Navigation (the part of the canal which forms the southern boundary of the INEOS Inovyn Runcorn Site). Although no longer operational (it stopped receiving dredgings in 2002), this deposit ground is still under environmental permit ref: EPR/KC3591CN/V004 and is subject to monitoring of wells around the Site perimeter and on the bunds at specific intervals. The maintenance of the bund is included as part of this permit and regular checks are undertaken to check for seepage of leachate. There are three monitoring wells (M1-M3) located on the bund of this Deposit Ground that are monitored

periodically. The location of these monitoring wells is shown on the Site Features Plan Drawing D01 - **Stage 1 Geo-Environmental Risk Assessment in ES Vol 2 Appendix 10-1 [EN010153/DR/6.2]**.

10.6.24 Directly adjacent to the southwest of the SADA is Cell 6 of the MSCDDG dredging tip, which is permitted under WML 53719, EPR reference: TMS001 and EPR number: EPR/XP3196CU/V003, Dated: 29.06.10). The status of the permit is live as tipping of dredgings followed by dewatering are continuing within this cell with an annual allowance of deposition of 950,000m^3. In conjunction with the operations continuing on Cell 6 and the live Environmental Permit in place, there are four monitoring wells (M1-M4) that are located along the boundaries of this cell, the locations of which, are shown in the Site Features Plan Drawing D01 - **ES Vol 2 Appendix 10-1 Stage 1 Geo-Environmental Risk Assessment in [EN010153/DR/6.2]**.

10.6.25 The monitoring wells associated with both the INEOS Inovyn Deposit Ground and Cell 6 MSCDDG will not be disturbed during the construction, operation or decommissioning phases.

Services/Wayleaves

10.6.26 There are various below ground and overhead services which traverse the Site, these are shown on **ES Vol 3 Figure 1-6 [EN010153/DR/6.3]**. This includes an existing underground high pressure gas pipeline (the Shocklach to Weston Point gas pipeline) which traverses the SADA from west to east. Three hydrocarbon pipelines from the Stanlow refinery pass through the SADA. These are below ground across much of the Site but there is also a section traversing the MSCDDG Cell 1 where the pipes are above ground.

10.6.27 Two overhead powerlines (132 and 400 kv) traverse the southern part of the Site, from west to east connect to the SPEN / National Grid electrical substation. An underground water supply which carries mains water traverses the SADA from west to east.

Hydrology/Drainage

10.6.28 There are Main Rivers which traverse the Frodsham and Helsby Marshes as shown on **ES Vol 3 Figure 1-3 [EN010153/DR/6.3]** and described in more detail in **ES Vol 1 Chapter 9.0 [EN010153/DR/6.1]**. Whilst classified as Main Rivers they comprise large drainage ditches, which drain the surrounding land and flow into the River Weaver on the northern boundary of the Site. A series of drainage ditches are also present across the Site, which connect with the aforementioned Main Rivers. There are ponds located within the NBBMA (former MSCDDG Cell 3). The nearest mapped surface watercourses to the Site are:

i) Hoolpool Gutter to the west of the Private Wire Connection and Access Road;
ii) Manchester Ship Canal to north of both SADA and NBBMA;
iii) River Weaver to north, east and northeast of the SADA and located in between the SADA and the SPEN substation; and,
iv) The Weaver Navigation located beyond the river Weaver SPEN Frodsham Substation and directly south of the INEOS Inovyn Runcorn Site.

10.6.29 Flood defences in the form of earth bunds are located along the northeastern area of the Frodsham and Helsby Marshes which abuts the river Weaver plus the area to the north of Cell 3.

10.6.30 The MSCDDG cells are bunded around their boundaries but are unlined, hence it is considered likely that these will be in hydraulic continuity with their surroundings.

Risk of Encountering Unexploded Ordnance (UXO)

10.6.31 Detailed UXO assessments have been produced (contained within **ES Vol 2 – Appendix 10-1: Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2].**

- The NBBMA, Private Wire Connection and Main Site Access and western area of SADA: the risk of encountering UXO on the majority of the MSCDDG dredging deposit Cell 1 and most northerly section of MSCDDG Cell 5 is high with the remainder of the assessed areas within Cell 5 as medium to high risk.
- Remainder of SADA: This area is assessed as having a medium risk from German air delivered UXO and a low to medium risk for Allied UXO. Overall, this area of the Site has been provided a precautionary Medium Risk from UXOs.

10.6.32 The UXO reporting also mentions a WWI POW camp but its location on the Frodsham Marshes is unknown and it is not known whether any explosives were stored there. From a review of the historical mapping, this appears to coincide with the Frodsham Marsh Huts formerly located within MSCDDG Cell 3. The former location of these huts will not be disturbed by construction or operation of the Proposed Development. This is because following demolition of the huts and infrastructure, the dredging cell was constructed above this area with dredging materials extending to depths exceeding 9.0m bgl. The proposed ground disturbance to facilitate construction of the NBBMA will extend to only around 1.0m bgl,

Radon

10.6.33 The Site lies within an area where between <1% of homes are estimated to be at or above the Radon Action Level and as such, no radon protection is required within new buildings

Geology/Ground Conditions

10.6.34 The ground conditions on the Site have been derived from the review of information detailed in **ES Vol 2 – Appendix 10-1: Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2].** Key details are summarised below; for full details, reference should be made to the supporting information provided.

Underlying Geology

10.6.35 Information available on the BGS website, historical OS mapping and existing site investigation information indicate the underlying natural geology on Site to be:

Table 10-10: Underlying Natural Geology and indications of Made Ground

Area	Made Ground	Superficial Deposits	Bedrock
Frodsham and Helsby Marshes	Suspected Made Ground Topsoil of 0.3mbgl encountered within 2 of 14 WS holes Vegetated mound: in the southeastern area of the arable land recorded dark brown clayey sandy cobbly gravel of mixed lithologies, tiles, brick fragments and cloth pieces.	Tidal Flat Deposits: Soft, light grey or mottled grey, brown silty clay to around 2.0mbgl, which, becomes very soft to soft dark grey to black silty sandy clay to around 3.5mbgl. Very loose to medium dense dark grey/black silty sand was encountered to the extent of the maximum drilled depth of 5.0mbgl. Water strikes were encountered within very soft to soft dark grey to black silty sandy clay in the western part from between 1.9 to 3.5mbgl and within the dark grey/black silty sand in the eastern half of this area. Glacial till as firm brown/red brown silty clay with traces of organic matter from between 16.3m and 20.0m bgl.	Western third of area within Order Limits: Chester Formation – Pebbly, gravelly sandstone. Central third: Wilmslow Sandstone Formation Eastern third: Helsby Sandstone Formation - Pebbly, gravelly sandstone with easternmost area of Site (Southeastern area of SADA) Boreholes drilled to the south of the Site in association with the M56 Motorway has recorded from east to west: hard red brown sandstone, hard green sandy MARL or soft red sandstone with Marl Beds recorded between 16.76m and 20.21m bgl. Three faults within the bedrock cross the SADA on an approximate NW to SE alignment one cuts across the middle of the Site (Frodsham Fault) with two further faults (Weston Fault and Overton Fault)
NBBMA & MSCDDG Cells	Made ground of dredging lagoon silts to a depth of around >9m bgl. coarser grained dredgings located close with inlet pipes with finer grained materials being located further away. The Tidal Flat Deposits located north of Cell 3 have been recorded as more granular than the Tidal Flat Deposits underlying the Cell 3 which are noted as more cohesive. A thin veneer of made ground topsoil, typically of 0.3m comprising (loose) dark brown sandy clay underlain by a light brown or yellow/brown/light grey sandy	Tidal Flat Deposits: alluvial clays and silt. Band of fibrous peat and/or organic silt (of around 3.0m in thickness and from a minimum of 10.m bgl) Fluvial Glacial Sands Glacial Till. This is underlain by the Tidal Flat Deposits comprising silty clays. The Tidal Flat Deposits located further north of Cell 3 (as observed within WS02, WS15, WS17 and WS18) were	Chester Formation Sandstone which has previously been encountered at 42m bgl.

Area	Made Ground	Superficial Deposits	Bedrock
	clay fill of a maximum proven thickness of 0.9m; this was then underlain by a dark grey or black silty clay fill with abundant rootlets and occasional pockets of coarse black sand to depths of between 4.5m and 5.7mbgl (although generally 5.5mbgl) where proven.	recorded as predominantly comprising sand. This is underlain by soft thinly laminated brown mottled orange and grey (and black) alluvial silts and sandy clays with peat comprising black fibrous or clayey amorphous between 7.7 and 9.5m (all forming part of the Tidal Flat Deposits). Glacial till comprising of stiff becoming thickly laminated, reddish brown slightly sandy slightly gravelly clay has been encountered to the maximum drilled depth of 21.1m bgl.	
MSCDDG Bunds around cells	Findings of previous investigations across this area show bund materials comprising varying silts, clays and sand with occasional inclusions of concrete cobbles, limestone and sandstone have been encountered to 7m bgl.		
Private Wire Connection (to Pool Lane Roundabout)	Road construction materials	Tidal Flat Deposits comprising: alluvial clays, silts, peat and organic material	Western half: Chester Formation Eastern half: Kinnerton Sandstone Formation One fault crosses the central area of the Private Wire Connection and Access Road on an approximate north to south alignment.
SPEN Grid Connection	reworked natural soils is anticipated within this area on the western bank of the River Weaver.	Tidal Flat Deposits	Tarporley Siltstone Formation comprising siltstone, mudstone, and sandstone is recorded within the north-western half of this area whereas the Helsby Sandstone Formation is encountered within the southeast.

Peat

10.6.36 BGS mapping identifies the full SADA to be underlain by peat and organic material strata of the Tidal Flat Deposits and specifically, with the presence of the Downholland 2 soil association. Whilst peat was found at depth beneath the MSCDDG (depths in excess of 10m BGL) peat has not been encountered beneath the eastern half of the Site (the Frodsham and Helsby Marshes area) during the ground investigation of June 2024 (which involved drilling to a maximum depth of 5.5m bgl). A Peat Reconnaissance Survey was also completed on this area of the Site and concluded that there is no evidence of peat occurrence. The reconnaissance survey has also concluded that any fen peat which may have developed on site historically is likely to have been wasted in light of the current usage of the Site for agriculture. Peat reconnaissance survey is included as **Appendix I of ES Vol 2 – Appendix 10-1: Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2].**

Natural Ground Stability

10.6.37 The whole Site is in an area where risks from compressible ground and running sands are moderate. The risks from landslides are very low across most of the Site and low within the north-eastern site corner. Risks from shrinking and swelling clays and collapsible ground are very low; and no hazard risk from collapsible deposits and ground dissolution is recorded.

Excavation/Mining/Minerals Safeguarding

10.6.38 The Site is not located within an area of historical mining for coal, aggregates or minerals nor in an area that is identified for mineral safeguarding within the development plan. The Phase 1 Geo-Environmental Assessment alongside intrusive investigation has identified the presence of sandy strata within the Tidal Flat Deposits and the fluvial glacial sands located across the Site. These are generally located from a minimum of 9.0m bgl and are initially silty.

10.6.39 Sands have been identified within the dredging deposits in the MSCDDG Cells, with a higher proportion around the inlet pipes from where dredgings

have been discharged into the cells. In general, the sands encountered are mixed with varying proportions of silts and clays and are of limited thickness (of between 0.7 to 1.0m). It is considered that the sands within the dredgings are unlikely to be viable for extraction as aggregate and may need to be subject to remediation to ensure their suitability for reuse as aggregate.

Hydrogeology/Groundwater

10.6.40 The aquifer designations of the underlying geological units are as follows:

Table 10-11: Aquifer Designations for Underlying Geology

Area	Strata	Aquifer Designation
The Solar Array Development (SADA)	Tidal Flat Deposits	Secondary undifferentiated aquifer
	Wilmslow Sandstone Formation	Principal aquifer
Non-Breeding Bird Mitigation Area (NBBMA)	Tidal Flat Deposits	Secondary undifferentiated aquifer
	Chester Formation	Principal aquifer
Private Wire Connection (to Pool Lane Roundabout)	Tidal Flat Deposits	Secondary undifferentiated aquifer
	Western half: Chester Formation Eastern half: Kinnerton Sandstone Formation	Principal aquifer
SPEN Grid Connection	Tidal Flat Deposits	Secondary undifferentiated aquifer
	Tarporley Siltstone Formation	Secondary B aquifer

10.6.41 The Site is not located in any Source Protection Zones and there are no EA registered or private water abstractions located on the Site. There is an active groundwater abstraction located at Weston Point (at around 50m away from the Order Limits) which is licensed for Inovyn Chlorvinyls Limited to abstract 1,000,120m^3 groundwater per day and was granted permission in 1966. It is understood this borehole abstracts from a depth of 150m.

10.6.42 Water strikes and groundwater were encountered during drilling as follows:

Table 10-12: Recorded Groundwater Levels

Proposed Development	Area	Depth of Groundwater During Intrusive Investigation and Corresponding Strata (m bgl)
The Solar Array Development (SADA)	MSCDDG Cells	MSCDDG Cell 5: Exploratory holes generally dry or damp Dredgings: 3.3m glaciofluvial sands at between 9.1 and 13.5m bgl Glacial till: 18.2 – 23.9mbgl Resting groundwater at 4.5 to 5.7mbgl. MSCDDG Cell 1: Exploratory holes generally dry or damp Dredgings: 2.8m; 4m & 9.3m bgl Resting groundwater at 6.27m bgl
	Frodsham & Helsby Marshes	Tidal Flat Deposits: 1.7 – 4.0m bgl Generally within dark grey to black silty Sand or silt. Occasionally within Black silty or sandy clay.
Non-Breeding Bird Mitigation Area (NBBMA)	MSCDDG Cell 3	Perched on or within black (or dark grey) silty clay (dredgings): 0.5 – 2.0m bgl. Resting groundwater at 3.2m bgl
	Area north of MSCDDG Cell 3:	Tidal Flat Deposits 2.2m bgl
Private Wire Connection		2.3 – 2.8m bgl

10.6.43 Dredgings within MSCDDG Cell 2 were piped for dewatering around the same period as MSCDDG Cell 1, with materials from the dredging cells all originating from the Manchester Ship Canal. The current site investigation data from Cells 1, 3 and 5 provide a good level of information pertaining to the chemistry and given the dates in which Cell 2 was filled and the same origin of materials, it is considered reasonable that similar conditions/chemistry exists at this location. It has therefore been possible to

make reasoned judgements on the likely significant environmental impacts for this specific area of the Proposed Development.

On-Site Contaminant Sources

10.6.44 From a review of desk study information, ground investigation and monitoring data, and the site walkover, the overall potential contaminant sources on Site have been summarised below. Further details regarding each section of the Site are provided in **Section 9.3 of ES Vol 2 – Appendix 10-1: Stage 1 Geo-Environmental Assessment [EN010153/DR/6.2].**

Solid Contaminants within dredging material

10.6.45 Of all samples analysed from dredgings within the MSCDDG Cells, only one elevated concentration of lead and one of total polychlorinated biphenyls (PCBs) has been encountered when compared to the corresponding Generic Assessment Criteria (GAC) for assessment of human health (for a proposed area of open space and commercial usage). In relation to PCBs, it is noted that groundwater sampled from the same monitoring well where the soil sample was retrieved had not encountered PCBs recorded above laboratory limit of detection (LOD) on the four occasions it has been sampled.

Asbestos within dredging material

10.6.46 Asbestos identified as free fibres of amosite were recorded within near surface samples of made ground collected from MSCDDG Cell 5 and chrysotile fibres were recorded within seven of twelve samples analysed from the NBBMA. Quantification of the fibres for all samples analysed across all investigations were reported at less than the limit of detection (as <0.001%). An asbestos risk assessment based on the Joint Industry Working Group risk assessment framework as detailed in CAR Soil has identified an overall low risk from the asbestos identified within the MSCDDG Cells.

Hydrocarbons within dredging materials and perched groundwater

10.6.47 Within all MSCDDG Cells investigated (including Cell 3 for the NBBMA), olfactory evidence of hydrocarbons of varying degrees has been reported with corresponding hydrocarbons in soils being recorded of mainly mid to heavy (i.e. less/non-volatile) ranges. None of the soil samples have exceeded corresponding GACs for human health. No observations of hydrocarbon staining, or hydrocarbon free phase product was recorded within any of the exploratory hole logs although twelve soil samples (all comprising dredged material) have been reported by the laboratory to have inclusions of petroleum/oil. Ten soil samples have been obtained from the MSCDDG Cell 5 and the other two have been from the NBBMA.

10.6.48 Free phase petroleum hydrocarbons have not been encountered within any of the sampled groundwater or surface water.

Contaminants within soils capable of chemical attack of concrete

10.6.49 Recorded concentrations of sulphates and anions within the dredgings are considered to have the potential to present a risk to belowground concrete from chemical attack if appropriate specification materials are not used.

Leachable contaminants from dredging materials

10.6.50 Soils sampled and analysed within the MSCDDG cells have identified elevated contaminants within laboratory-generated leachate when compared against Environmental Quality Standards (EQS) for Estuarine/Coastal Water and Freshwater. This includes heavy metals and metalloids (arsenic, copper, mercury, lead and zinc), ammonia and select polyaromatic hydrocarbons (PAHs). There was no clear distinction in contaminant concentration between the dredging cells.

10.6.51 Within MSCDDG Cell 3, exceedances of metals and the PAHs recorded within the perched groundwater were comparable to that recorded within soil leachate.

10.6.52 The only exceptions appear to be for cadmium and nickel which are not elevated within soil leachate but have shown as elevated within perched groundwater, and for arsenic which is elevated within soil leachate but this is reflected within perched groundwater. Unionised ammonia is generally higher within groundwater than recorded within soil leachate. Within soil leachates lead was recorded between 2 and 27ug/l whereas within sampled groundwater Cell 3, lead concentrations were lower recorded between 0.4 and 2.0ug/l.

10.6.53 This suggests that the leaching of contaminants within the dredgings has occurred and that soils are likely to already be in chemical continuity with perched groundwater.

10.6.54 Surface water sampling undertaken on the shallow surface scrapes made within the Cell 3 in 2015 and in June 2024 has recorded elevated metals and PAHs which generally appear comparable to that recorded within soil leachate samples.

10.6.55 Groundwater and surface waters sampled from locations to the north of Cell 3 and from the Hoolpool Gutter to the west do not appear to show contaminant concentrations that are elevated above corresponding threshold criteria.

Ground Gas

10.6.56 Ground gases are expected to arise from the organic dredging silts and clay in the MSCDDG cells. Ground gas monitoring performed in monitoring wells within the dredging cells have recorded methane concentrations up to 60% v/v and carbon dioxide up to 40% v/v. Corresponding flows, where reported have, however, been low (up to 2.6 l/hr) which may be reflective of the presence of perched groundwater.

10.6.57 Intrusive investigation undertaken within the Frodsham and Helsby Marshes has not identified superficial deposits of significant organic alluvial clays and peat within shallow soils. Black silt, silty clay or silty sands have, however, been recorded within the Tidal Flat Deposits of most of the intrusive holes

from depths of around 1.9m bgl. Water strikes have corresponded with these strata.

Solid Contaminants within Made ground other than Dredgings

10.6.58 Other than discrete areas of suspected made ground topsoil (of 0.3m bgl) within the recycled aggregate materials used to maintain tracks, no other forms of made ground have been identified within the Site. A vegetated mound of material was observed along the edge of an arable field in the eastern part of the SADA (to the east of Brook Furlong). A hand-pit excavated in the mound recorded dark brown clayey sandy cobbly gravel of mixed lithologies, tiles, brick fragments and cloth pieces. The sample analysed did not reveal the presence of any elevated contaminant concentrations above corresponding thresholds for construction or maintenance workers or public open space nor the presence of asbestos. Made Ground is suspected within the SPEN Grid Connection located on the northern bank of the River Weaver although it is considered most likely to be generated from reworked natural materials and will be subject to testing at detailed design.

Neighbouring Land Use/Nearby Contaminative Activities

10.6.59 The Inovyn Deposit Ground is located off site directly to the north of the SADA. It accepted dredging deposits from the Weaver Navigation Canal periodically from the early 1960s until 2002. The cell is still under an active environmental permit despite it no longer accepting dredgings and is subject to monitoring, sampling and bund inspection at regular intervals. The materials deposited within this area are located above the Tidal Flat Deposits. The leachate generated from the dredgings, as they settle out, are known to discharge under consent to the River Weaver via an outfall to the north. It is unknown whether this cell is lined, if not, this material could be in hydraulic continuity with groundwater within the underlying Tidal Flat Deposits.

10.6.60 Directly adjacent to the southwest of the SADA is Cell 6 of the MSCDDG which is permitted under WML 53719, EPR reference: TMS001 and EPR number: EPR/XP3196CU/V003, Dated: 29.06.10). The status of the permit is

live as tipping operations of dredgings followed by dewatering are continuing within this cell with an annual allowance of deposition of 950,000m^3. Under the requirements of the permit, monitoring and sampling of groundwater from four monitoring boreholes located around but within the Cell boundary is undertaken. The closest borehole to the Proposed Development Site is M4 which has been installed within dredgings and the underlying Tidal Flat Deposits.

10.6.61 Under the active environmental permitting activities for MSCDDG Cell 6, bi-annual monitoring and sampling of four monitoring wells located around the Site boundary, with response zones in the dredgings and underlying Tidal Flat Deposits, is undertaken. Monitoring has been completed since 2004.

10.6.62 Results of the sampling and analysis of groundwater has identified elevated contaminants of arsenic, lead, mercury, nickel, zinc, ammoniacal nitrogen within the groundwater although contaminant concentrations have not consistently been elevated. Groundwater within monitoring well M4 (the borehole closest to the Proposed Development) is considered as tidally influenced owing to the large range of groundwater levels recorded during monitoring. The cell is dewatered with resultant water discharged to the Hoolpool Gutter.

10.6.63 The West Clifton Marsh Lagoon is an operational deposition ground which settles out slurries from the adjacent INEOS Inovyn Runcorn Site and its activities are authorised under an environmental permit recorded to ICI Chemicals and Polymers Limited where industrial sludges and effluent is pumped to settle out. It is located around 100m to the north of the SPEN Grid Connection.

10.6.64 The INEOS Inovyn Runcorn Works to the east and northeast of the Site beyond the River Weaver, and Weaver Navigation, has had a long industrial history and continues to operate as one of the largest manufacturers of chemicals and polymers in the country. The operations could have given rise to diffuse aerial pollution and impacts to the Secondary (Undifferentiated)

aquifer within the superficial deposits and potentially to the principal bedrock aquifers located at depth. The migration of contaminants within the Tidal Flat Deposits is unlikely, however, owing to the presence of the river and estuary located in between the Site and INEOS Inovyn Runcorn Works.

10.6.65 Significant industrial premises have also operated to the west, including a former fertiliser manufacturer located close to the Private Wire Connection and the Main Site Access. The potential for significant contamination migration onto the proposed Private Wire Connection, given the proximity of these premises located on the opposite bank of the Hoolpool Gutter, is unlikely. No construction would be undertaken along the section of the Main Site Access to the west of Hoolpool Gutter.

10.6.66 The immediate surroundings are generally agricultural or marshland. MSCDDG Cell 6 is located directly to the south/southwest which is expected to give rise to similar contamination as identified on the Site is MSCDDG Cells 1, 2, 3 and 5. This cell is still receiving dredgings and operates under an environmental permit. A hovercraft leisure racetrack is located at 200m to the south of the Site which is unlikely to give rise to contamination that could cause significant impacts upon the Site.

Future Baseline

10.6.67 The methodology adopted for geo-environmental assessment (the LCRM[xvii]) framework used for this assessment is based on determining a ‘reasonable worst case’ assessment.

10.6.68 It is expected that the concentrations of contamination in association with the existing contaminant pathways to groundwater and surface water on Site, have reached equilibrium with the surrounding area. Within the areas of dredging infill (including the MSCDDG Cells 1, 2, 3 and 5), equilibrium is expected owing to the age of the dredging deposits (being 60-80yrs plus in age), and contaminant concentrations recorded within perched groundwater and surface waters exhibiting a similar contaminant profile to that of the soils.

If the Proposed Development did not occur, the baseline conditions are not expected to significantly change over the long term.

10.7 Incorporated Mitigation and Enhancement Measures

10.7.1 The assessment takes account of the incorporated design mitigation measures that have been specifically embedded into the Proposed Development to reduce environmental effects. They are assumed to be implemented and are therefore factored into the determination of residual significant effects. These may include design decisions made as a result of the design evolution process, specific components of development added to the design to avoid, reduce or offset impacts or provision of management plans secured via requirements of the DCO, as a mechanism for securing required mitigation.

Construction Phase

The assessment takes account of the incorporated mitigation measures which would serve to avoid, reduce or minimise impacts during the construction phase. These measures are set out in the **Outline Construction Environmental Management Plan (oCEMP) [EN010153/DR/7.5].** Post-consent, this outline plan will be developed into a detailed plan which must be in substantial accordance with the outline, and the Proposed Development must be constructed in accordance with that detailed plan. This is secured via a Requirement in Schedule 2 of the draft DCO.

10.7.2 The following relevant incorporated mitigation measures are proposed:

i) All foul sewage generated from welfare facilities associated with the construction compound would be collected within a sealed system to be uplifted and tankered for disposal/treatment at a suitably licensed off-site facility.
ii) The storage of fuels or chemicals required during the construction phase would be limited to diesel generators to provide power to the construction compound area and above ground diesel and ad-blue tanks/ fuel tankers for re-fuelling site plant. Such fuel storage would be housed appropriately and bunded, refuelling would be limited to designated re-fuelling areas and

a suitably stocked spill-kit would be retained within the compound areas as part of a standard construction compound requirement.

iii) A protocol to deal with unexpected contamination encountered during works during the construction phase would be prepared and implemented.

iv) Environmental Incident Management and Pollution Prevention Plan (EIMP) will be produced prior to construction commencing and will be reviewed and updated regularly by the Site Manager. Training will be provided to site workers as part of the induction process and will be updated as necessary. It will provide a structured response framework for fuel or chemical spills, unexpected contamination events, and pollution control measures to prevent impacts on watercourses and groundwater.

v) Groundwater and Surface Water Management Plan (GSWMP) that would detail site-wide measures for drainage, rainfall runoff management, reducing runoff of silty or otherwise contaminated run-off and groundwater interaction. The plan will involve monitoring of groundwater and surface water quality.

vi) Any workers entering underground confined spaces such as below ground excavations or underground cable runs/ducts (applicable to both construction and operational phases) would use gas and vapour alarms and comply with confined spaces working procedures.

vii) Dust suppression during dry and windy conditions, good housekeeping during construction to reduce potential impacts of litter, dust and debris generation.

viii) Provision of silt traps and similar within the vicinity of nearby surface watercourses.

ix) During the construction stage, groundwater management practices would be adopted where groundwater is encountered. Dewatering practices may include a series of cut-off trenches and pumping employing best engineering practices.

x) Production of a UXO Management Plan will be prepared prior to construction commencing and adhered to. A site-specific UXO Awareness Briefing will be given to all operatives. In certain areas as defined by the

UXO Management Plan, an Intrusive Magnetometer Survey of all pile locations and excavations down to the maximum bomb penetration depth will be undertaken. A UXO Specialist will be available at all times during the Construction Phase to monitor works as required.

xi) Risks to construction works can be mitigated via use of appropriate personal protective equipment (PPE) together with implementing good site housekeeping, hygiene and other good practice site health and safety protocols.

xii) Appropriate stand-offs to existing utilities as required by utility owners and use of vibration monitors during excavation or piling works.

Operational Phase

10.7.3 The assessment takes account of the incorporated mitigation measures which would serve to avoid, reduce or minimise impacts during the operational phase. These measures are set out in the **Outline Operational Environmental Management Plan (oOEMP) [EN010153/DR/7.6].** Post-consent, this outline plan will be developed into a detailed plan which must be in substantial accordance with the outline, and the Proposed Development must be constructed in accordance with that detailed plan. This is secured via a Requirement in Schedule 2 of the draft DCO. The measures set out would apply for regular maintenance and also periodic replacement campaigns for the replacement of solar PV panels, PCUs, battery storage units etc. Intrusive ground works are not anticipated during the operational period. However, if this is required then it may be necessary to conducted focused ground investigation for those elements.

10.7.4 The following relevant incorporated mitigation measures are proposed:

i) The base of the permeable stone surfacing in the BESS would be lined with an impermeable geotextile.

ii) A bunded lagoon would be provided within the BESS compound to contain contaminated firewater in the event of such an incident.

iii) A shut off valve would be installed on the final manhole chamber of the surface water system serving the BESS, to prevent the release of water from the BESS to the watercourse in the event of a fire.

iv) Foul effluent from the BESS Control Room and the Frodsham Substation Control Room would be discharged to a sealed tank where it would be tankered off at appropriate intervals.

v) Any workers entering underground confined spaces such as below ground underground cable runs/ducts would use gas and vapour alarms and comply with confined spaces working procedures.

vi) Workers using standard construction protocols such as wearing personal protective equipment (PPE), implementing good hygiene practices and good housekeeping protocols

vii) The storage of fuels, chemicals or cleaning agents required during the operational phase will be limited to cleaning agents, fuel for equipment, fuel for diesel generators to provide power to working areas. These will be stored in a suitable bunded location on Site and will be returned to this location in properly sealed containers at the end of each working day.

viii) A suitably stocked spill-kit will be retained within the Site and an Emergency Spillage Plan will be prepared setting out procedures to respond to a spillage, and for reporting if required to the Environment Agency.

ix) Equipment to be regularly inspected to ensure that damage or leaks are identified early, and repairs are made, or equipment replaced.

x) Environmental Incident Management and Pollution Prevention Plan (EIMP) will be produced prior to operation commencing and will be reviewed and updated regularly by the Site Manager. Training will be provided to site workers as part of the induction process and will be updated as necessary. It will provide a structured response framework for fuel or chemical spills, unexpected contamination events, and pollution control measures to prevent impacts on watercourses and groundwater.

Decommissioning Phase

10.7.5 The assessment takes account of the incorporated mitigation measures which would serve to avoid, reduce or minimise impacts during the decommissioning phase. These measures are set out in the **Outline Decommissioning Environmental Management Plan (oDEMP) [EN010153/DR/7.7].** Post-consent, this outline plan will be developed into a detailed plan which must be in substantial accordance with the outline, and the Proposed Development must be constructed in accordance with that detailed plan. This is secured via a Requirement in Schedule 2 of the draft DCO.

10.7.6 The following relevant embedded mitigation measures are proposed as part of the DEMP:

i) Any major decommissioning works will be minimised during heavy precipitation and carried out during dry months where possible. Silt fencing and where appropriate, filter strips will be utilised to trap and filter run-off from excavations works which includes the removal of foundations for the BESS compound, removal of the below ground parts of the solar photovoltaic support frames, works to cable trenches and in relation to access roads.

ii) Equipment and spill kits will be provided to contain and clean up any spills to minimise the risk of pollutants entering any watercourses. Where there are instances of either fuel, oil or solvents being stored temporarily on Site, these containers will be stored within bunded areas and covered where possible, to prevent the accumulation of rainwater and to prevent accidental damage. Additional precautions would be taken during plant operations and in areas where there is storage of fuels or chemicals.

iii) Environmental Incident Management and Pollution Prevention Plan (EIMP) will be produced prior to decommissioning activities commencing and will be reviewed and updated regularly with the Principal Contractor. Training will be provided to site workers as part of the induction process

and will be updated as necessary. In the unlikely event of any incident, the Site Manager will be notified and will work to coordinate remedial actions.

iv) Groundwater and Surface Water Management Plan (GSWMP) that would detail site-wide measures for drainage, rainfall runoff management, reducing runoff of silty or otherwise contaminated run-off and groundwater interaction. The plan will involve monitoring of groundwater and surface water quality.

v) Unexpected contamination protocol to accompany the DEMP which details what to do in the event that potential contamination is encountered.

vi) Dust suppression during dry and wind conditions, good housekeeping during decommissioning to reduce potential impacts of list, dust and debris generation.

vii) Provision of silt traps and similar within the vicinity of nearby surface watercourses as per a GWSWMP.

10.7.7 Refuelling would be limited to designated re-fuelling areas where a suitably stocked spill-kit will be retained within the compound area as part of a standard compound requirement. The following relevant embedded mitigation measures are proposed as part of the design of the decommissioning phase compound and working areas:

i) The storage of fuels or chemicals required during the decommissioning phase will be limited to diesel generators to provide power to the compound area and above ground diesel tanks and ad-blue tanks for re-fuelling Site plant. Such fuel storage would be housed appropriately and bunded.

10.8 Assessment of Likely Impacts and Effects

10.8.1 This section presents the likely effects of the Proposed Development in relation to impacts on human health, groundwater, surface water, ecology, land and livestock receptors arising from existing ground conditions, including impacts related to contaminated land and land instability.

10.8.2 The assessment of effects takes account of the potential impacts on each receptor following the implementation of the incorporated mitigation measures set out in the previous section.

Sensitivity of Receptors

10.8.3 The sensitivity of the receptors during the construction, operational and decommissioning phases, with reference to Table 10.10, have been determined with reference to Table 10-3 which has been based on methodology presented within Ciria C552. Professional judgement has been applied within the assessment and in particular, for receptors that have not been included within the guidance (such as utilities etc.). The sensitivity of receptors is detailed within Table 10-13 below.

Table 10-13: Sensitivity of Identified Receptors During Construction, Operation & Decommissioning Phases

Receptor	Phase (C, O, D)*	Sensitivity	Relevant Scheme Activities
Ground Workers during the preparatory and construct-ion phases	C & D	Low to High	Low –Solar PV modules will either be piled into the ground to only shallow depth (of between 1.5 and 5m) or use prefabricated concrete blocks set directly onto the ground. The foundations for electrical transformers and associated electrical equipment will comprise concrete foundation slab or concrete piles to extend to 3.5m. The BESS and Frodsham Solar Substation will comprise concrete foundation slab or concrete piles to extend to 3.5m with external areas comprising loose stone over a geotextile membrane. Decommissioning works due to limited excavation / ground disturbance. Medium – excavation of cable trenches, construction of foundations (should traditional ground bearing methods of construction be adopted for BESS, control compound, electrical transformers and substation),

Receptor	Phase (C, O, D)*	Sensitivity	Relevant Scheme Activities
			High – extensive ground disturbance earthworks associated with development of NBBMA.
Future Site Users	O	Low	Low – maintenance workers, users of PRoW around Site and Wildfowlers.
Existing Site Users of Adjacent Land	C, O & D	Low	Members of the Public crossing the Site, users of wildfowler land, scattered residences nearby (e.g. Frodsham Marsh Farm)
Ground-water (superficial)	C & D	Medium to Low	Tidal Flat Deposits is a Secondary undifferentiated aquifer of medium to high groundwater vulnerability. The Proposed Development is not located within a Source Protection Zone. The groundwater is tidally influenced and brackish, particularly towards the northern part of the Site where it is in proximity to the Frodsham Score and Mersey Estuary. Medium: Tidal Flat Deposits of mainly granular composition, composed mainly of sands. Low: Where the Tidal Flat Deposits are predominantly cohesive composed of clay
Ground-water (bedrock)	C & D	High to Medium	High – The Sandstone Formations (Chester, Wilmslow and Helsby) – are classed as Principal aquifers with Low to Medium groundwater vulnerability. Medium – Easternmost area of site (coinciding with the SPEN substation): Tarporley Siltstone Formation – Secondary B aquifer with Low to Medium groundwater vulnerability.
Surface waters	C & D	Medium to Low	Medium - Named Main Rivers which traverse the Frodsham and Helsby Marshes: Red Wall Ditch, The Lum, Marsh Green and Ship Street Course. Medium - Surface watercourses adjacent to the Site: Hoolpool Gutter, Manchester Ship Canal, River Weaver. Low - There are ponds and drains located within the NBBMA (former MSCDDG Cell 3) and multiple field drains dissect the Site along field boundaries and roads.

Receptor	Phase (C, O, D)*	Sensitivity	Relevant Scheme Activities
Property/ building/ services	C, D	High	Utilities traversing the Site including high-pressure gas pipes and oil pipes overhead power and telephone lines.
	O	Low	Buildings and above ground infrastructure developed as part of the Proposed Development
Ecology / Eco-systems	C, O & D	Low to High	High: The whole Site is located within a SSSI Impact Risk Zone. Mersey Estuary to north is designated as an SSSI, RAMSAR, and SPA. Part of the Site falls within the Mersey Estuary SSSI. The SADA forms part of the Frodsham and Helsby and Ince Marshes Local Wildlife Site. Low to Medium: NBBMA when operational and grazing livestock on MSCDDG Cells.

**C: Construction Phase; O: Operational Phase; D: Decommissioning Phase*

10.8.4 The potential impact on receptors during the construction, operational and decommissioning phases are considered within the Table 10-14 below and takes account of incorporated mitigation measures within the design of the Proposed Development (as detailed previously in Section 10.7).

Table 10-14: Assessment of Likely Impacts and Effects with Incorporated Mitigation Applied

Receptor & Sensitivity	Potential Impact	Incorporated Mitigation Applied	Magnitude of Impact	Resulting Level of Effect	Significance of Effect
Construction Phase					
Ground Workers/ construction workers during the preparatory and construction phases (**Low to High**)	Exposure to contaminants within shallow soils and groundwater.	Provision of PPE Protocol to deal with encountering unexpected contamination Environmental Incident Management Plan Dust suppression measures Above included within **oCEMP [EN010153/DR/7.5]**.	**Small**	**Negligible to Minor**	**Not Significant**
	Exposure to asbestos fibres		**Small**	**Negligible to Minor**	**Not Significant**
	Exposure to ground gases and hydrocarbon vapours	Confined Space Entry Protocol included within **oCEMP [EN010153/DR/7.5]**.	**Small**	**Negligible to Minor**	**Not Significant**
	Encountering UXO	Production and Implementation of UXO Management Plan. Included within **oCEMP [EN010153/DR/7.5]**.	**Small**	**Negligible to Minor**	**Not Significant**
Existing Site Users of Adjacent Land (**Low**)	Migration of contaminants within dusts, debris, litter, silts	Implementation of dust suppression and provision of silt traps to be included within **oCEMP [EN010153/DR/7.5]**.	**Small**	**Negligible**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Incorporated Mitigation Applied	Magnitude of Impact	Resulting Level of Effect	Significance of Effect
Groundwater (superficial) (**Medium to Low**)	Creation of migratory pathways to allow migration of leachable and otherwise mobile contaminants to groundwater within superficial deposits from soils and perched groundwater	Undertaking suitable groundwater Management Practices (included within **oCEMP**) **[EN010153/DR/7.5]**.	**Medium**	**Moderate (for groundwater residing in the Tidal Flat Deposits comprising mainly granular materials e.g. sands) to** **Minor** **(for perched groundwater residing within the more cohesive silts and clays within the Tidal Flat Deposits, Glacial Till or Made Ground)**	**Significant (where resulting level of effect is moderate)** **to** **Not Significant (where resulting level of effect is Minor)**
Groundwater (bedrock) (**High to Medium**)	Creation of migratory pathways to allow migration of leachable and otherwise mobile contaminants to	There are no deep piles (maximum is 5m bgl) and no piles will extend into bedrock hence no plausible migratory pathway	**Negligible**	**Negligible to Minor**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Incorporated Mitigation Applied	Magnitude of Impact	Resulting Level of Effect	Significance of Effect
	groundwater within bedrock aquifer from soils and perched groundwater				
Surface waters (**Medium to Low**)	Creation of migratory pathways to allow migration of leachable and otherwise mobile contaminants to surface water Silty or otherwise contaminated run-off	Provision of surface water management as part of **oCEMP [EN010153/DR/7.5]**.	**Small**	**Minor**	**Not Significant**
Property/ building/ services (**High**)	Disturbance of contaminants and ground gases / vapours to build up within buildings. Chemical attack on services. Direct disturbance of existing Site Services	Implementation of appropriate stand-offs from existing services crossing the Site and use of vibration monitors during excavation and piling works.	**Small**	**Minor**	**Not Significant**
Ecology / Ecosystems (**Low to High**)	Creation of migratory pathways for contaminants within soils and perched groundwater and soil dusts to impact SSSI and ecology on Site within surface water and terrestrial habitats.	GWSWMP to be produced and implemented as part of **oDEMP [EN010153/DR/7.7]**.	**Medium**	**Minor to Moderate**	**Significant to Not Significant**
Ecology / Ecosystems (**Low to High**)	Creation of migratory Pathways for Grazing	Removing livestock from areas of construction and ground disturbance	**Small**	**Minor to Negligible**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Incorporated Mitigation Applied	Magnitude of Impact	Resulting Level of Effect	Significance of Effect
	Livestock following ground disturbance				
Operation Phase					
Future Site Users (**Low**)	Build-up of ground gases and vapours within buildings and confined spaces Permeation of hydrocarbons to impact drinking water supply	Confined Space Entry Protocol as part of **oOEMP [EN010153/DR/7.6]**.	**Medium**	**Minor**	**Not Significant**
Existing Site Users of Adjacent Land (**Low**)	Migration of contaminants within surface run off and generation of dusts	Undertaking suitable dust minimisation, litter and surface water management Practices included within **oOEMP [EN010153/DR/7.5]**.	**Small**	**Negligible**	**Not Significant**
Property/ building/ services (**Low**)	Chemical attack on belowground concrete and polymers due to migration of contaminants through new preferential pathways. Settlement of ground creating instability of foundations.	Detailed Design to incorporate suitable foundation options for Proposed Development	**Small to Medium**	**Minor to Negligible**	**Not Significant**
Ecology / Ecosystems	Creation of migratory pathways for contaminants	Pollution incidence response plan with suitably stocked spill kits and cut off valve for prevention of	**Small**	**Minor to Negligible**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Incorporated Mitigation Applied	Magnitude of Impact	Resulting Level of Effect	Significance of Effect
(**Low to High**)	within soils and perched groundwater and soil dusts to impact SSSI and ecology on Site within surface water and terrestrial habitats	potentially polluted run-off from entering surface waters. Plan included within **oOEMP [EN010153/DR/7.5]**.			
Ecology / Ecosystems (**Low to High**)	Creation of migratory pathways for grazing livestock following ground disturbance	No incorporated mitigation required	**Small**	**Minor to Negligible**	**Not Significant**
Decommissioning Phase					
Ground Workers during decommission-ing (**Low to High**)	Exposure to contaminants within shallow soils and groundwater	Provision of PPE Protocol to deal with encountering unexpected contamination Environmental Incident management Plan Dust suppression measures Above provided in **oDEMP [EN010153/DR/7.7]**.	**Small**	**Negligible to Minor**	**Not Significant**
	Exposure to asbestos fibres		**Small**	**Negligible to Minor**	**Not Significant**
	Exposure to ground gases and hydrocarbon vapours	Implementation of suitable confined space entry protocol	**Small**	**Negligible to Minor**	**Not Significant**
Existing Site Users of Adjacent Land	Migration of contaminants within dusts, debris, litter, silts	Dust suppression measures and GWSWMP included in **oDEMP [EN010153/DR/7.7]**.	**Small**	**Negligible**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Incorporated Mitigation Applied	Magnitude of Impact	Resulting Level of Effect	Significance of Effect
(**Low**)					
Groundwater (superficial) (**Medium to Low**)	Creation of migratory pathways to allow migration of leachable and otherwise mobile contaminants to groundwater within superficial deposits from soils and perched groundwater	Programme of monitoring included within GWSWMP included as part of **oDEMP [EN010153/DR/7.7]**.	**Small**	**Minor to Negligible**	**Not Significant**
Groundwater (bedrock) (**High to Medium**)	Creation of migratory pathways to allow migration of leachable and otherwise mobile contaminants to groundwater within bedrock aquifer from soils and perched groundwater	There are no deep piles (maximum is 5m bgl) and no piles will extend into bedrock hence no plausible migratory pathway when piles are either removed or left insitu.	**Negligible**	**Negligible to Minor**	**Not Significant**
Surface waters (**Medium to Low**)	Creation of migratory pathways to allow migration of leachable and otherwise mobile contaminants to surface water Silty or otherwise contaminated run-off	GWSWMP included in **oDEMP [EN010153/DR/7.7]**.	**Small**	**Minor to Negligible**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Incorporated Mitigation Applied	Magnitude of Impact	Resulting Level of Effect	Significance of Effect
Property/ building/ services (**High**)	Disturbance of contaminants and ground gases / vapours to build up within buildings. Chemical attack on services. Direct disturbance of existing Site Services	Stand-off applied to site services and MSCDDG bunds.	**Small**	**Minor**	**Not Significant**
Ecology / Ecosystems (**Medium to High**)	Creation of migratory pathways for contaminants within soils and perched groundwater and soil dusts to impact SSSI and ecology on Site within surface water and terrestrial habitats	GWSWMP included in **oDEMP [EN010153/DR/7.7]**.	**Small**	**Minor to Negligible**	**Not Significant**

10.9 Additional Mitigation, Enhancement and Monitoring

Construction Phase

10.9.1 In addition to the incorporated mitigation measures, the following additional mitigation, enhancement or monitoring would be carried out after the DCO is granted as set out in the **oCEMP [EN010153/DR/7.5]**:

i) Further detailed investigation and assessment to be undertaken to inform the detailed design which would focus on proposed areas of piling and ground disturbance and the areas of the Site where there is the potential for localised contamination as identified within this assessment. A Foundation Works Risk Assessment (FWRA) would assist with this assessment process. A FWRA will be prepared to support the construction phase which would be agreed in consultation with the EA and CWaCC.

ii) A Piling Risk Assessment (PRA) will be produced and form part of the FWRA, as detailed above. The PRA will adopt the most suitable piling technique which is likely to entail a method where generation of arisings is minimal (to reduce likelihood of exposure to construction workers) and methods to reduce the likelihood of contaminant remobilisation during piling which would be considered by CWaCC and EA.

iii) Asbestos awareness and management is to be implemented during construction phase through the CEMP.

iv) Provision of a Materials Management Plan (MMP) or, if this is not possible, then a Deposit for Recovery (DfR) Permit as required for the excavation and reuse of soils as part of the works for the NBBMA and other areas on Site where reuse of Soils from the Site are required.

v) These would be supported by appropriate controlled water risk assessments, Remediation Strategy and groundwater and surface water monitoring programme as approved by the regulators. Such documentation would detail recovery, segregation, testing and replacement works and be approved by the regulators prior to implementation. This would detail that any dredging arisings would be

replaced under the existing surface soils (following careful recovery) to ensure surface ground conditions remain similar to baseline conditions.

vi) A management and monitoring plan to mitigate any adverse effects to wading birds would be prepared for the NBBMA area as part of the approved Landscape and Ecology Management Plan (pursuant to the **oLEMP**) **[EN010153/DR/7.13]**. It is expected this work would entail a watching brief by a suitably qualified ecologist/ornithologist during creation of the NBBMA, monitoring of water quality within surrounding surface watercourses and surveying such as invertebrate abundance monitoring both during and post construction. This is consistent with works which were agreed during the initial formation of the ecological scrapes as part of the Frodsham Wind Farm construction.

vii) Ground gases and vapours can migrate and accumulate within enclosed structures including cable trenching. Enclosed structures would be limited to the BESS and Frodsham Solar Substation and centralised invertors and Power Conversion Units which form part of proposed standalone transformer stations (described within Section 2.4 of **ES Vol 1 Chapter 2 Main Report [EN010153/DR/6.1].** The design of these buildings would be finalised at detailed design. Should these be containerised units which reside on legs or frames above ground level, then the overall risk from build-up of ground gas and hydrocarbon vapour is low. If permanent ground-bearing enclosed structures are adopted, then an appropriate gas monitoring programme would be undertaken at the detailed design stage prior to the construction of the buildings to assess whether gas protection measures are required within the design of the structures.

viii) Materials specification for piling, other foundations and laying of site services would be determined at detailed design to mitigate against risks to property presented from the chemically aggressive belowground environment and settlement causing instability.

ix) Where remediation of Site Won soils is required, a Remedial Strategy with options appraisal, and verification implementation plan will be produced. The largest ground disturbance is proposed in association with the

creation of the NBBMA. In advance of undertaking an options appraisal, the remediation methodology of soil stabilisation has been explored and is considered as a potentially suitable methodology for remediation of soils from the NBBMA to facilitate their reuse. An Outline Remedial Concept Technical Note for soils stabilisation is provided as ES **Vol 2 Appendix 10-2 [EN010153/DR/6.1]**.

Operational Phase

i) No additional enhanced mitigation in addition to embedded measures are required during the operational phase of the Proposed Development.

Decommissioning Phase

i) No additional enhanced mitigation measures are required during decommissioning phase of the Proposed Development. It is assumed that the NBBMA will remain insitu at the point of decommissioning.

Monitoring

10.9.2 In addition to monitoring requirements under the GWSWMP which is required by the **oCEMP [EN010153/DR/7.5]**, groundwater and surface water quality monitoring will be undertaken prior to, during and for an agreed period of time after the groundworks have ta ken place. The monitoring programme will be produced post DCO approval to support Detailed Design prior to commencement of works. The monitoring plan will focus on the NBBMA where significant earthworks will take place but will also include a programme of monitoring of groundwater and surface water over the remaining areas of the Site where dredging materials are to be excavated and disturbed. It is considered that the proposed monitoring will be undertaken over an agreed period during and following completion of construction, long-term monitoring beyond one year after construction is not considered likely to be required.

10.10 Residual Effects

10.10.1 Table 10-15 details an assessment of residual significant effects for each contaminant linkage once applied, and enhanced mitigation and monitoring is incorporated.

Table 10-15: Assessment of Likely Impacts and Residual Effects with Additional Mitigation Applied

Receptor & Sensitivity	Potential Impact	Resulting Level of Effects	Significance of Effect (Without Applied Mitigation)	Additional Mitigation Measures and Monitoring	Magnitude of Impact	Residual Level of Effect	Significance of Effect
Construction Phase							
Ground Workers during the preparatory and construction phases (**Low to High**)	Exposure to contaminants within shallow soils and groundwater	Negligible to Minor	Not Significant	PRA will adopt an appropriate technique which will minimise the generation of arisings to further reduce the likelihood of works coming into contact with contaminated soil.	**Negligible**	**Negligible to Minor**	**Not Significant**
	Exposure to asbestos fibres during ground disturbance	Negligible to Minor	Not Significant	Asbestos awareness and management protocol to be prepared and implemented.	**Negligible**	**Negligible to Minor**	**Not Significant**
	Exposure to ground gases and hydrocarbon vapours	Negligible to Minor	Not Significant	If enclosed working spaces are constructed on ground-bearing foundations (rather than modular units) then an appropriate ground gas risk assessment including monitoring programme to assess whether in-built design ground gas mitigation measures (ventilation and gas resistant membrane is required).	**Negligible**	**Negligible to Minor**	**Not Significant**
	Encountering UXO	Minor	Not Significant	No additional mitigation beyond that adopted in the **oCEMP** (UXO toolbox	**Small**	**Minor to Negligible**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Resulting Level of Effects	Significance of Effect (Without Applied Mitigation)	Additional Mitigation Measures and Monitoring	Magnitude of Impact	Residual Level of Effect	Significance of Effect
				talk/awareness training and attending UXO engineer) **[EN010153/DR/7.5]**.			
Existing Site Users of Adjacent Land (**Low**)	Migration of contaminants within dusts, debris, litter, silts	Negligible	Not Significant	No additional mitigation beyond that adopted in the **oCEMP** (dust suppression, GWSWMP to reduce runoff of silts) **[EN010153/DR/7.5]**.	**Small**	**Negligible**	**Not Significant**
Groundwater (superficial) (**Medium to Low**)	Creation of migratory pathways to allow migration of leachable and otherwise mobile contaminants to groundwater within superficial deposits from soils and perched groundwater	Moderate to Minor	Significant to Not Significant	PRA will adopt techniques which will minimise disturbance and potential remobilisation of contaminants. Works within the NBBMA to be informed by a groundwater risk assessment prior to commencement of construction which will include the requirement for baseline, construction and completion of works groundwater and surface water monitoring with the scope to be agreed with the EA.	**Small**	**Minor to Negligible**	**Not Significant**
Groundwater (bedrock) (**High to Medium**)	Creation of migratory pathways to allow migration of leachable and otherwise mobile contaminants to groundwater within	Negligible to Minor	Not Significant	No additional mitigation required – bedrock will not be disturbed during construction as any piled foundations will not extend to such a depth. Remedial works of soils to be provided as per Remedial Strategy.	**Negligible**	**Minor to Negligible**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Resulting Level of Effects	Significance of Effect (Without Applied Mitigation)	Additional Mitigation Measures and Monitoring	Magnitude of Impact	Residual Level of Effect	Significance of Effect
	bedrock aquifer from soils and perched groundwater						
Surface waters (**Medium to Low**)	Creation of migratory pathways to allow migration of leachable and otherwise mobile contaminants to surface water Silty or otherwise contaminated run-off	Minor	Not Significant	PRA will adopt techniques which will minimise disturbance and potential remobilisation of contaminants. Works within the NBBMA to be informed by a groundwater risk assessment prior to commencement of construction which will include the requirement for baseline, construction and completion of works groundwater and surface water monitoring with the scope to be agreed with the EA. Remedial works of soils to be provided as per Remedial Strategy.	**Negligible**	**Minor to Negligible**	**Not Significant**
Property/ building/ services (**High)**	Disturbance of contaminants and ground gases / vapours to build up within buildings. Chemical attack on services. Direct disturbance of existing Site Services	Minor	Not Significant	Site investigation to inform detailed design will include testing of foundation bearing strata to determine the aggressive chemical environment for concrete classification (ACEC), appropriate Design Class of concrete and stability and settlement properties of the ground. Findings to be incorporated into PRA.	**Negligible**	**Minor**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Resulting Level of Effects	Significance of Effect (Without Applied Mitigation)	Additional Mitigation Measures and Monitoring	Magnitude of Impact	Residual Level of Effect	Significance of Effect
				If enclosed working spaces are constructed on ground-bearing foundations (rather than modular units) then an appropriate ground gas risk assessment including monitoring programme to assess whether in-built design ground gas mitigation measures (ventilation and gas resistant membrane is required)			
Ecology / Ecosystems (**Low to High**)	Creation of migratory pathways for contaminants within soils and perched groundwater and soil dusts to impact SSSI and ecology on Site within surface water and terrestrial habitats	Minor to Moderate	Significant to Not Significant	Earthworks associated with the NBBMA will be completed with an appropriate MMP / DfR in place. This will be supported by an appropriate Controlled Waters Risk Assessment and monitoring plan. Monitoring will include surface and groundwater and ecological surveys to be conducted prior to construction, during and following completion. PRA to determine best technique to include minimising potential for contaminant remobilisation.	**Small**	**Minor to Negligible**	**Not Significant**
Operation Phase							
Future Site Users (**Low**)	Build-up of ground gases and vapours	Minor	Not Significant	If enclosed working spaces are constructed on ground-bearing foundations (rather than modular units) then an appropriate ground gas	**Small**	**Negligible**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Resulting Level of Effects	Significance of Effect (Without Applied Mitigation)	Additional Mitigation Measures and Monitoring	Magnitude of Impact	Residual Level of Effect	Significance of Effect
	within buildings and confined spaces Permeation of hydrocarbons to impact drinking water supply			risk assessment including monitoring programme to assess whether in-built design ground gas mitigation measures (ventilation and gas resistant membrane is required) Ground investigation to include testing of soils at depth in which any water pipelines are to be laid to assess whether barrier pipe is required to mitigate against any potential for residual contaminants to permeate water supply pipes.			
Existing Site Users of Adjacent Land (**Low**)	Migration of contaminants within surface run off and generation of dusts	Negligible	Not Significant	No additional mitigation proposed	**Small**	**Negligible**	**Not Significant**
Property/ building/ services (**Low**)	Chemical attack on belowground concrete and polymers due to migration of contaminants through new preferential pathways Settlement of ground creating	Minor to Negligible	Not Significant	Mitigated by Construction stage measures: Site investigation to inform detailed design will include testing of foundation bearing strata to determine the aggressive chemical environment for concrete classification (ACEC) and appropriate Design Class of concrete. Findings to be incorporated into PRA. If enclosed working spaces are constructed on ground-bearing	**Negligible**	**Negligible**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Resulting Level of Effects	Significance of Effect (Without Applied Mitigation)	Additional Mitigation Measures and Monitoring	Magnitude of Impact	Residual Level of Effect	Significance of Effect
	instability of foundation.			foundations (rather than modular units) then an appropriate ground gas risk assessment including monitoring programme to assess whether in-built design ground gas mitigation measures (ventilation and gas resistant membrane is required)			
Ecology / Ecosystems (**Low to High**)	Creation of migratory pathways for contaminants within soils and perched groundwater and soil dusts to impact SSSI and ecology on Site within surface water and terrestrial habitats	Minor to Negligible	Not Significant	Mitigated by Construction stage measures: Earthworks associated with the NBBMA and other areas of the Site and will be completed with an appropriate MMP / DfR in place. This will be supported by an appropriate Controlled Waters Risk Assessment, monitoring plan and Remedial Strategy / Design Statement. Monitoring will include surface and groundwater and ecological surveys to be conducted. prior to construction, during and following completion. PRA to determine best technique to include minimising potential for contaminant remobilisation. The proposed monitoring programme and Remediation Strategy will be provided to statutory consultees for their approval.	**Small**	**Minor to Negligible**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Resulting Level of Effects	Significance of Effect (Without Applied Mitigation)	Additional Mitigation Measures and Monitoring	Magnitude of Impact	Residual Level of Effect	Significance of Effect
	Creation of migratory Pathways for Grazing Livestock following ground disturbance	Minor to Negligible	Not Significant	Mitigated by MMP or DfR which will include handling, segregation, testing and replacement of recovered materials. This will be undertaken under a Remediation Strategy or Design Statement. This will ensure any dredging arisings are replaced below existing surface topsoil	**Negligible**	**Minor to Negligible**	**Not Significant**
Decommissioning Phase							
Workers during the decommissioning works (**Low to High**)	Exposure to contaminants within shallow soils and groundwater	Negligible to Minor	Not Significant	Ground investigation post decommission around BESS, control compound and Frodsham Substation to determine whether any changes to Baseline Conditions have occurred. Update of **oDEMP [EN010153/DR/7.7]** accordingly to produce DEMP post DCO approval.	**Negligible**	**Minor to Negligible**	**Not Significant**
	Exposure to asbestos fibres	Negligible to Minor	Not Significant	No additional mitigation required	**Small**	**Minor to Negligible**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Resulting Level of Effects	Significance of Effect (Without Applied Mitigation)	Additional Mitigation Measures and Monitoring	Magnitude of Impact	Residual Level of Effect	Significance of Effect
	Exposure to ground gases and hydrocarbon vapours	Negligible to Minor	Not Significant	No additional mitigation required	**Small**	**Negligible to Minor**	**Not Significant**
Existing Site Users of Adjacent Land (**Low**)	Migration of contaminants within dusts, debris, litter, silts	Negligible	Not Significant	Ground investigation post decommission around BESS, control compound and Frodsham Substation to determine whether any changes to Baseline Conditions have occurred. Update of **oDEMP [EN010153/DR/7.7]** accordingly to produce DEMP post DCO approval.	**Negligible**	**Negligible**	**Not Significant**
Groundwater (superficial) (**Medium to Low**)	Creation of migratory pathways to allow migration of leachable and otherwise mobile contaminants to groundwater within superficial deposits from soils and perched groundwater	Minor to Negligible	Not Significant	GWSWMP included as part of **oDEMP [EN010153/DR/7.7]**.	**Small**	**Minor to Negligible**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Resulting Level of Effects	Significance of Effect (Without Applied Mitigation)	Additional Mitigation Measures and Monitoring	Magnitude of Impact	Residual Level of Effect	Significance of Effect
Groundwater (bedrock) (**High to Medium**)	Creation of migratory pathways to allow migration of leachable and otherwise mobile contaminants to groundwater within bedrock aquifer from soils and perched groundwater	Minor to Negligible	Not Significant	No additional mitigation Required	**Negligible**	**Minor to Negligible**	**Not Significant**
Surface waters (**Medium to Low**)	Creation of migratory pathways to allow migration of leachable and otherwise mobile contaminants to surface water Silty or otherwise contaminated run-off	Minor to Negligible	Not Significant	GWSWMP included as part of **oDEMP [EN010153/DR/7.7]**.	**Small**	**Minor to Negligible**	**Not Significant**
Property/ building/ services (**High**)	Disturbance of contaminants and ground gases / vapours to build up within buildings. Chemical attack on services. Direct disturbance of existing Site	Minor	Not Significant	No additional mitigation required	**Small**	**Minor**	**Not Significant**

Receptor & Sensitivity	Potential Impact	Resulting Level of Effects	Significance of Effect (Without Applied Mitigation)	Additional Mitigation Measures and Monitoring	Magnitude of Impact	Residual Level of Effect	Significance of Effect
	Services to remain on Site.						
Ecology / Ecosystems (**Medium to High**)	Creation of migratory pathways for contaminants within soils and perched groundwater and soil dusts to impact SSSI and ecology on Site within surface water and terrestrial habitats	Minor to Negligible	Not Significant	GWSWMP included as part of **oDEMP [EN010153/DR/7.7]**. A Method Statement and Monitoring Plan will be created and implemented during any large-scale excavation works within the dredgings cells to mitigate the effects to wading birds will be prepared for the works within the NBBMA area. It is expected this will entail a watching brief by a suitably qualified ecologist/ornithologist during creation of the NBBMA, monitoring of water quality within surrounding surface watercourses and surveying such as invertebrate abundance monitoring both during and post construction.	**Small**	**Minor to Negligible**	**Not Significant**

10.11 Inter-Project Cumulative Effects Assessment

Introduction

10.11.1 Cumulative effects can result from a combination of impacts, which on their own may not be significant but when combined with others, could generate significant effects.

10.11.2 The approach to the Cumulative Effects Assessment is described in **ES Vol 1 Chapter 4 Methodology [EN010153/DR/6.1].** A short list of projects which the Proposed Development could have potential significant cumulative environmental effects with has been prepared, see **ES Vol 2 Appendix 4-4 Short List of other 'reasonably foreseeable' developments [EN010153/DR/6.1]**. The location of the projects is shown on **ES Vol 3 Figure 4-3: Short List Cumulative Schemes – 1km [EN010153/DR/6.3].**

10.11.3 As set out in **ES Vol 1 Chapter 4 Methodology [EN010153/DR/6.1]** there are a several development schemes located within Protos. Protos is a significant development site and with the benefit of planning permissions for a range of energy generation and resource management businesses. Due to the proximity of the developments to one another they have been collectively assessed below. Where specific cumulative effects could arise from an individual project these have been expanded on.

10.11.4 Project Ref 16 (100MW BESS) and Ref 17 (135Kv substation) have also been considered together due to their proximity and the interrelationship of the two projects.

Halton Schemes - Ref 16 (100MW BESS) and Ref 17 (135Kv substation)

Construction, Operation and Decommissioning

These two schemes are located beyond the northeastern bank of the Weaver Navigation and will involve only fairly small-scale ground disturbance as much of the building and infrastructure will be located above ground or will require only shallow foundations. Both proposed developments will be located over

chemical wastes known as ‘galligu’. Both schemes have been subject to phased contamination assessment with recommendations. It is considered unlikely that the associated disturbance will cause migratory pathways and such cumulative significant impacts to ground conditions to affect, or interact with, the Frodsham Solar development and land located within the Order Limits owing to the presence of the Weaver Navigation. Cumulative impacts from this development are considered unlikely and **Not Significant.**

Protos Schemes – Ref 20 (Ince Biopower CO2); Ref 27 (Plastics Recycling Facility); Ref 25 & 28 (Hydrogen Production Facility); Ref 31 (Waste Recycling and hydrogen refuelling); 34 (Standby Electricity Generating Plant); Ref 35 (Post Combustion CO2 Capture Facility); Ref 81 (Protos West AGI)

Construction, Operation and Decommissioning

10.11.5 The majority of the land area within the Protos development area is of natural origin with a proportion of the land having been previously drained. The Private Wire Connection will be constructed within existing roads and at shallow depth and does not progress through the Protos development area, and the other elements of Frodsham Solar are approximately 1.7km away. As such, cumulative impacts from this development are considered unlikely and **Not Significant**.

Ref 33 (Encirc Automated Warehouse)

Construction, Operation and Decommissioning

10.11.6 No significant cumulative effects on ground conditions are considered likely due to the distance of the development from the areas of the Order Limits subject to ground disturbance or activities which could give rise to effects on ground conditions (i.e. development within the SADA, Private Wire Connection; SPEN Grid Connection or the NBBMA). Cumulative impacts from this development are considered unlikely and **Not Significant**.

Ref 32 (Hydrogen Production Facility)

Construction, Operation and Decommissioning

10.11.7 No significant cumulative effects on ground conditions are considered likely due to distance of the development from the areas of the Order Limits subject to ground disturbance or activities which could give rise to effects on ground conditions (i.e. development within the SADA, Private Wire Connection; SPEN Grid Connection or the NBBMA). Cumulative impacts from this development are considered unlikely and **Not Significant**.

Ref 37 (HyNet Carbon Dioxide Pipeline)

Construction, Operation and Decommissioning

10.11.8 No significant cumulative effects on ground conditions are considered likely due to distance of the development from the areas of the Order Limits subject to ground disturbance or activities which could give rise to effects on ground conditions (i.e. development within the SADA, Private Wire Connection; SPEN Grid Connection or the NBBMA). Cumulative impacts from this development are considered unlikely and **Not Significant**.

Ref 38 (HyNet Hydrogen Pipeline)

Construction, Operation and Decommissioning

10.11.9 The scheme is in the pre-application stage of the DCO process. The project intersects the Order Limits of the Proposed Development although the pipeline and its associated redline boundary does not intersect the MSCDDG cells and will be located to the south of all dredging cells and within agricultural land. The pipeline will, however, pass through the SADA. HyNet will reinstate the land within the pipeline corridor once the pipeline has been constructed.

10.11.10 There will be no permanent aboveground infrastructure proposed on the Site and hence the main cumulative effects are therefore likely to be limited to the construction and decommissioning phases only. It is understood from Chapter

12 – Ground Conditions of the HyNet PEIR that a full and detailed CEMP will be implemented in addition to a Drainage Water Management Plan (DWMP). This will reduce impacts from the construction phase. Diversion and reinstatement of existing drainage networks would manage water and silt runoff in addition to the application of stand-off distances from watercourses. The belowground infrastructure proposed would be designed to minimise disruption to existing subsurface flow pathways. The pipeline will have an easement of 24.4m where no other development nor ground disturbance will be allowed. Construction of the development may occur during the same time as construction of the Frodsham Solar scheme but it is presumed construction will be isolated from the Frodsham Solar scheme. The **oCEMP [EN010153/DR/7.5]** includes a commitment to work with Hynet to coordinate construction works and minimise environmental impacts.

10.11.11 No significant effects have been identified with respect to ground conditions and it is considered there **is unlikely to be significant** cumulative effects.

Ref 78 (Runcorn Carbon Dioxide Spur Pipeline)

Construction

10.11.12 The project is at the pre-application stage and there is only an EIA scoping report is available and a project website (which includes a refined route corridor to that illustrated in the Scoping Report) to inform the cumulative assessment. Construction of this pipeline may occur at the same time as the construction of Frodsham Solar. The pipeline would be routed through Cell 1, 2 and 3, but would not be constructed at the same time as the Cell 3 mitigation works.

10.11.13 The EA has recommended that a Phase 1 and contamination desk study and ground investigation work should be undertaken to support the forthcoming ES for Ref 78. Piling or any other foundation designs using penetrative methods can result in risks to potable supplies from, for example, pollution / turbidity, risk of mobilising contamination, drilling through different aquifers and creating preferential pathways. The EA has requested that it should be

demonstrated that any proposed piling will not result in contamination of groundwater.

10.11.14 As with the project Ref 38 above there will be no permanent aboveground infrastructure proposed on the Site and hence the main cumulative effects are therefore likely to be limited to the construction and decommissioning phases only. Under the title of Embedded Mitigation the scoping report states that:

The embedded mitigation measures applicable to Land and Soils are standard good practices and will minimise exposure risks for the duration of the Construction Stage.

These measures are likely to form part of a standard construction environmental management plan, which will be produced for the Runcorn Spur Pipeline Proposed Development.

10.11.15 It is anticipated that adoption of best practice measures implemented via the proposed CEMPs on both schemes would avoid significant cumulative effects arising. The **oCEMP [EN010153/DR/7.5]** includes a commitment to work with Eni to coordinate construction works and minimise environmental impacts.

10.11.16 Cumulative impacts with this development are therefore considered unlikely and **not significant.**

10.12 Conclusions

10.12.1 This Ground Conditions Chapter has considered the potential impacts that affect sensitive receptors during the construction, operational and decommissioning phases of the Proposed Development.

10.12.2 A baseline assessment has been completed to qualitatively characterise the identified source-pathway-receptors.

10.12.3 There is sufficient site information available to characterise the risks presented in conjunction with the Proposed Development and define the likely mitigation measures that would be required to manage risks at the Site that are proportionate to the contamination and land instability risks identified.

10.12.4 Whilst some contamination sources have been identified on Site, they have remained historically in place over a period of between 60 and 80 years with soils in hydraulic continuity with perched groundwater. Construction, operation and decommissioning of the Proposed Development will not introduce additional contaminants, but it is recognised that construction works could re-mobilise existing contaminants in the absence of suitable mitigation or design measures and potentially cause short term contaminant impacts.

10.12.5 The risk of contaminant mobilisation is largely associated with ground disturbance during construction of the NBBMA and foundation works (piles and excavations) across the SADA. It is, however, considered that standard mitigation techniques can be employed to reduce such risk to a low or negligible level as detailed, as set out in this chapter. Any piles required for solar PV module support frames, or other structures within the BESS and Frodsham Solar Substation will be short and will not breach the base of the dredging cells. Nonetheless, piling works will be subject to a Piling Risk Assessment (PRA) which will adopt the appropriate methods / techniques to reduce the generation of soil arisings and also the likelihood of contaminant remobilisation. Materials specification for piling and laying of other foundations and site services will be determined at detailed design to mitigate against risks to property presented from the chemically aggressive below

ground environment and settlement from ground instability. This will all be presented within a Foundation Works Risk Assessment, to be produced at detailed design.

10.12.6 It is acknowledged that the disturbance of ground during construction (particularly with consideration of the NBBMA) may temporarily increase the leachability of contaminants within soils and perched groundwater to controlled waters. However, the excavations within the NBBMA are only to be shallow (depth of circa 1m) and to be located above the water table and therefore present a low risk.

10.12.7 A management and monitoring plan to mitigate the effects on wading birds during any large-scale excavation works within the dredgings cells will be prepared for the works within the NBBMA area. It is expected this will entail a watching brief by a suitably qualified ecologist/ornithologist during creation of the NBBMA, monitoring of water quality within surrounding surface watercourses and surveying such as invertebrate abundance monitoring both during and post construction, this requirement is detailed within the **oLEMP [EN010153/DR/7.13] and oCEMP [EN010153/DR/7.5]**. A materials management plan (MMP) / Deposit for Recovery (DfR) will also be prepared once detailed design is finalised and will be agreed with regulatory authorities prior to implementation.

10.12.8 The potential for remobilisation of contaminants during ground disturbance of the NBBMA will be managed under a robust CEMP and MMP / DfR permit. Additional groundwater risk assessment followed by production of a Remediation Strategy and possible requirement for treatment of soils will be prepared in advance to support the MMP process. All the above will be undertaken post DCO Approval and approval will be gained from regulators.

10.12.9 A Remediation Technical Concept Note for MSCDDG Cell 3 **ES Vol 1 Appendix 10-2 [EN010153/DR/6.1]** has been prepared as part of the application which has identified that soil stabilisation may be an appropriate remedial technique for facilitating development of the NBBMA.

10.12.10 The required mitigation measures to be employed during the construction, operational and decommissioning phases are set out in the **oCEMP [EN010153/DR/7.5]**, **oOEMP [EN010153/DR/7.6]** and **oDEMP [EN010153/DR/7.7].** Post-consent, these outline plans will be developed into detailed plans which must be in substantial accordance with the outline, and the Proposed Development must be undertaken in accordance with those approved detailed plans. This is secured via a Requirement in Schedule 2 of the draft DCO.

10.12.11 Through the implementation of incorporated and additional mitigation measures there would be **no significant** residual effects on human health, groundwater, surface water, ecology, land and livestock receptors or buildings/ground stability have been identified.

10.12.12 Overall, the effects are predicted to be **not significant** with respect to ground conditions, contamination and land instability and no significant residual effects having been identified.

10.13 References

[i] CL:AIRE (March 2011) 'The Definition of Waste: Development Industry Code of Practice. Version 2'
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