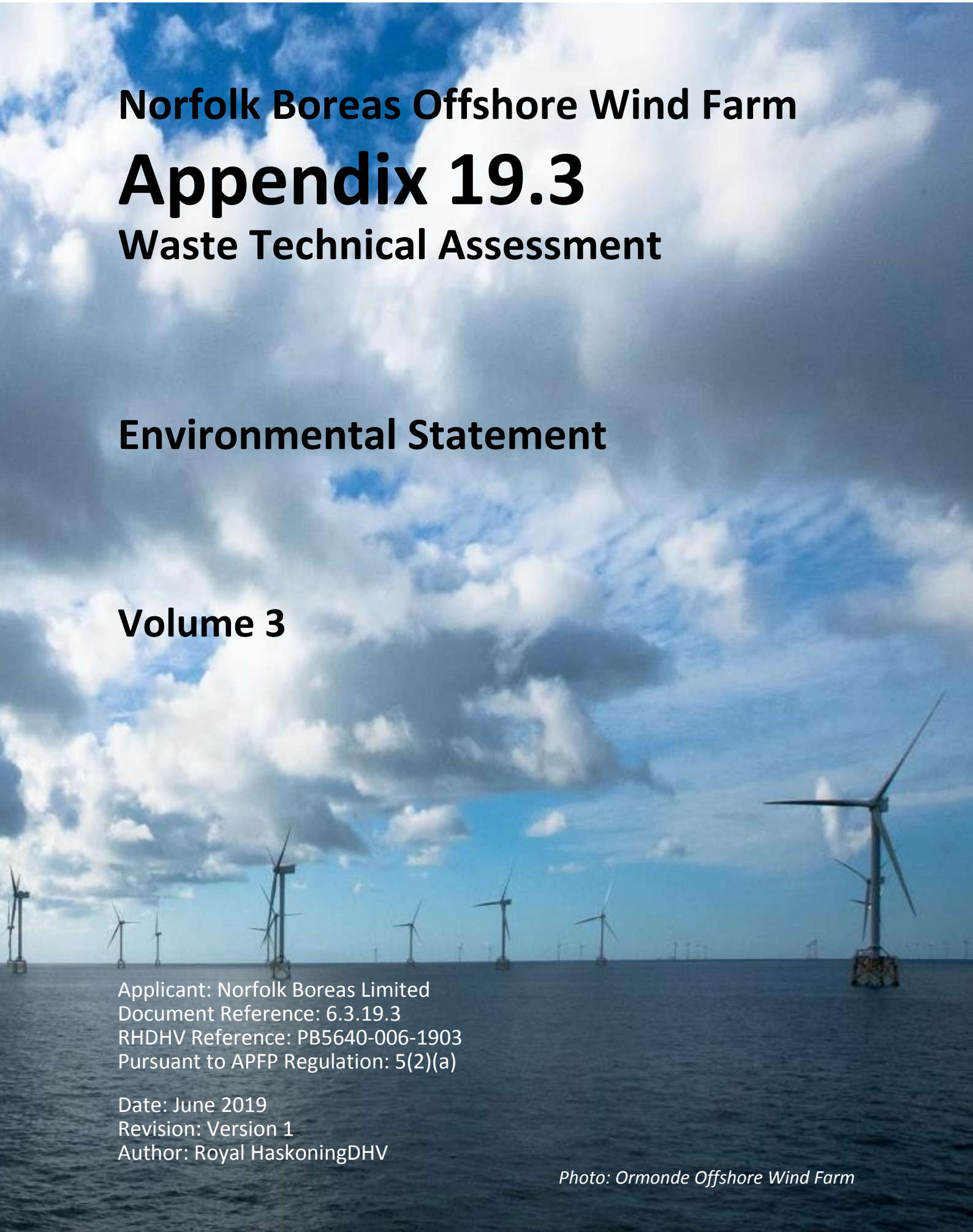
Norfolk Boreas Offshore Wind Farm

Appendix 19.3

Waste Technical Assessment

Environmental Statement

Volume 3



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Glossary of Acronyms

ABE	Approved Battery Exporter
ABTO	Approved Battery Treatment Operator
AQMA	Air Quality Management Area
CL:AIRE	Contaminated Land: Applications in Real Environments
CoCP	Code of Construction Practice
CoP	Code of Practice
DCO	Development Consent Order
Defra	The Department for Environment Food & Rural Affairs
DPD	Development Plan Document
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
EWC	European Waste Catalogue
HCI	Household, commercial and industrial
HDD	Horizontal Directional Drilling
HDPE	High-density Polyethylene
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
HWR	Hazardous Waste Regulations
HWRC	Household Waste Recycling Centre
JCS	Joint Core Strategy
LDF	Local Development Framework
MMP	Materials Management Plan
MRS	Metal Recycling Site
MWDF	Mineral and Waste Development Framework
NPPF	National Planning Policy Framework
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PET	Polyethylene Terephthalate
POP	Persistent Organic Pollutant
PRA	Preliminary Risk Assessment
PRoW	Public Rights of Way
rWFD	Revised Waste Framework Directive
SVOC	Semi Volatile Organic Compounds
SWMP	Site Waste Management Plan
TEU	Treaty on European Union
UK	United Kingdom
VOC	Volatile Organic Compounds
WAC	Waste Acceptance Criteria
WEEE	Waste Electrical and Electronic Equipment
WRAP	Waste & Resources Action Programme
WTS	Waste Transfer Station

Glossary of Terminology

Cable pulling	Installation of cables within pre-installed ducts from jointing pits located along the onshore cable route.
Ducts	A duct is a length of underground piping, which is used to house electrical and communication cables.
Jointing pit	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts
Landfall	Where the offshore cables come ashore at Happisburgh South
Link boxes	Underground chambers or above ground cabinets next to the cable trench housing low voltage electrical earthing links.
Mobilisation area	Areas approx. 100 x 100m used as access points to the running track for duct installation. Required to store equipment and provide welfare facilities. Located adjacent to the onshore cable route, accessible from local highways network suitable for the delivery of heavy and oversized materials and equipment.
National Grid overhead line modification	The works to be undertaken to complete the necessary modification to the existing 400kV overhead lines.
National Grid substation extension	The permanent footprint of the National Grid substation extension.
Necton National Grid substation	The grid connection location for Norfolk Boreas and Norfolk Vanguard
Onshore cable route	The up to 35m working width within a 45m wide corridor which will contain the buried export cables as well as the temporary running track, topsoil storage and excavated material during construction.
Onshore cables	The cables which take power and communications from landfall to the onshore project substation
Onshore project area	The area of the onshore infrastructure (landfall, onshore cable route, accesses, trenchless crossing zones and mobilisation areas; onshore project substation and extension to the Necton National Grid substation and overhead line modifications).
Onshore project substation	A compound containing electrical equipment to enable connection to the National Grid. The substation will convert the exported power from HVDC to HVAC, to 400kV (grid voltage). This also contains equipment to help maintain stable grid voltage.
Onshore project substation temporary construction compound	Land adjacent to the onshore project substation which would be temporarily required during construction of the onshore project substation.
The project	Norfolk Boreas Wind Farm including the onshore and offshore infrastructure.

1 Introduction

1. This Waste Assessment Report forms part of the Environmental Statement (ES) for the proposed Norfolk Boreas Offshore Wind Farm project (herein 'the project').

2. The project description is provided in Chapter 5 Project Description.

3. This report assesses the impacts of the onshore project area in terms of waste generation during the construction, operation and decommissioning phases, taking into account the proposed options for recycling, recovery or disposal of waste, and the capability of the existing local or regional waste management facilities to manage the waste.

4. The Environmental Impact Assessment (EIA) will be undertaken using the following two alternative scenarios (further details are presented in Chapter 5 Project Description) and an assessment of potential impacts will be undertaken against each scenario:

   - **Scenario 1** – Norfolk Vanguard proceeds to construction and installs ducts and other shared enabling works for Norfolk Boreas.
   - **Scenario 2** – Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. Norfolk Boreas undertakes all works required as an independent project.

5. A Waste Hierarchy Assessment has been produced to accompany this report (Annex 1 Waste Hierarchy Assessment).

2 Waste Planning Policy Context

6. This section presents a summary of the key waste planning policy that is associated with the project.

7. In terms of waste, UK legislation is underpinned by several international (e.g. European Union (EU)) agreements. Following the 2016 referendum on UK withdrawal from the EU, the UK will continue to be committed to EU agreements until finalisation of the withdrawal agreement and/or until two years after initiation of article 50 of the Treaty on European Union (TEU). Following withdrawal, the exact nature of amendments to UK legislation which had an origin in EU law will depend on the agreements made with the EU and the extent to which EU measures continue to apply (e.g. to achieve trading agreements) as well as the ongoing political agendas of the UK government.

3 Legislation, Guidance and Policy

3.1 National Planning and Policy

3.1.1 National Planning Policy Framework

8. The National Planning Policy Framework (NPPF), which was published on 27 March 2012 and updated in July 2018, does not contain specific waste policies. Paragraph 4 indicates that the frameworks should be read in conjunction with the Government's planning policy for waste. In terms of achieving sustainable development, the NPPF identifies that minimising waste and pollution is a fundamental part of the environmental role of the planning system.

9. The NPPF states planning policies should, so far as practicable, take account of the contribution that substitute, or secondary and recycled materials and minerals waste would make to the supply of materials, before considering extraction of primary materials, whilst aiming to source minerals supplies indigenously. The project should therefore have regard to these requirements in terms of waste management.

3.1.2 National Planning Policy for Waste 2014

10. The Government published the National Waste Planning Policy for England as a replacement of Planning Policy Statement 10 (Planning for Sustainable Waste Management – 2011). The updated policy maintains the core principles of the 'plan led' approach, with a continued focus of moving waste up the waste hierarchy.

11. It requires local authorities to have regard to its policies when discharging their responsibilities to the extent that they are appropriate to waste management. Increasingly local authorities are working together in partnerships to deliver full and efficient waste services; a requirement of the duty to cooperate in section 110 of the Localism Act 2011. The document sets out detailed waste planning policies to facilitate a more sustainable and efficient approach to resource use and management, for example by ensuring the design and layout of new infrastructure complements sustainable waste management.

12. When determining planning applications for non-waste development, the Policy requires that local planning authorities should, to the extent appropriate to their responsibilities, ensure that:

- The likely impact of proposed, non-waste related development on existing waste management facilities, and on sites and areas allocated for waste management, is acceptable and does not prejudice the implementation of the waste hierarchy and/or the efficient operation of such facilities;

- New, non-waste development makes sufficient provision for waste management and promotes good design to secure the integration of waste management facilities with the rest of the development; and
- The handling of waste arising from the construction and operation of development maximises reuse/recovery opportunities and minimises off-site disposal.

3.1.3 Government Review of Waste Policy in England 2011

13. The Department for Environment Food & Rural Affairs (Defra) conducted a review of the existing national waste policy in 2011 to set a direction towards a 'Zero Waste Economy'.

14. The principle commitments from the policy review that are relevant to this development include:

- Continued assessment of progress against several EU targets; focussing action in specific areas, including recovering at least 70% of construction and demolition waste by 2020;
- A greater focus on waste reduction at the earlier, design stages of construction projects as this is where the largest environmental and financial savings can be made. This would be part of a wider, ongoing programme of work with the industry including support for the Sustainable Construction Task Group Action Plan; and
- A review of the Site Waste Management Plan (SWMP) Regulations 2008 (SI 314), examining how effective the regulations have been in reducing costs for businesses, embedding resource efficiency and reducing the fly tipping of construction waste.

15. It should be noted that the SWMP Regulations 2008 were revoked by the UK Government in December 2013 as part of an initiative to reduce red tape, meaning that SWMPs are no longer a legal requirement in England for all construction projects. However, despite this change SWMPs are considered the standard practice on construction and demolition sites as they facilitate compliance with the Waste Hierarchy.

3.1.4 National Waste Management Plan for England 2013

16. Defra published a National Waste Management Plan England in July 2013. The key aim of the Waste Management Plan for England was to set a direction towards a zero waste economy as part of the transition to a sustainable economy. In particular, this meant using the 'waste hierarchy' (waste prevention, re-use, recycling, recovery and finally disposal as a last option) as a guide to sustainable waste management.

17. The Waste Management Plan for England was a high level document which is non–site specific. It evaluated how it would support implementation of the objectives and provisions of the revised Waste Framework Directive (rWFD).

18. The rWFD established the principle of 'proximity'. This is within the context of the requirement on Member States to establish an integrated and adequate network of waste disposal facilities for recovery of mixed municipal waste collected from private households. The requirement included where such collection also covers waste from other producers.

19. The plan identified the measures to be taken to ensure that by 2020 at least 70% by weight of construction and demolition waste is subjected to material recovery.

20. It should be noted that the construction, demolition and excavation sector is the largest contributing sector to the total waste generation. The UK generated 202.8 million tonnes of total waste in 2014[1]. More than half of this (59%) was generated by construction and demolition activities. The Government keeps progress towards the 2020 targets under review by monitoring actual recycling rates and by modelling future recycling. The recovery rate from non-hazardous construction and demolition waste in the UK in 2014[2] was 89.9%. This already exceeds the 2020 target of recovering at least 70% by weight, of non-hazardous construction and demolition waste.

3.1.5 Waste Prevention Programme for England 2013

21. The Government developed a Waste Prevention Programme for England in 2013 to set out the key roles and actions which should be taken to move towards a more resource efficient economy. As well as describing the actions the government is taking to support this move, it also highlights actions businesses, the wider public sector, the civil society and consumers can take to benefit from preventing waste. Using resources more efficiently, designing and manufacturing products for optimum life and repairing and reusing more items could save money and provide opportunities for economic growth at the same time as improving the environment.

22. The waste prevention programme is a requirement of the rWFD. It sets out detailed actions to:

[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/683051/UK_Statisticson_Waste_statistical_notice_Feb_2018_FINAL.pdf

[2] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/683051/UK_Statisticson_Waste_statistical_notice_Feb_2018_FINAL.pdf

- Encourage businesses to contribute to a more sustainable economy by building waste reduction into design, offering alternative business models and delivering new and improved products and services;
- Encourage a culture of valuing resources by making it easier for people and businesses to find out how to reduce their waste, to use products for longer, repair broken items, and enable reuse of items by others;
- Help businesses recognise and act upon potential savings through better resource efficiency and preventing waste, to realise opportunities for growth; and
- Support action by central and local government, businesses and civil society to capitalise on these opportunities.

23. In order to measure progress against the aim of the programme, the government measures changes in overall waste arising, assesses the environmental impacts of this waste and considers how these factors relate to changes in the resource efficiency of the economy.

3.2 Local and Regional Planning Policy

24. The onshore project area consists of the following elements:

- Landfall;
- Onshore cable route, accesses, trenchless crossing technique (e.g. Horizontal Directional Drilling (HDD)) zones and mobilisation areas;
- Onshore project substation; and
- Necton National Grid substation extension and overhead line modification.

25. The onshore project area falls under the jurisdiction of Norfolk County Council and the following local planning authorities:

- Broadland District Council;
- North Norfolk District Council; and
- Breckland Council.

26. The planning policies associated with each area are outlined below.

3.2.1 Norfolk County Council - Norfolk Minerals and Waste Development Framework (MWDF): Core Strategy and Minerals and Waste Development Management Policies Development Plan Document 2010-2026 (Adopted September 2011)

27. The Core Strategy, along with the Proposals Map, sets out the spatial vision for future mineral extraction and associated development and waste management facilities in Norfolk from 2011-2026. It also contains strategic objectives and policies that make clear where, in broad terms, mineral extraction and associated development and waste management facilities should be located in Norfolk, and

conversely where they should not be located. The location of these waste management facilities must be considered in the context of managing waste from the project.

28. The policies contained within the spatial strategy that are applicable to managing waste for the project include:

- Policy CS6 – General waste management considerations;
- Policy CS16 – Safeguarding mineral and waste sites and mineral resources; and
- Policy CS17 – Use of secondary and recycled aggregates.

3.2.2 Norfolk County Council - Norfolk Minerals and Waste Development Framework: Waste Site Specific Allocations Development Plan Document (Adopted October 2013)

29. As part of its preparation of the MWDF, Norfolk County Council produced a Waste Site Specific Allocations Development Plan Document (DPD). Its purpose is to set out specific, allocated sites where waste management facilities are considered acceptable in principle so to provide sufficient waste management capacity to meet the expected arisings of municipal, commercial and industrial waste in Norfolk over the period 2011-2026. The location and capacity of these facilities should be considered for the management of waste during the construction phase.

3.2.3 Broadland District Council Local Plan

30. Broadland's current local plan is made up of several documents (as outlined below). These documents set out the general and specific planning policies and detailed local policies. They aim to help planning officers and applicants to achieve high standard of development in the district and are used as the main guide to determining planning applications.

- Greater Norwich Development Partnership - Joint Core Strategy (JCS) for Broadland, Norwich and South Norfolk (adopted 2011, amendments adopted January 2014): The JCS sets out the long-term vision and objectives for the area, including strategic policies for steering and shaping development. The objectives and policies considered relevant to the project include:
    - Spatial Planning Objective 9: To protect, manage and enhance the natural, built and historic environment, including key landscapes, natural resources and areas of natural habitat or nature conservation value - Efficient use will be made of minerals, energy and water resources, and the production of waste will be minimised.
    - Area Wide Policies - Policy 1: Addressing climate change and protecting environmental assets - In areas not protected through international or

national designations, development will: protect mineral and other natural resources identified through the MWDF.

- Broadland District Council - Development Management DPD (adopted August 2015): The Development Management DPD is a Local Plan established in accordance with the Town and Country Planning (Local planning) (England) Regulations 2012. It sets out the generic policies that are to be applied throughout the Broadland planning authority area and is in conformity with the objectives set out in the NPPF and the JCS (Broadland, Norwich and South Norfolk) (adopted 2011, amendments adopted January 2014). The policies set out within the Development Management DPD do not repeat but seek to further the aims and objectives set out within the NPPF and JCS. It therefore includes more detailed local policies for the management of development. For major development, proposals will be expected to include appropriate provision for waste collection and recycling facilities in accordance with Policy CSU4.

- Broadland District Council - Site Allocations DPD (adopted May 2016): Identifies or allocates areas of land in Broadland for specific types of development, such as housing, employment, community facilities, retail, recreation etc. An increase in development within the area could result in reduced capacity within local waste management facilities. This should be taken into consideration in the context of the project.
- Growth Triangle Area Action Plan (adopted July 2016): This plan specifically applies to the areas of Rackheath, Old Catton, Sprowston, Thorpe St Andrew and other parishes which are not covered by the Site Allocations DPD. The JCS identified these areas for major urban development concentrating on growth that can support local services such as waste management facilities, transport links, secondary education, healthcare, and green infrastructure. The development of such waste management facilities could be utilised for managing waste produced from the project.

3.2.4 North Norfolk Local Development Framework - Core Strategy (2008)

31. The Core Strategy provides the overarching approach for development in North Norfolk. It sets out a long-term spatial vision, objectives and policies to guide public and private sector investment up to 2021. The policies considered relevant to the project include:

- Policy EN6: Sustainable Construction and Energy Efficiency - To maximise the use of locally sourced / re-used / renewable / low embodied energy materials in the development, and minimise waste generated during construction.

32. North Norfolk District Council Emerging Local Plan (2016 – 2036) (also known as the Local Development Framework (LDF)) will soon replace Core Strategy (2008). It is a collection of planning documents which will guide the planning policy context for development across the whole of North Norfolk for the period 2016 – 2036. The process to produce the new Local Plan is expected to take around 3 years to complete.

3.2.5 Breckland Council Emerging Local Plan (2011 - 2036)

33. Breckland Council are in the process of producing a new Local Plan which will replace the Core Strategy and suit of documents that make up the current adopted Local Plan. The new (emerging) Local Plan will run from 2011 – 2036.

34. The policies and objectives considered relevant to the project include:

- Policy CP9: Pollution and Waste - The high quality management of the District's environment will be encouraged and supported through the careful appraisal of development proposals to ensure that they do not damage the environment. Management of the environment will require the emission of pollutants in terms of noise, odour, light or other waste materials or by-products to be minimised. Appropriate construction technologies and design principles are required to minimise waste generation. In fulfilling the development needs of the District, development and service provision must make all opportunities to utilise sustainable construction technologies. Development should strive to maximise the re-use and recycling of waste materials and minimise the environmental consequences of waste production. This will include consideration of appropriate waste storage and ease of collection in new developments. Mitigation against all forms of pollution, including air, noise, water, light and land, will be a fundamental consideration in the design process. A development's design should actively seek to minimise or mitigate against forms of pollution. This mitigation must include measures that would protect future occupiers of a site from external sources of pollutants, where appropriate. Development should minimise any unavoidable polluting effects. This objective will be achieved through the development control process where development will be required to avoid or minimise the pollution of the environment and to prevent any direct contamination caused by the construction process or resultant operations. Where necessary appropriate mitigation measures will be secured via planning condition or obligation.
- Strategic Objectives 17: To minimise the amount of waste produced and promote sustainable waste management.

3.3 Waste Legislation

3.3.1 Waste Framework Directive

35. The key European legislation is the revised Waste Framework Directive (2008/98/EC) ('rWFD'), which consolidates several separate waste Directives and amendments. It establishes the basis for the management of wastes across the EU. It defines certain terms, such as "waste", "recovery" and "disposal", to ensure that a uniform approach is taken across the EU.

3.3.2 Duty of care

36. The waste duty of care is a legal requirement, originally implemented by Section 34 of the Environmental Protection Act 1990, to ensure that producers and holders handle their waste safely and in compliance with the appropriate regulations. One of the fundamental aspects of duty of care requires the holder of waste to make sure that anyone else dealing with their waste has the necessary authorisation to do so. If the holder does not do this and their waste is subsequently found to have been illegally disposed, the holder could be held responsible and may face prosecution.

37. The requirements of the waste duty of care are contained in the Waste (England and Wales) Regulations 2011 (SI 988).

3.3.3 The waste hierarchy

38. The waste hierarchy is set out at Article 4 of the rWFD and has been implemented by The Waste (England and Wales) Regulations 2011.

39. The waste hierarchy requires the producer/holder of a waste to demonstrate that the priorities identified in Table 3.1 have been considered to determine the most suitable waste management option for all wastes prior to removal from site.

Table 3.1 The waste hierarchy

Waste Hierarchy	Relevant Activity
Prevention	Using less material in design and manufacture, keeping products for longer, re-use, using less hazardous materials.
Preparing for re-use	Checking, cleaning, repairing, refurbishing, whole items or spare parts.
Recycling	Turning waste into a new substance or product, including composting if it meets quality protocols.
Other recovery	Includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste, some backfilling.
Disposal	Landfill and incineration without energy recovery.

[1] Table reproduced from Defra website: https://www.gov.uk/waste-legislation-and-regulations

40. A Waste Hierarchy Assessment has been produced to accompany this report (Annex 1 Waste Hierarchy Assessment).

3.3.4 Hazardous waste

41. The Hazardous Waste Regulations (HWR) provides the rules for assessing if a waste is hazardous or not. As part of the assessment of waste, the HWR refer to the List of Wastes (which is often referred to as the European Waste Catalogue (EWC)) for the relevant thresholds for some of the hazardous properties; and to assign the formal description and code for the waste. The regulatory framework to do this is contained in the Hazardous Waste (England and Wales) Regulations 2005 (SI 894) as amended.

42. Detailed technical guidance on the hazardous waste assessment process is provided by 'Waste Classification and Assessment (Technical Guidance WM3)' issued in July 2015. Note that further amendments to the Hazardous Waste regime (and WM3) are planned from July 2018, to accommodate a common European position on the assessment methodology for the Ecotoxic hazardous property (HP14).

43. This document is jointly approved by all of the UK environmental regulators. It provides thresholds and criteria for assessing each of the 15 hazardous properties and Persistent Organic Pollutants (POPs).

3.4 Waste Standards and Guidance

44. The waste assessment has also been guided and informed by additional standards and guidance documents, including:

- CIRIA Publication C741: Environmental Good Practice on Site Guide (fourth edition, 2015);
- Contaminated Land: Applications in Real Environments (CL:AIRE) - The Definition of Waste: Development Industry Code of Practice (the CoP) (v2, March 2011);
- DEFRA (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites; and
- Environment Agency Model Procedures for the Management of Land Contamination (Contaminated Land Report (CLR) 11) (2004).

4 Methodology Criteria

4.1 Methodology Approach

45. This appendix considers the likely quantity and composition of waste materials predicted to be generated during the construction, operation and decommissioning phase. On-site re-use and recovery of the waste in the development are explored, along with the capability for existing local and regional waste management infrastructure to manage the arisings according to the principles of the waste hierarchy.

46. The assessment tools and criteria for waste management were derived for this report based on professional judgement and guidelines derived from national and local planning policy and legislation relating to waste management; and the requirements of the waste hierarchy.

4.2 Assumptions and Limitations

4.2.1 Scenario 1

47. It is anticipated that the sequence of main construction activities will be between 2022 and 2027:

- Onshore substation pre-construction works are scheduled to begin in 2022;
- Landfall duct installation works (Option A – landfall duct installation prior to cable pulling in 2024 and 2025; or Option B – landfall duct installation concurrently with Norfolk Vanguard in 2022 and 2023);
- Onshore substation primary works (2024-2025);
- Landfall and onshore cable route cable pulling (2026 - 2027); and
- Onshore substation electrical plant installation and commission (2026-2027).

4.2.2 Scenario 2

48. It is anticipated that the sequence of main construction activities will be between 2021 and 2026:

- Onshore cable route and onshore substation pre-construction works begin in 2021;
- Landfall and cable duct installation works (2023-2024);
- Onshore substation primary works (2023-2024);
- Landfall and onshore cable route cable pulling (2025-2026); and
- Onshore substation electrical plant installation and commission (2025-2026).

4.2.3 Scenario 1 and Scenario 2

49. No buildings will be demolished as part of the works however, one overhead line tower will be removed under Scenario 2.

50. The quantity of biodegradable waste from vegetation clearance is currently unknown at this stage and is dependent on the final design.

51. The proposed cut and fill balance for the onshore project substation earthworks (including foundations works) is not known at this stage and is dependent on the final design.

52. The majority of the onshore project area is located in agricultural land, where significant contamination is not expected. The main Chapter 19 Ground Conditions and Contamination; and associated Appendix 19.2 Land Quality Phase 1 Preliminary Risk Assessment (PRA), provide further details on the locations of pockets of potential contamination; and they are summarised in section 5 below. Therefore, there are isolated pockets of material with elevated concentrations of contamination that could result in a small quantity of excavated material being considered hazardous.

53. The project will make a commitment to return any temporary works areas to the original condition of the land.

5 Description of Baseline Conditions

5.1 Existing Conditions at the Site

54. The land use in the onshore project area is predominantly agricultural with urban areas around the coastal fringe and larger settlements of North Walsham, Aylsham, Reepham and Dereham. There are several patches of 'non-agricultural' land, which is comprised of areas of woodland and waterbodies (e.g. rivers, lakes and ponds). There are A-roads (A149, A140 and A1067), B-roads (B1159) and local roads in the search area, as well as numerous Public Rights of Way (PRoW) and National Cycle routes. The Dudgeon Offshore Wind Farm underground cable route comes into the onshore project substation from the north at Necton.

55. The PRA detailed in Appendix 19.2 was undertaken to identify whether there are potentially unacceptable risks to human health or the environment posed by the onshore project area and the immediate surroundings (250m buffer), which warrant further investigation.

56. A site walkover survey of the survey area covered in the PRA was also undertaken in February 2017 to verify current conditions at the site. Based on the PRA and the findings of the site walkover, potential sources of contamination are:

- Within the onshore project area:
    - Agricultural land can be associated with some contaminative activities including use/storage of pesticides and herbicides and burial of wastes (including asbestos);
    - The dismantled railway lines south east of Themelthorpe, south east of Oulton, are largely Made Ground and have the potential to contain elevated concentrations of contaminants such as petroleum and diesel hydrocarbons, heavy metals and polycyclic aromatic hydrocarbons (PAHs);
    - A number of common clay and shale, sand and gravel pits present in various locations within the survey area have been infilled, and may contain unknown and potentially contaminated fill material;
    - Historic clay bricks & tiles manufacturers north and north east of North Walsham, which could be associated with heavy metals (e.g. hexavalent chromium) and inorganic compounds (arsenic compounds);
    - Graveyard north of North Walsham, which may be source of contaminants, such as metals, nutrients and pathogens;
    - Historic tanks in Happisburgh, which may be associated with very wide range of contaminants including hydrocarbons and other organic compounds like polychlorinated biphenyls (PCBs). It is understood that these are connected with the lighthouse; and
    - Potential residual contamination associated with a historic military jet crash.
- Within the PRA study area:
    - Road haulage centre north of Reepham, which might be associated with hydrocarbons, Volatile Organic Compounds (VOCs) such as Methyl Tert-Butyl Ether (MTBE) and chlorinated hydrocarbons, Semi Volatile Organic Compounds (SVOCs), heavy metals (zinc, copper, chromium and lead) and Polycyclic Aromatic Hydrocarbons (PAHs);
    - Electricity Industry Facilities north of Reepham; associated with very wide range of contaminants including hydrocarbons and other organic compounds such as PCBs;
    - Timber treatment works in Silvergate, which may be associated with contaminants such heavy metals, inorganic elements and compounds such as chlorates and sulphates and PAHs;
    - Petroleum Storage Facilities near Walcott, which may be associated with a very wide range of contaminants including hydrocarbons and other organic compounds such as PCBs; and
    - Historical landfill south west of Witton may be associated with a very wide range of contaminants, including VOCs, SVOCs, heavy metals, cyanides, ammonium, chlorides, sulphates and PAHs.

57. The PRA concludes that:

- Further assessment or investigation of potential Made Ground in the on-site source areas at dismantled railway lines is undertaken to establish the risk to construction and the suitability of soils for re-use.
- Protocols for dealing with unexpected contamination should be set in place prior to construction to ensure that procedures are known and agreed with the Regulators should contaminated materials be encountered.

5.2 The Project

58. The construction activities for the onshore project area relate to landfall, onshore cable route, onshore project substation and National Grid substation extension. The project description is provided in Chapter 5 Project Description. A brief outline of construction activities for Scenario 1 and 2 are presented below.

5.2.1 Scenario 1

- Temporary works areas:
  - Landfall – two 60m x 50m Horizontal Directional Drilling (HDD) compounds to accommodate the drilling rigs, ducting and associated materials and welfare facilities, with (maximum) of two transition pits, each 10m x 15m x 5m.
  - Temporary works areas at onshore project substation 200m x 100m and a total land requirement for the constructed substation of 250m x 300m. Given construction duration, the temporary works areas will likely be tarmacked with some concrete hard standing for heavier plant and equipment, and will accommodate offices, welfare facilities, car parking, workshops and storage areas.
  - One National Grid substation extension temporary works area of approximately 200m x 150m. The total constructed extension area would be 142m x 131m. Given construction duration, the works area will likely be surfaced with asphalt with some concrete hard standing for heavier plant and equipment, and will accommodate offices, welfare facilities, car parking, workshops and storage areas.
- Reinstatement of running track (formed of protective matting, temporary metal road or permeable gravel aggregate) 12km x 6m wide x 0.3m deep, to deliver equipment to the installation site. Temporary bridges or culverting may be employed at crossings to allow continuation of the running track (same 6m width as the running track).

- 150 jointing pits, comprising of an excavated area of 15m x 6m x 2m, with a reinforced concrete floor to allow winching during cable pulling and a stable surface to allow jointing.

5.2.2 Scenario 2

- Temporary works areas:
  - Landfall – two 60m x 50m Horizontal Directional Drilling (HDD) compounds to accommodate the drilling rigs, ducting and associated materials and welfare facilities, with (maximum) of two transition pits, each 10m x 15m x 5m.
  - 16 trenchless crossing technique (e.g. HDD) compound pairs 150m x 50m (launch side) and 100m x 50m (reception side) to accommodate the drilling rig, ducting and associated materials and welfare facilities. These dimensions will be fully determined by site specific constraints and drilling requirements such as cable segregation and drilling depth.
  - Temporary works areas at onshore project substation 200m x 100m, with a total land requirement for the constructed substation of 250m x 300m. Given construction duration, the temporary works areas will likely be tarmacked with some concrete hard standing for heavier plant and equipment, and will accommodate offices, welfare facilities, car parking, workshops and storage areas.
  - One National Grid substation extension temporary works area of approximately 350m x 150m. The permanent extension footprint would be 199m x 142m. Given construction duration, the works area will likely be surfaced with asphalt with some concrete hard standing for heavier plant and equipment, and will accommodate offices, welfare facilities, car parking, workshops and storage areas. Plus two new permanent overhead line towers with a total search area of 9,250m^2.
  - 13 x mobilisation areas for onshore cable route and 1x mobilisation area at Spicers Corner (to be used for the construction works at the substation), the dimensions are 100m x 100m (or 150m x 100m if combined with a trenchless crossing technique (e.g. HDD) zone) – used to store equipment and provide welfare facilities. Hardstanding will likely comprise of permeable gravel aggregate to a depth of 0.3m underlain by geotextile.
- Temporary topsoil strip width to a maximum of 35m.
- Running track (formed of protective matting, temporary metal road or permeable gravel aggregate) 60km x 6m wide x 0.3m deep, to deliver equipment to the installation site. Temporary bridges or culverting may be employed at crossings to allow continuation of the running track (same 6m width as the running track).

- Two cable trenches 1m wide x 1.5m deep x 60km length (maximum width of cable trench is 5m considering two adjacent trenches excavated as a single trench). Minimum 1.05m depth from the surface to the top of the duct target. A stabilised backfill such as CBS (Cement Bound Sand) will be installed at the base of the trench to a depth of approximately 100mm above the cable ducts.
- 150 jointing pits, comprising of an excavated area of 15m x 6m x 2m, with a reinforced concrete floor to allow winching during cable pulling and a stable surface to allow jointing.

5.3 Waste Management Facilities in the Local Area

59. Local waste management facilities were identified from the Environment Agency Public Register. The search radius was set at every 10km along the 60km onshore cable route from landfall to the onshore project substation. The location, grid reference and nearest postcode of each point is outlined in Table 5.1.

Table 5.1 Location, grid reference and nearest postcode of each search point

Location	Grid reference		Nearest postcode
	Easting	Northing	
Landfall	634060	334299	NR12 0JH
Point 1 (10km from Landfall)	632283	331438	NR28 9UF
Point 2 (20km from Landfall)	622627	330377	NR11 7EB
Point 3 (30km from Landfall)	614108	325119	NR10 4JB
Point 4 (40km from Landfall)	605878	319376	NR9 5PU
Point 5 (50km from Landfall)	597017	314879	NR19 2QD
National Grid substation extension zone	589004	310664	PE37 8DL

60. The list of facilities on the Public Register includes all waste management facilities that hold an existing permit within a 10km radius. This would include facilities that are not likely to receive waste from the project, e.g. vehicle dismantling facilities, Household Waste Recycling Centres (HWRC), etc.

61. The waste management facilities that could receive waste from the project are shown in Table 5.2 to Table 5.8. Waste management facilities on the Public Register that are not likely to receive waste from the construction, operation or decommissioning phase were not included in the table.

Table 5.2 Local waste management facilities within 10 km of landfall (NR12 0JH)

Name	Address	Distance from site (km)	Facility type
C B C Metal Merchants Ltd.	Land/premises At, Marshgate, Spa Common, North Walsham, Norfolk, NR28 9LG.	5.5km	Metal Recycling Site (mixed MRS's)

Name	Address	Distance from site (km)	Facility type
Drurys Environmental Services Ltd.	Drurys Transport Ltd, Folgate Road, Lyngate Industrial Estate, North Walsham, Norfolk, NR28 0AJ.	6.5km	Waste Transfer Station (WTS)
Carl Bird Limited.	Boundary Pit, Sandy Hills Lane, North Walsham, Norfolk, NR28 9LY.	7.5km	WTS

Table 5.3 Local waste management facilities within 10km of point 1 (NR28 9UF)

Name	Address	Distance from site (km)	Facility type
C B C Metal Merchants Ltd.	Land/premises At, Marshgate, Spa Common, North Walsham, Norfolk, NR28 9LG.	2.9km	Mixed MRS's
Drurys Environmental Services Ltd.	Drurys Transport Ltd, Folgate Road, Lyngate Industrial Estate, North Walsham, Norfolk, NR28 0AJ.	4.3km	WTS
Carl Bird Limited.	Boundary Pit, Sandy Hills Lane, North Walsham, Norfolk, NR28 9LY.	4.6km	WTS

Table 5.4 Local waste management facilities within 10km of point 2 (NR11 7EB)

Name	Address	Distance from site (km)	Facility type
Norse Environmental Waste Services Ltd.	Unit 6, Dunkirk Industrial Estate, Aylsham, Norfolk, NR11 6SU.	3.5km	Hazardous WTS
Aylsham Plant Hire Limited.	Weighbridge & Yard, Industrial Estate, Aylsham, Norfolk, NR11 6SS.	3.6km	Treatment of Waste to Produce Soil <75,000 tpy
Drurys Environmental Services Ltd.	Drurys Transport Ltd, Folgate Road, Lyngate Industrial Estate, North Walsham, Norfolk, NR28 0AJ.	5.4km	WTS
C B C Metal Merchants Ltd.	Land/premises At, Marshgate, Spa Common, North Walsham, Norfolk, NR28 9LG.	7.0km	Mixed MRS's
Norfolk Environmental Waste Services Ltd.	Wood Farm, Marsham, Norwich, Norfolk, NR10 5QQ.	8.3km	Composting Facility
Frimstone Limited.	Mayton Wood Quarry, Little Hautbois, Coltishall, Norwich, Norfolk, NR12 7JX.	8.9km	Management of Inert or Extractive Waste at Mine Treatment of waste to produce soil <75,000 tpy

Name	Address	Distance from site (km)	Facility type
Norfolk County Council.	Mayton Wood, Mayton Road, Horstead, Norwich, Norfolk, NR5 0T.	9.2km	Non-hazardous Landfill Site
Mr Richard Pointer And Mrs Sally-Ann Pointer.	Five Berries Farm, Brick Kiln Road, Hevingham, Norwich, NR10 5NL.	9.9km	Mobile Plant for Land Spreading

Table 5.5 Local waste management facilities within 10km of point 3 (NR10 4JB)

Name	Address	Distance from site (km)	Facility type
Norfolk Environmental Waste Services Ltd.	Wood Farm, Marsham, Norwich, Norfolk, NR10 5QQ.	4.4km	Composting Facility
Bailey's Of Norfolk Limited.	50, Brick Kiln Road, Hevingham, Norwich, Norfolk, NR10 5NL.	6.0km	Physical Treatment Facility
Mr Richard Pointer And Mrs Sally-Ann Pointer.	Five Berries Farm, Brick Kiln Road, Hevingham, Norwich, NR10 5NL.	6.3km	Mobile Plant for Land Spreading
Aylsham Plant Hire Limited.	Weighbridge & Yard, Industrial Estate, Aylsham, Norfolk, NR11 6SS.	6.5km	Treatment of waste to produce soil <75,000 tpy
Norse Environmental Waste Services Ltd.	Unit 6, Dunkirk Industrial Estate, Aylsham, Norfolk, NR11 6SU.	6.7km	Hazardous WTS
European Metal Recycling Limited.	Atlas Works, Norwich Road, Lenwade, Norfolk, NR9 5SN.	7.4km	Mixed MRS's
O R M North Norfolk Limited.	Shrubbs Farm, Edgefield, Norwich, Norfolk, NR24 2AT.	8.0km	Composting Facility
Biffa Waste Services Ltd	Land/premises At, Reepham Road, Attlebridge, Norfolk, NR9 5TD.	8.7km	Non-hazardous Landfill Site
Tarmac Aggregates Limited.	Lyng Sand & Gravel, Easthaugh Road, Lyng, Norfolk, NR9 5LN.	9.2km	Landfill taking Non-Biodegradable Wastes

Table 5.6 Local waste management facilities within 10km of point 4 (NR9 5PU)

Name	Address	Distance from site (km)	Facility type
Tarmac Aggregates Limited.	Lyng Sand & Gravel, Easthaugh Road, Lyng, Norfolk, NR9 5LN.	2.2km	Landfill taking Non-Bio-degradable Wastes
Norfolk Recycling Ltd.	Six Acres, Stone Road, Hockering, Norwich, Norfolk, NR20 3PZ.	5.0km	Physical Treatment Facility
T M A Bark Supplies Ltd.	The Runway, Woodforde Farm, Weston Longville,	5.6km	Composting Facility

Name	Address	Distance from site (km)	Facility type
	Norwich, Norfolk, NR9 5LG.		
Timothy Barber.	Eden Farm, Guestwick Road, Foulsham, Norfolk, NR20 5RS.	5.8km	Use of Waste in a Deposit for Recovery Operation
European Metal Recycling Limited.	Atlas Works, Norwich Road, Lenwade, Norfolk, NR9 5SN.	6.5km	Mixed MRS's
Pips Skips Ltd Waste Transfer Station.	Frans Green Industrial Estate, Sandy Lane, East Tuddenham, Dereham, Norfolk, NR20 3JG.	6.5km	WTS
Norman Wenn Skip Hire.	Unit 2 Frans Green Ind Est, Sandy Lane, East Tuddenham, Dereham, Norfolk, NR20 3JQ.	6.6km	75kte Household, Commercial Industrial (HCI) WTS (TS) + Treatment.
John Bannister.	Frans Green Industrial Estate, Sandy Lane, East Tuddenham, Dereham, Norfolk, NR20 3JG.	6.7km	75kte HCI Waste TS + Treatment + Asbestos.
Biffa Waste Services Ltd.	Land/premises At, Reepham Road, Attlebridge, Norfolk, NR9 5TD.	9.6km	Non-hazardous Landfill Site.

Table 5.7 Local waste management facilities within 10km of point 5 (NR19 2QD)

Name	Address	Distance from site (km)	Facility type
Haller & Sons (Dereham) Ltd.	Land/premises At, Dereham Road, Scarning, Dereham, Norfolk, NR19 2PU.	2.8km	Mixed MRS's WTS
Norfolk County Council.	Land/premises At, Folly Lane, Beetley, Norfolk, NR20 4HJ.	3.6km	Household, Commercial & Industrial Waste Landfill
Middleton Aggregates Ltd.	Middleton Aggregates Ltd, Rawhall Lane, East Bilney, Dereham, Norfolk, NR20 4HH.	3.6km	Management of Inert or Extractive Waste at Mine Treatment of Waste to Produce Soil <75,000 tpy
Mcleod Aggregates Limited.	Bittering Quarry, Reed Lane, Bittering, East Dereham, Norfolk, NR19 2QS.	3.8km	Management of Inert or Extractive Waste at Mine
Raymond Mc Leod (Farms) Ltd.	Longham Hall, Longham, Dereham, Norfolk, NR19 2RJ.	3.8km	Mixed MRS's, Deposit of Waste to Land as a Recovery Operation
East Anglian Stone Limited.	Stanfield Quarry, Stanfield, Dereham, Norfolk, NR20 4JJ.	5.9km	Treatment of Waste to Produce Soil <75,000 tpy Use of Waste in a Deposit for Recovery Operation
East Anglian Stone Ltd.	Punch Farm Quarry, Watery Lane, Beeston,	7.0km	Use of Waste for Reclamation etc. <100,000 tps

Name	Address	Distance from site (km)	Facility type
	Kings Lynn, Norfolk, PE32 2RW.		
Norfolk Waste Ltd.	Airfield Industrial Estate, Shipdham, Thetford, Norfolk, IP25 7SD.	8.6km	Household, Commercial & Industrial WTS
A E Daniels & Son.	Willow House, Dereham Road, Whissonsett, East Dereham, Norfolk, NR20 5TQ.	8.7km	WTS
J P Skips.	Gibbet Farm, Hale Road, Bradenham, Thetford, Norfolk, IP25 7QX.	9.1km	75kte HCI Waste TS + Treatment

Table 5.8 Local waste management facilities within 10km of National Grid substation extension (PE37 8DL)

Name	Address	Distance from site (km)	Facility type
J P Skips.	Gibbet Farm, Hale Road, Bradenham, Thetford, Norfolk, IP25 7QX.	3.8km	75kte HCI Waste TS + Treatment
East Anglian Stone Ltd.	Punch Farm Quarry, Watery Lane, Beeston, Kings Lynn, Norfolk, PE32 2RW.	5.3km	Use of Waste for Reclamation etc. <100,000 tps
Raymond Mc Leod (Farms) Ltd.	Bittering Quarry, Bittering, Dereham, Norfolk, NR19 2Q.	7.3km	Deposit of Waste to Land as a Recovery Operation Deposit of Waste to Land as a Recovery Operation
Haller And Sons (Dereham) Ltd.	Norfolk House, Dereham Road, Scarning, Norfolk, NR19 2PU.	7.5km	WTS Mixed MRS's
Mcleod Aggregates Limited.	Bittering Quarry, Reed Lane, Bittering, East Dereham, Norfolk, NR19 2QS.	7.8km	Management of Inert or Extractive Waste at Mine
Middleton Aggregates Ltd.	East Bilney Quarry, Rawhall Lane, East Bilney, Beetly, Norfolk, NR20 4HH.	9.9km	Treatment of Waste to Produce Soil <75,000 tpy

5.4 Regional Waste Management Facilities

62. The potential regional waste management capacity was assessed. The Environment Agency provides waste capacity data on its website[3]. This data set was assessed to identify the remaining regional capacity according to waste management options in East of England (Norfolk is covered by East of England data). This provides an indication of whether the predicted waste types from the project can be managed

[3] https://www.gov.uk/government/publications/waste-management-for-england-2016 (22/03/2018)

within the Region in accordance with the proximity principle (i.e. managing wastes as close to the source of production as possible).

63. The rWFD (Article 16) establishes the principle of proximity for managing waste as close to the source of production. The Proximity Principle recognises that transporting waste has environmental, social and economic costs so, as a general rule, waste should be dealt with as near to the place of production as possible.

64. The data in Table 5.9 to Table 5.14 inclusive provides an indication of the widespread availability of a range of types of waste management facilities within East of England, based upon the most current published data set (2016). Note that the facilities identified in Table 5.2 to Table 5.8 would also be included within the summarised data below. The data presented below is reproduced in the format presented by the Environment Agency. There are too many regional sites to list individually.

Table 5.9 Number of waste management facilities in East of England

Site type		Former Planning Region									ENGLAND
		North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South East	South West	
Landfill	Number of sites with an environmental permit at end 2016	26	48	71	61	50	90	8	94	59	**507**
	Number of sites that accepted waste in 2016	27	35	48	46	38	52	5	55	34	**340**
Land Disposal	Number of sites with an environmental permit at end 2016	8	34	36	26	22	54	10	63	64	**317**
	Number of sites that accepted waste in 2016	5	24	26	11	10	29	9	41	57	**212**
Incineration	Number of sites with an environmental permit at end 2016	10	16	17	16	20	14	11	27	15	**146**
	Number of sites that accepted waste in 2016	4	8	9	7	14	6	7	17	9	**81**
Transfer	Number of sites with an environmental permit at end 2016	181	428	398	279	371	366	211	405	348	**2,987**
	Number of sites that accepted waste in 2016	137	321	293	216	279	295	164	334	301	**2,340**
Treatment	Number of sites with an environmental permit at end 2016	145	423	364	283	332	361	137	394	343	**2,782**
	Number of sites that accepted waste in 2016	103	290	284	225	235	271	103	309	255	**2,075**
Metal Recovery	Number of sites with an environmental permit at end 2016	155	389	408	235	375	294	101	202	261	**2,420**
	Number of sites that accepted waste in 2016	71	181	210	114	182	164	52	121	149	**1,244**
Use of Waste	Number of sites with an environmental permit at end 2016	7	24	18	16	19	16	3	18	54	**175**
	Number of sites that accepted waste in 2016	3	15	7	8	7	7	1	6	36	**90**
Total	**Number of sites with an environmental permit at end 2016**	**532**	**1,362**	**1,312**	**916**	**1,189**	**1,195**	**481**	**1,203**	**1,144**	**9,334**
	Number of sites that accepted waste in 2016	**350**	**874**	**877**	**627**	**765**	**824**	**341**	**883**	**841**	**6,382**

The number of sites that accepted waste in 2016 represents those who submitted waste returns.

This table does not include other waste operations such as mobile plants, closed /closing landfills, pet crematorium/pet cemeteries, mining waste operations and gas engines.

Table 5.10 Remaining landfill capacity in the East of England (2016)

Landfill Type	Sub-Region						EAST OF ENGLAND
	Bedfordshire	Cambridgeshire	Essex	Hertfordshire	Norfolk	Suffolk	
Hazardous Merchant	-	-	-	-	-	-	-
Hazardous Restricted	-	-	-	-	-	-	-
Non Hazardous with SNRHW cell*	-	2,201	-	-	-	4,327	**6,528**
Non Hazardous	-	9,033	12,709	1,812	5,066	-	**28,620**
Non Hazardous Restricted	-	-	484	-	-	-	**484**
Inert	846	2,365	4,485	25,249	1,188	1,819	**35,952**
Total	**846**	**13,599**	**17,678**	**27,061**	**6,254**	**6,145**	**71,584**

*All figures are provided in 000s cubic metres.
* Some non-hazardous sites can accept some Stable Non-Reactive Hazardous Wastes (SNRHW) into a dedicated cell, but this is usually a small part of the overall capacity of the site.

Table 5.11 Incineration capacity in East of England (2016)

Incineration Type	Sub-Region						EAST OF ENGLAND
	Bedfordshire	Cambridgeshire	Essex	Hertfordshire	Norfolk	Suffolk	
Animal By-Product	438	-	-	-	450	160	**1,048**
Animal Carcasses	-	-	-	-	-	-	-
Clinical	-	5	-	-	-	9	**13**
Co-Incineration of Hazardous Waste	-	-	-	-	-	-	-
Co-Incineration of Non Hazardous Waste	-	-	-	-	-	-	-
Hazardous	-	-	-	-	-	-	-
Municipal and/or Industrial & Commercial	-	85	-	-	-	269	**354**
Sewage Sludge	-	-	-	-	-	-	-
Total	**438**	**90**	-	-	**450**	**438**	**1,415**

*All figures are provided in 000s tonnes.
*This data table is for operational incineration facilities that accepted waste from off-site sources. It does not include facilities that burned waste from their own in-house processes or were non/pre-operational.

Table 5.12 Transfer, treatment and metal recycling volumes in East of England (2016)

Site Type	Sub-Region						EAST OF ENGLAND
	Bedfordshire	Cambridgeshire	Essex	Hertfordshire	Norfolk	Suffolk	
Hazardous waste	83	362	247	61	198	143	**1,094**
HIC	283	476	899	290	621	264	**2,832**
Clinical	-	0	1	182	3	0	**186**
Civic amenity site	40	103	222	76	60	75	**576**
Non Biodegradable	-	5	303	65	1	21	**395**
Transfer Total	**406**	**947**	**1,673**	**674**	**882**	**502**	**5,083**
Material recovery	117	264	302	319	-	165	**1,167**
Physical	155	401	1,308	409	946	567	**3,784**
Physico-chemical	-	485	165	-	370	202	**1,222**
Chemical	8	-	-	-	7	0	**16**
Composting	92	332	130	138	159	97	**947**
Biological	137	348	883	287	339	61	**2,055**
Treatment Total	**508**	**1,830**	**2,787**	**1,153**	**1,821**	**1,092**	**9,191**
Vehicle depollution	3	82	64	29	10	49	**236**
Metal recycling site	117	165	1,384	297	87	2	**2,052**
Metal Recycling Sector Total	**120**	**247**	**1,448**	**325**	**97**	**52**	**2,288**

*All figures are provided in 000s tonnes.

Table 5.13 East of England - deposit on land for recovery inputs (2016)

Site Type	Sub-Region						EAST OF ENGLAND
	Bedfordshire	Cambridgeshire	Essex	Hertfordshire	Norfolk	Suffolk	
Deposit in landfill for recovery	24	294	1,247	147	179	204	**2,096**
Total	**24**	**294**	**1,247**	**147**	**179**	**204**	**2,096**

*All figures are provided in 000s tonnes.
*This data table is for the deposit of waste in land for benefit and recovery purposes.

Table 5.14 East of England – use of waste (2016)

Site Type	Sub Region						EAST OF ENGLAND
	Bedfordshire	Cambridgeshire	Essex	Hertfordshire	Norfolk	Suffolk	
Use of waste in construction	-	-	-	25	1	-	26
Use of waste in reclamation	-	-	23	-	182	20	225
Use of waste for timber manufacturing	-	-	-	-	-	-	-
Total	**-**	**-**	**23**	**25**	**183**	**20**	**252**

*All figures are provided in 000s tonnes.
*These activities are for use of waste permitted under Standard Rules Permits for waste operations.

5.5 Availability and Capacity of Regional Facilities

65. The specific waste streams that are predicted to be generated as a result of the project are identified in section 6, section 7 and section 8. These sections provide a discussion on the types of waste that are predicted to be generated and whether those wastes would be recovered on site; or would be recovered or disposed off-site. Off-site management would involve the use of facilities identified in Table 5.2 to Table 5.14.

66. The information shows that there are numerous waste management facilities providing a wide variety of waste management options within the local area (Table 5.2 to Table 5.8) and region (Table 5.9 to Table 5.14).

67. The overall capacity data means that these facilities are likely to be capable of managing the majority of the wastes requiring off-site management that are predicted to be generated by the project during construction, operation and decommissioning. There are hazardous Waste Transfer Station (WTS's) in the region, however there are no hazardous waste landfills and so if hazardous waste requires landfill disposal it would have to be exported out of the region.

68. The local and regional waste management capability sets the baseline condition of waste management infrastructure. It is not possible to predict whether all of the facilities identified in Table 5.2 to Table 5.14 will be available during the proposed construction period. However, the project will have no influence upon the availability of these facilities, therefore, in the absence of the scheme it is reasonable to predict that the level of waste management facilities within the local area and region would be maintained.

6 Construction Waste Composition and Quantities

6.1 Construction Waste Arisings

69. For both scenarios, waste material will be generated at all stages of the construction process, including site clearing, excavations, grading, foundation digging and waste material from structure development.

70. For Scenario 1 the anticipated construction programme, is likely to be over a six year period (2022– 2027) based on current information at this stage of the application process.

71. For Scenario 2, the anticipated construction programme is also likely to be over a six year period (2021-2026), again based on the current information at this stage of the application process.

72. The most significant waste stream will be excavated material. The activities that are considered most pertinent to excavated material during the construction phase are as follows:

Scenario 1 and Scenario 2

1 Landfall;
2 Reinstatement of running track for cable pulling;
3 Cable jointing pits;
4 Onshore project substation; and
5 National Grid substation extension.

Scenario 2 *only*

1 Mobilisation areas and Temporary Works areas;
2 Onshore cable route trenching;
3 Running track for duct installation;
4 Trenchless techniques e.g. HDD.

73. The approximate quantities of excavated waste associated with the above activities are outlined below, based upon data that is available at the time of writing this report. Construction waste management measures are outlined in Section 6.2.

6.1.1 Contractor temporary works areas and mobilisation areas

74. The type, number and dimensions of the temporary works areas and mobilisation areas required during the construction phase are outlined in Table 6.1. To create the temporary works areas and mobilisation areas, it is anticipated that 30cm topsoil will be stripped back, stockpiled and protected during storage whilst the construction works progress. This will be reinstated, so there will be no waste topsoil arising from this activity. It has been assumed that 30cm of hardstanding (permeable gravel aggregate underlain by geotextile) will be placed over each area during construction. A layer of tarmac may also be placed over the temporary works areas that will use/store heavy machinery/equipment. Any surface vegetation removed as part of excavation works will be separately stockpiled and sent for recovery at a local composting or an anaerobic digestion facility.

Table 6.1 Scenario 1 estimated material to be excavated for temporary works area

Material	Depth (m)	Volume (m^3) per works area	Number of works areas	Volume for total works areas (m^3)	Comment
Temporary works area at landfall					
Topsoil	0.30	3,000	2	1,800	Assuming 2 works areas, dimensions 50m by 60m,
Temporary works area at onshore project substation					
Topsoil	0.30	6,000	1	6,000	Assuming 1 works area, dimensions of 200m by 100m to accommodate offices, welfare facilities, car parking, workshops and storage areas.
Temporary Necton National Grid substation works area					
Topsoil	0.30	9,000	1	9,000	Assuming 1 works area, dimensions of 200m by 150m to accommodate offices, welfare facilities, car parking, workshops and storage areas.

Table 6.2 Scenario 2 estimated material to be excavated for temporary works area

Material	Depth (m)	Volume (m^3) per works area	Number of works areas	Volume for total works areas (m^3)	Comment
Temporary works area at landfall					
Topsoil	0.30	3,000	2	1,800	Assuming 2 works areas, dimensions 50m by 60m.
Trenchless works area – launch site					
Topsoil	0.30	2,250	17	38,250	Assuming 17 works areas, dimensions of 150m by 50m to accommodate the drilling rig, ducting and associated materials and welfare facilities.
Trenchless works area – reception pit					
Topsoil	0.30	1,500	17	25,500	Assuming 17 works areas, dimensions of 100m by 50m to accommodate the drilling rig, ducting and associated materials and welfare facilities.
Temporary works area at onshore project substation					
Topsoil	0.30	6,000	1	6,000	Assuming 1 works area, dimensions of 200m by 100m to accommodate offices, welfare facilities, car parking, workshops and storage areas.
Temporary Necton National Grid substation works area					
Topsoil	0.30	6,750	1	6,750	Assuming 1 works area, dimensions of 150m by 150m to accommodate offices, welfare facilities, car parking, workshops and storage areas.
Mobilisation areas for onshore cable route					
Topsoil	0.30	3,000	14	42,000	Assuming 14 works areas, dimensions of 100m by 100m to store equipment and provide welfare facilities.

6.1.2 Onshore cable route trenching (Scenario 2 only)

75. One of the major components of the construction works is the excavation of up to two open cut trenches for a total of 60km from the landfall to the Necton National Grid substation, a total of two trenches are assumed.

76. The expected width of each trench is 1m; and the proposed depth of each trench is 1.5m. The profile of the trench is likely to comprise an upper layer of topsoil; and a lower layer of subsoil consisting of soil and stones. The depth of topsoil has been estimated to average approximately 0.3m across the whole of the onshore cable route. However, the actual depth of topsoil is expected to vary across the onshore cable route and onshore project substation. All of the topsoil is anticipated to be reinstated on site and it will not be considered waste where this is the case. Any topsoil that is contaminated and unsuitable for reinstatement will be considered waste. This is likely to be removed from site for disposal, where there is no option for it to be used in landscaping; or where it is surplus or unsuitable for use for construction purposes.

77. It is anticipated that most of the excavated subsoil will be reinstated back into the trench, and where this is the case, the reinstated material is not considered waste. However, the material around the cable systems needs to be thermally resistive and CBS will be used to cover the cables, therefore, not all of the excavated subsoil can be replaced. The cable systems will be placed at the bottom of the trench. The estimated volume of excavated material is calculated in Table 6.3.

78. Any surface vegetation removed as part of excavation works will be separately stockpiled and sent for recovery at a local composting or an anaerobic digestion facility.

Table 6.3 Estimated material to be excavated from onshore cable route trenching in Scenario 2

Material	Depth (m)	Volume (m^3) / trench	Volume (m^3) for 2 trenches	Comment
Topsoil	0.30	18,000	36,000	All of the excavated uncontaminated topsoil will be reinstated along the onshore cable route.
Reinstated Subsoil	0.75	45,000	90,000	All of the uncontaminated subsoil between the topsoil layer and the cable covers will be reinstated.
Surplus Subsoil	0.45	27,000	54,000	The lower layer of excavated material will be entirely replaced by cement bound sand and cable ducts to ensure thermal resistivity around the cable systems.
Total	1.5	90,000	180,000	Assuming 2 trench dimensions of 60km long and 1m wide and 1.5m depth.

79. Therefore, out of the total volume of material to be excavated (180,000m^3) there is estimated to be 54,000m^3 surplus subsoil that is unsuitable for reinstatement back in the trench. Options will be sought for reusing this material within the development.

6.1.3 Jointing pits (Scenario 1 and 2)

80. There are anticipated to be up to 150 jointing pits under both scenarios. The dimensions of each cable jointing pit will be approximately 6m wide by 15m long by 2m deep. There will be a reinforced concrete floor to an estimated depth of 0.3m to allow winching during cable pulling and a stable surface to allow jointing. In the worst-case scenario, all of the subsoil from the lower 0.8m of the jointing pits will need to be replaced by concrete, assuming that the joints are covered by a concrete casket for protection and future ease of access or stabilised backfill. The estimated volume of excavated material is calculated in Table 6.4.

Table 6.4 Estimated material to be excavated from jointing pits Scenario 1 and 2

Material	Depth (m)	Volume (m^3) / joint pit	Volume (m^3) for 150 jointing pits	Comment
Topsoil	0.3	27	4,050	All of the excavated uncontaminated topsoil will be reinstated along the onshore cable route.
Reinstated Subsoil	0.9	81	12,150	All of the uncontaminated subsoil between the topsoil layer and the concrete floor will be reinstated.
Surplus Subsoil	0.8	72	10,800	In a worst-case assessment, none of the subsoil from the lower 0.8m would be reinstated. The lower 0.8m of excavated material will be entirely replaced by a concrete floor, joints and concrete box burial or stabilised backfill.
Total	2	180	27,000	Assuming 150x jointing pits of 15m long and 6m wide and 2m depth.

81. Therefore, out of the total volume of material to be excavated (27,000m^3) there is estimated to be 10,800m^3 surplus subsoil that is unsuitable for reinstatement back in the jointing pits.

6.1.4 Running track (Scenario 1 and 2)

82. For Scenario 1 there will be one running track reinstated for the cable pulling process in Scenario 1. The track will be 6m wide and up to 12km in length. To create the track along the onshore cable route it is anticipated that 30cm topsoil will be

stripped back, stockpiled and protected during storage whilst the construction works progresses. Stripping back topsoil is therefore estimated to create 21,600m^3 of excavated topsoil (based on one running track at 6m wide road, 30cm depth and a running track total length of 12km). This will be reinstated, so there will be no waste topsoil arising from this activity.

83. For Scenario 2, one running track is required for to deliver equipment to the duct installation work-front. The track will be 6m wide and extend the full length of the onshore cable route (60km). To create the track along the onshore cable route it is anticipated that 30cm topsoil will be stripped back, stockpiled and protected during storage whilst the construction works progresses. Stripping back topsoil is therefore estimated to create 108,000m^3 of excavated topsoil (based on one running track at 6m wide road, 30cm depth and an onshore cable route total length of 60km). This will be reinstated, so there will be no waste topsoil arising from this activity.

84. Under both scenarios in poor ground conditions, temporary surfacing, such as inert hardcore (permeable gravel aggregate), geotextiles or reusable plastic or metal trackway may be required to provide a stable platform for vehicle movement. If reusable geo-textile, metal or plastic surfacing is used, this will not create any waste arisings when it is removed (unless the use has resulted in deterioration of the product to below a usable standard). However, if hardcore is used, this will create waste when the hardcore forming the temporary running track is removed, when the section of onshore cable route is completed. The contractor will justify the appropriate system for creating running tracks along the onshore cable route in accordance with the ground conditions.

85. Any surface vegetation removed as part of excavation works will be separately stockpiled and sent for recovery at a local composting or an anaerobic digestion facility.

6.1.5 Trenchless crossings (Scenario 2 only)

86. There are several routing constraints along the onshore cable route from the landfall to the onshore project substation. Trenchless crossing (e.g. HDD) is an accepted method of installing cables in areas that cannot be open cut (for example under rivers and railway lines etc.). Trenchless crossing involves the drilling of a hole at depth through the ground between two points through which the cable will be installed. These are usually referred to as entry and exit points (or launch and reception points), with the drilling rig being set up on the entry side of the crossing.

87. The quantity of material that is displaced by the trenchless installation along the onshore cable route is based upon two bores, each of assumed 0.75m diameter and 250m long. This leads to 220.9m^3 in total for two bores at each crossing location.

There are 17 crossing sites currently proposed, providing a total of 3755.3m^3. In addition, the quantity of material that is displaced by the HDD installation at the landfall is based upon three bores (which includes a worst-case allowance for the two anticipated bores, plus one bore for a failed drill), each of 0.75m diameter and 1,000m long, providing a total of 441.8m^3 per bore and 1325.4m^3 in total.

88. It is common for bentonite fluid to be used as a lubricant during the drilling process. This produces a non-hazardous drilling mud waste comprising sludge and displaced soil and stones etc. The waste can be placed in sumps, where it is dewatered.

89. The volume of drilling mud that returns to the sumps is dependent on the ground characteristics. In some situations, the majority is absorbed into the ground and little drilling mud returns and in other conditions, large quantities of drilling mud will be returned to the sumps. Currently, the quantity of drilling mud produced is unknown and is dependent on the final design.

6.1.6 Onshore project substation (Scenario 1 and 2)

90. The onshore project substation construction has the potential to generate significant quantities of waste. The dimensions of the onshore project substation are the same for both scenarios. During construction the footprint would be stripped and graded, with stripped material re-used on site where possible. Any excess material would be used for bunding and shielding where possible or disposed of at a licenced disposal site.

91. At this stage it is not known whether the foundations would either be ground-bearing or piled based. Due to the uncertainties associated with final design, the quantity of inert waste (concrete, brick), excavated soils, vegetation strip and metal waste from the construction of the onshore project substation are unknown.

92. High level studies have indicated than an attenuation pond with volume 4,050m^3 (approximate dimensions of 58m x 58m x 1.2m) should be employed to allow a sufficient attenuation to greenfield runoff rates into the closest watercourse or sewer connection. The full specification for the attenuation pond and drainage strategy would be addressed as part of detailed design post-consent. However, excavated material will be produced as part of this activity.

6.1.7 National Grid Substation Extension (Scenario 1 and 2)

93. The National Grid substation extension (including overhead line works under Scenario 2) have the potential to generate significant quantities of waste.

94. The Necton National Grid substation would require an extension to accommodate the Norfolk Boreas connection points under both scenarios. The extension would need to accommodate the circuit breakers which are the connection points for the

associated busbar structures. The National Grid substation extension foundations are anticipated to be of ground-bearing form with no requirement for piling (see Chapter 5 Project Description). Under Scenario 1 the National Grid substation extension would be in an easterly direction and the dimensions will be 131m by 142m, under Scenario 2 the extension would be in a westerly direction and the dimensions would be 199m by 142m.

95. During construction the site would be stripped and graded, with stripped material re-used on site where possible. Any excess material would be used for bunding and shielding where possible or disposed of at a licenced disposal site.

96. Under Scenario 2, there would be a requirement of two new overhead line towers, one of which will be in close proximity to the existing corner tower and the existing corner tower would be demolished. The tower foundations may be piled or excavated and cast, dependant on the ground conditions and structural requirements. Due to the uncertainties associated with final design, the quantity of inert waste (concrete, brick), excavated soils, vegetation strip and metal waste from the construction of the onshore project substation and National Grid substation extension are unknown.

97. Under Scenario 1 the existing attenuation pond at the Necton National Grid substation would be required to be relocated and increased in size to accommodate additional impermeable ground associated with the substation extension for Norfolk Boreas, a total volume of 6,300m^3 is assumed. Under Scenario 2 the existing attenuation pond at the Necton National Grid substation will be extended, a total volume of 4,200m^3 is to be assumed. The full specification for the attenuation pond and drainage strategy would be addressed as part of detailed design post-consent. However, excavated material will be produced as part of this activity.

6.1.8 Site workers

98. For Scenario 1 it is estimated that the required number of employees for the cable installation would be 170, and at the onshore project substation there would be 10 (see Chapter 24 Traffic and Transport, Table 24.17 Scenario 1 employee summary per infrastructure component).

99. Under Scenario 2 it is estimated that the total required employee numbers for the infrastructure components would be between 430 to 550 employees (see Chapter 24 Traffic and Transport, Table 24.23 Employee demand) during construction activities.

100. For both scenarios these operatives will produce non-hazardous wastes during the construction programme, including general waste and toilet waste at the welfare facilities within the site temporary works areas or mobilisation areas. General waste is considered similar in composition to solid domestic waste i.e. dry recyclables, such

as paper and cardboard, plastic, glass, and food waste. Currently, the quantity of general waste and toilet waste produced from site workers is unknown.

6.1.9 Other construction wastes

101. Almost all of the waste produced during the construction phase concerns excavated arisings. However other wastes will be produced during the construction process, particularly in the temporary works areas, including waste wood, waste metal, waste packaging, waste oils, solvents, paints and other ad hoc hazardous wastes. Currently, the quantity of these wastes is unknown and would be dependent on the final design and chosen construction methodologies. It is anticipated that wastes produced along the construction corridor, would then be transferred back to the nearest mobilisation area or temporary works area for temporary storage pending removal by a registered waste carrier in accordance with the waste duty of care.

6.2 Construction Waste Management Measures

102. This section describes the measures that can be implemented to eliminate or reduce the anticipated quantity of waste sent to landfill by implementing the waste hierarchy. These measures would increase reuse; recycling or recovery opportunities, thereby reducing the effect of significant environmental impacts. The waste management measures for the construction phase are split in the section below, into those that can generally be applied to one or more waste type; and those that are applied to specific waste streams.

103. A SWMP (including excavated waste) will be prepared to record any decisions given to materials resource efficiency when designing and planning the works. Any assumptions on the nature of the project; its design; the construction method or materials employed, to minimise the quantity of waste produced on site; or maximise the amount of waste reused, recycled or recovered, will be captured within the SWMP.

104. The SWMP will provide information on each waste type that is expected to be produced in the project with the appropriate European Waste Catalogue (EWC) code and description for each waste type. It will provide an estimate of the quantity of each type of waste and the proposed waste management option for each waste produced (i.e. re-use, recycling, recovery or disposal; on or off-site).

6.2.1 General waste management measures

105. There are certain principles of waste management that can be applied to most wastes that would be created during the construction phase. These are:

- Adhere to waste legislation for storage and handling on-site; and ensure that the relevant regulatory controls have been applied to the reuse, recycling or recovery of waste on-site.
- No waste from the project shall be deposited outside the boundary of the Site, unless it is at a facility that holds a valid environmental permit or suitable authorised exemption. Off-site waste management facilities are legally obliged to operate under an environmental permit (or an authorised exemption), which is in place to ensure that the site is operated in a manner to prevent emissions causing harm to human health or the environment.
- Ensure that those who remove waste from site have the appropriate authorisation (i.e. are registered waste carriers); and those facilities that receive waste from the site hold a valid environmental permit or authorised exemption.
- Allocate space on site for the storage of waste materials and ensure that storage areas and containers are clearly labelled (appropriate signage) so site workers know which wastes should be put there. Paved areas/impermeable surfaces may be required, as deemed necessary, to prevent direct contact with the ground.
- Hazardous waste must be stored separately from non-hazardous wastes to avoid contamination. The Hazardous Waste Regulations make it illegal to mix hazardous waste with non-hazardous waste.
- Provide separate containers for dry recyclables, such as paper & cardboard, plastic, glass, wood and metal at welfare facilities within temporary works areas. This would encourage recycling and increase the potential value of the recyclable items by avoiding contamination.
- Monitor the actual quantities of wastes produced during construction and update the SWMP to allow comparison with waste arisings estimated prior to construction. Record the proposed waste management option (e.g. reuse on site, recycle off-site, or dispose off-site) for each waste produced.
- All wastes that are removed off site would be described on a waste transfer note or hazardous waste consignment note (as appropriate) that tracks the movement of the waste to the specified disposal or recovery facility.
- The appointed contractors should identify appropriate staff that are responsible for waste management; and ensure that all contractor staff are aware of the appropriate reuse, recovery or disposal routes for each waste.

106. These measures would promote sustainable waste management practices by maximising waste prevention, re-use, recycling and recovery opportunities for material destined for offsite waste management. This would actively discourage sending waste to landfill and would promote the waste hierarchy, which is a legal requirement. It is recommended that these measures are incorporated into the Code of Construction Practice (CoCP), an outline CoCP has been submitted as part of the DCO application.

6.2.2 Waste-specific management measures

6.2.2.1 Inert waste

107. Waste inert materials (for example concrete, bricks, rubble) generated could be crushed and processed in accordance with the Waste & Resources Action Programme (WRAP) Aggregates Quality Protocol. This would allow for on-site reuse as engineering fill material complying with an appropriate engineering standard for fill (for example the Manual of Contract Documents for Highway Works Volume 1 - Specification for Highway Works).

108. Aggregate material that has been produced in accordance with the Aggregates Quality Protocol will not be waste at the point of production.

109. Control procedures must be in place to ensure that only the appropriate types of inert materials are accepted, which are listed in Appendix C of the Quality Protocol.

110. Every load must be inspected visually, both on initial receipt and after tipping, to ensure compliance with the acceptance control procedures. The facility that receives the inert waste for processing into the aggregate must have an environmental permit.

111. A rigorous sampling and testing regime is required to ensure that the processed material meets the required market specification according to the type of product produced.

112. To be able to demonstrate compliance with the Quality Protocol, producers must maintain delivery documentation for every load of recycled aggregate despatched.

113. For the purposes of the Quality Protocol the producer must keep and retain specified records for a minimum of two years; and make them available for inspection by the regulator (if requested).

114. It is important to note that even if the Quality Protocol is complied with, the material will become waste again and subject to waste management controls at any stage if it is discarded or there is an intention or requirement to discard.

115. These measures would reduce the amount of waste sent off-site; and promote on-site recycling into engineering-standard product, therefore, reducing the amount of material classed as waste on-site. The remaining surplus inert material would be sent off-site to a local recycling facility for processing into aggregate. This is a waste recycling measure in accordance with the waste hierarchy.

6.2.2.2 Non-hazardous wastes

6.2.2.2.1 Biodegradable waste from vegetation clearance

116. Biodegradable waste is anticipated to be generated from site clearance as part of the excavation works. This would be effectively managed by being sent for recovery at a local composting or an anaerobic digestion facility. None of this material is anticipated to require landfill disposal.

6.2.2.2.2 Excavated material – non-hazardous

117. Excavated material may comprise concrete hardstanding, bitumen, made ground and subsoil according to the specific parts of the site. The inert concrete hardstanding would be dealt with as inert waste (see above).

118. It is anticipated that some of the excavated soil would be retained on site for reuse as general fill as part of the cut and fill balance associated with the construction process. Any excavated soil that is surplus to requirements would be sent for recovery to a soil conditioning facility or local landfill for beneficial use as restoration material or daily cover, where possible as a preference over landfill depending upon availability.

119. Effective stockpile management would be essential within each location. It would maximise the amount of material that can be beneficially reused on site. Where excavated material is proposed to be used on-site, the appropriate regulatory mechanism must be followed prior to use to demonstrate that it will not cause unacceptable harm to the environment when used.

120. As the site is largely greenfield, there are two proposed approaches for the use of excavated material within the development:

- Use of the exclusion from the rWFD; or
- Use of the CL:AIRE CoP.

121. The use of naturally occurring, uncontaminated material is excluded from the scope of the waste regulatory framework according to very specific circumstances. This is because of Article 2(1)(c) of the rWFD, which states that "*uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated*" is excluded from the scope of the rWFD. The use is not subject to any waste regulatory controls if it can be demonstrated that the use is recovery. Overarching principles of rWFD must be adhered to. These are:

- *" …take the necessary measures to ensure that waste management is carried out without endangering human health, without harming the environment and, in particular:*
  (a) Without risk to water, air, soil, plants or animals;
  (b) Without causing a nuisance through noise or odours; and
  (c) Without adversely affecting the countryside or places of special interest."

122. The exclusion does not apply to material removed from the site.

123. The rWFD does not define 'uncontaminated'. However, the Environment Agency has a strict interpretation based on environmental risk: *"At its most basic or general, in this context, 'contamination' means the presence of substances in soil that produce a risk of harm or pollution. In the Environment Agency's opinion, the presence or absence of "contamination" has to be assessed on a site specific basis having regard to a risk assessment e.g. some soil may not be considered contaminated for one land use but may be for another. It is not just a matter of what levels of substances are present within a soil but where and how that soil is used."*

124. Therefore a risk assessment would be required, which is one of the fundamental requirements of the CL:AIRE Definition of Waste Code of Practice (CoP). In using the exclusion, it is recommended that the principles of the CoP are followed (including the use of Materials Management Plans (MMP)) but without the formal signoff.

125. The CoP is anticipated to provide the framework for the reuse of the remaining excavated material and provides principles that allow the excavated material to cease to be waste when used. The CoP can also apply to the use of contaminated material (including excavated material classified as hazardous waste – see below), where an appropriate risk assessment demonstrates that there would be no unacceptable level of risk to human health or the environment in the proposed context of use.

126. The CoP is supported by the Environment Agency and is subject to self-regulation, via the use of an independent assessment by a Qualified Person for sign-off. The Qualified Person is a person that fulfils the required experience, qualifications and professional membership criteria set by CL:AIRE. The CoP sets out the principles for achieving a non-waste status by setting a risk-based approach when excavated material is used within a development. The principles are:

- The proposed use of the material must not cause any harm to human health or the environment.
  - A risk assessment for the specific end use would be required following the principles defined in Environment Agency Contaminated Land Report 11, ('CLR11'). This would find out whether any contaminants from

anthropogenic and/or natural sources present an unacceptable level of risk to human health, controlled waters, ecosystems and/or the built environment, based on the available pathways and receptors. If the level of risk is unacceptable after treatment, the CoP cannot apply to the material, therefore, it would be a waste and an environmental permit would be required to allow the reuse of the material.

- The excavated material is suitable for its proposed use.
    - This would consider the chemical and geotechnical requirements of the material in relation to a specification defined for their end use.
- The excavated material must not require further treatment prior to use.
    - The material must be suitable for use in all respects without treatment. If it requires treatment, it is waste.
- The use of the excavated material is certain.
    - The holder must be able to demonstrate that all of the material would be used and that use is a certainty, not a probability. The use of the excavated material must form part of the final design, so it can be clearly identified where in the scheme the material would be used; and how much would be used. This requires a MMP to be prepared to show how and where all materials on the ground are to be dealt with; and a tracking system to monitor any waste/material movements; and also contingency measures must be defined, i.e. who takes responsibility and what happens in the event that the material is not suitable for use.
- Only a sufficient quantity of material would be used.
    - The material must be destined for a defined purpose, which is defined in the scheme design. The quantity of material required for that purpose must be known prior to construction. If excess material is deposited to undertake that purpose this is an indication that it is being discarded and it would be waste.

127. The benefit of the CoP is that an environmental permit is not required where the principles can be met; and therefore, this promotes waste reduction, because the material ceases to be waste when it is used.

128. These measures would promote on-site recovery and reduce the amount of waste on-site.

129. A proportion of the excavated non-hazardous material may not be suitable for reuse due to the presence of large rocks/stones or fibrous material. This material would be stockpiled separately for off-site management in accordance with the waste hierarchy.

6.2.2.2.3 Surface planings - bitumen

130. It is anticipated that bitumen based surface planings would be treated at an authorised mobile treatment unit by crushing, grinding and screening, and used again on site in the construction of paving structures similar to those from which the waste arose, in accordance with a 'U1' Waste Exemption (Use of Waste for Construction).

6.2.2.2.4 Dry recyclables from site workers

131. Site workers will create waste produced by themselves, by taking refreshment and from site welfare activities. The most effective waste management solution for waste generated by site workers taking refreshment on site is to introduce a policy to require them to take their own waste home. This is likely to reduce the amount of waste produced.

132. In terms of the waste that would be produced on site from site workers in the temporary office locations and in the site temporary works areas, this is similar in composition to mixed municipal waste and is therefore considered to be non-hazardous. Space should be made available to provide receptacles to collect different waste streams and allow the separate collection of dry recyclables from residual waste.

133. Segregation of the different streams of plastic waste (e.g. Polyethylene terephthalate (PET), High-density polyethylene (HDPE) and mixed plastics) would maximise opportunities for recycling. Some source segregated plastics, particularly PET and HDPE, can generate income. Card and paper should be separately collected as should aluminium and steel cans. Glass should be separated into different receptacles where possible. These measures would ensure that the maximum amount of waste is diverted for reuse, recycling and recovery. The food waste should also be separately collected and sent for anaerobic digestion.

134. All receptacles for contractor waste should be clearly labelled and have lids to prevent wind-blown litter.

135. Frequent collections of waste should be arranged to ensure that quantities on site are within the capacity of one skip and waste is not retained on site for long periods to reduce scavengers and vermin; and to reduce odour issues.

136. The remaining residual waste should be sent to an off-site materials recycling facility.

137. It should be noted that the level of recycling / separate collection will be dependent on the amount of space at the site temporary works and availability of different types of container; and waste management and recycling policies introduced by the Contractor.

6.2.2.2.5 Excess or off-spec materials

138. Timely procurement and buying only the required amount of material should ensure that the material is delivered at the time when it is needed and only in sufficient quantities. This would prevent waste from unused or spoiled items because of bulk purchasing.

139. Ensure that perishable materials are stored so that they are protected from the local climate.

140. All damaged or off-specification material should be immediately returned to the supplier where possible, which would reduce the amount of waste held on site.

141. These measures are anticipated to reduce the amount of this type of waste on site at any one time.

6.2.2.2.6 Metal wastes

142. Metal waste (i.e. from overhead line modifications, off-cuts and scrap metal that cannot be reused) should be collected in containers/skips or stored in an allocated area and removed off site for recycling. There is an active metal recycling market in the UK to deal with this waste.

6.2.2.2.7 Packaging

143. To minimise the effects of packaging, suppliers should be required to take back any packaging associated with their products. This would assist the suppliers in fulfilling their own producer responsibility obligations under Packaging Waste Regulations 2007 (as amended).

144. Packaging materials that cannot be returned should be kept for on-site use (e.g. use of pallets for storage).

145. Any residual packing that cannot be used on site should be segregated into distinct dry recyclable waste streams and sent for recycling off-site. No waste packaging would be landfilled.

6.2.2.2.8 Wood

146. The condition of any timber waste would determine whether they can be recycled at a wood processing facility; or whether they would have to be chipped or treated and prepared for recovery at a biological treatment facility, such as composting; or prepared for use as a fuel in a biomass energy from waste facility.

6.2.2.2.9 Imported materials

147. Local and sustainable products would be imported to minimise the effects on the environment by reducing carbon emissions from transport, promoting local businesses and saving natural resources.

6.2.2.3 Hazardous wastes

148. Empty fuel or oil drums should be retained for reuse on site for storing waste oil where possible. Those that cannot be retained should be sent to a drum reconditioning facility to enable the container to be prepared for re-use. Damaged drums should be sent for recycling.

149. These measures are anticipated to maximise waste managed at the highest waste hierarchical option and reduce the amount of waste sent off site.

150. The use of an active maintenance regime on plant and equipment should reduce the potential for machinery to cause leaks. Valves, stopcocks and pipes should be regularly checked for leakages. Fuelling activities should be carried out in bunded areas, or off-site.

151. The storage of fuels and liquids should be in accordance with the Oil Storage Regulations 2001 and the appropriate pollution prevention control guidelines (PPG)to protect the environment from both storage and spillages of hazardous substances, which can be obtained from the government archive website (Note: Although these guidelines are no longer supported by the Environment Agency, they represent good practice). The relevant PPG are:

- PPG 2 - Choosing and using oil storage tanks;
- PPG 7 – Operating refuelling facilities;
- PPG 8 - Safe storage and disposal of used oils;
- PPG 22 - Dealing with spills; and
- PPG 26 – Storage and handling drums and intermediate bulk containers.

152. Using these guidelines as good waste management practice to avoid leaks occurring, would reduce the potential for leakages, therefore reducing the volume of absorbent required to clean up spillages.

153. Hazardous materials should be stored securely, away from non-hazardous or incompatible materials. Small items of hazardous waste should be prevented from being disposed of in general waste skips to avoid contamination. Hazardous material should be collected frequently to minimise the total volume on site at any one time.

6.2.2.3.1 Contaminated Excavated Material

154. Appendix 19.2 – Land Quality Phase 1 Preliminary Risk Assessment states that the some of the area within the overall development footprint has been subject to anthropogenic influence including agricultural activities, buried waste, Made Ground, historic infilled pits, clay bricks & tiles manufacturers, graveyard and tanks. As such, there could be areas of contamination within the onshore project area. There are also potentially contaminative areas within 250m of the onshore project area including roads, electricity industry facilities, petroleum storage facilities and a historic landfill. A Phase 2 site investigation has not been undertaken that would determine the current nature and extent of contamination within the onshore project area. So, specific locations of contamination hotspots have not been identified.

155. Therefore, a precautionary approach should be adopted, which assumes that some contaminated material will be encountered.

156. A watching brief should be maintained during construction, in accordance with the CoCP, and any excavated material that is suspected of contamination (e.g. because of staining or odour) should be stockpiled separately from any other stockpiled material; and be sampled for analysis to determine the classification (i.e. hazardous or non-hazardous) and potential risk associated with the material.

157. Any excavated material that is found to be contaminated (including material classified as hazardous) should be assessed against the principles of the CoP and reused where there is a need for the material; and it is demonstrated to be suitable for use. This would reduce the amount of material on site that is waste.

158. Any material found to be hazardous and unsuitable for reuse on site should be sent off-site. Surplus hazardous material should be sent to a soil treatment facility holding a valid environmental permit that authorises treatment, where it can be treated to remove or reduce the levels of contamination to a level acceptable for recovery of the material. This would reduce the amount of hazardous waste from the facility going to landfill (which could have to be exported out of the region), and would promote the waste hierarchy and proximity principle, where such facilities are available within the region.

159. If any excavated material is classified as hazardous and is required to be landfilled because it cannot be treated for recovery, further testing would be carried out to ensure that it meets the Hazardous Waste Acceptance Criteria (WAC) prior to landfill disposal outside of the region.

7 Operational Waste Composition and Quantities

7.1 Operational Waste Arisings

160. Waste arisings during operation will be the same under both scenarios.

7.1.1 Onshore cable route

161. The cables will be insulated and protected; however, occasional routine maintenance works will still be required during the operational phase. In the event of a cable failure, it may be necessary to excavate around the cables and replace / repair the faulty cable along limited stretches. Limited waste arisings are anticipated in accordance with this activity relating to excavated material and faulty cable.

162. Waste cable will be assessed and reused if possible; or will be recycled if not - there is an active metal recycling market in the UK. Waste excavated material that cannot be returned to the trench will be sent for off-site waste management in accordance with the waste hierarchy.

7.1.2 Onshore project substation / National Grid substation extension works

163. The servicing of equipment in the onshore project substation and the National Grid substation extension is likely to give rise to small quantities of liquid hazardous waste (used oil, solvents, paints etc.), solid hazardous waste (oil-contaminated wipes, absorbent, and some specialist electrical equipment and batteries etc.) and non-hazardous waste (packaging, cables, metal waste, plastic waste, waste electrical and electronic equipment (WEEE)).

164. To reduce waste generation, electrical and electronic equipment should be used and serviced in accordance with manufacturers' instructions to extend their working life. WEEE, packaging and batteries should be recycled to fulfil Producer Responsibility requirements.

165. The quantity of oily wastes and rags generated can be reduced by preventing any possible leakage of oil, since the rags are mainly generated by cleaning tools or surfaces contaminated by small accidental spills or leakages. Oily rags can be treated using industrial washing facilities to remove oily residues, allowing the cleaned rags to be reused. The liquid can be collected and treated to recover the oil fraction. There is an active UK-wide market for the recycling of used oils into refined oil or fuel.

166. The reuse of organic paint solvents shall be considered for cleaning painting equipment or thinning paint. A way to re-use paint residuals could be achieved by making excess paints available for a further use by conserving them properly sealed. Solvent-based paint can be blended into a high calorific fuel for use in cement kilns.

167. The onshore project substation will be unmanned, however due to the requirement for general ad hoc maintenance, personnel / maintenance engineers will visit the site. Small amounts of solid domestic waste may be generated; however, workers should take their waste home for it to be placed in applicable municipal waste bins for collection.

168. Currently, there is insufficient information regarding the specific operational activities that would generate waste to predict the quantities of waste that are likely to be produced. However, in addition to the principles identified for non-hazardous and hazardous construction wastes; there are general principles that would need to be followed to ensure effective management of operational waste arisings. These are provided below.

7.2 Operational Waste Management Measures

7.2.1 Duty of care

169. Personnel generating waste from the servicing and maintenance of the onshore cable route and onshore project substation would be under a legal obligation to comply with the waste duty of care to ensure that they handle waste safely and in compliance with the appropriate regulations.

170. The duty of care involves making sure that the waste has been described properly and that all of the properties associated with the waste are known; and to ensure that persons involved in the transfer of waste hold the necessary authorisation to do so.

171. The basic responsibilities that the commercial occupiers would be expected to follow are:

- Know whether waste is hazardous or non-hazardous.
- Store waste in suitable containers at a secure location, in a manner that prevents releases of the waste.
- Label the waste containers so that it is clear what is in them.
- Check that the waste is subsequently handled by those who hold an appropriate environmental authorisation. This means checking that the waste carrier is registered (or is exempt from having to be a registered waste carrier). It is also good practice to check that the facility that will receive the waste holds a suitable environmental permit that allows the waste to be handled on their site.
- Provide documentation with any waste transfer that accurately describes the waste and contains the relevant code for the waste.
- Keep records of all waste transfers in a register.

7.2.2 Hazardous waste

172. Servicing and maintenance personnel would be required to know the difference between hazardous waste and non-hazardous waste. The controls that are applied to hazardous waste are stricter. All hazardous waste must be segregated from non-hazardous wastes or other non-waste materials. All hazardous wastes must be accompanied by a hazardous waste consignment note when removed from site.

7.2.3 Producer responsibility

173. Producer responsibility requires businesses to:

- Minimise waste arising and promote their re-use.
- Ensure the waste products are treated and meet recovery and recycling targets for the waste materials.
- Design products by reducing material use and enhancing reusability and recyclability.

174. The key requirements of the project in terms of producer responsibility would be to ensure batteries, WEEE and packaging wastes are managed appropriately.

7.2.4 WEEE

175. WEEE must be collected separately from other wastes and sent to the appropriate recycling facilities. If a business does have WEEE to recycle, it has a Duty of Care to act responsibly and ensure that the contractor it appoints to collect it is legitimate and has the appropriate licences and permits.

176. A business should ensure that the waste is taken to a suitable facility to be treated and recycled. The site must have a permit or licence that allows them to accept trade waste. For WEEE waste, it must obtain and keep proof that WEEE was given or sold to a waste management (or asset management) business and was treated and recycled in an environmentally sound way.

177. All WEEE from a business should go through Approved/Authorised Treatment Facilities for treatment and recycling.

7.2.5 Packaging

178. The Packaging Waste Regulations 2007 (as amended) require businesses or organisations to:

- Reduce packaging;
- Reduce how much waste packaging goes to landfill; and
- Increase the amount of packaging waste that is recycled and recovered.

179. Compliance is facilitated by the segregation of packaging from other waste; and the segregation of different types of packaging from each other (e.g. separating plastic packaging from paper and cardboard packaging).

180. The amount of packaging waste held by a business or organisation can be reduced by returning as much packaging back to the supplier as possible. This in turn will help suppliers achieve their obligations under the Packaging Waste regulations.

7.2.6 Batteries

181. The Waste Batteries and Accumulators Regulations 2009 (as amended) impose obligations on the producers and distributers of batteries to ensure that batteries are appropriately treated or recycled using compliance schemes that are financed by producers and distributers of batteries.

182. It is illegal to send waste industrial or vehicle and other automotive batteries for incineration or to landfill. Maintenance operatives must ensure that all batteries are sent to an Approved Battery Treatment Operator (ABTO) or an Approved Battery Exporter (ABE) for treatment and recycling.

7.2.7 Landfill disposal

183. Before any waste can be sent to landfill, the waste producer/holder must ensure that the option for landfill has been justified in accordance with the waste hierarchy.

184. It is a legal requirement that all wastes going for landfill must be pre-treated, unless treatment is not technically possible (note, this applies to inert wastes only); or if treatment would not reduce the quantity or the hazards that it poses to human health or the environment. The proposed pre-treatment option must comply with the definition of 'treatment'. This involves a 'three-point test':

- It must be a physical, thermal, chemical or biological process including sorting.
- It must change the characteristics of the waste.
- It must do so to:
    - Reduce its volume; or
    - Reduce its hazardous nature; or
    - Facilitate its handling; or
    - Enhance its recovery.

185. If the waste is classified as hazardous waste and landfill has been determined as a suitable option in accordance with the waste hierarchy, it can only be disposed in a hazardous class of landfill and must pass the hazardous WAC. This must be confirmed through chemical WAC testing.

186. If the waste is inert, it can only be deposited in an inert class of landfill if it can be demonstrated that it meets the inert WAC.

8 Decommissioning Waste Composition and Quantities

8.1 Decommissioning Waste Arisings

8.1.1 Cable system

187. No decision has been made regarding the final decommissioning policy for the onshore cables, as it is recognised that industry best practice, rules and legislation change over time. It is likely that the onshore cables will be removed from the ducts and recycled, with the ducts capped and sealed then left in situ. The decommissioning methodology cannot be finalised until immediately prior to decommissioning but would be in line with relevant policy at that time.

8.1.2 Onshore project substation

188. In relation to the onshore project substation, the programme for decommissioning is expected to be similar in duration to the construction phase.

189. The detailed activities and methodology would be determined later within the project lifetime, but are expected to include:

- Dismantling and removal of outside electrical equipment from site located outside of the onshore project substation buildings;
- Removal of cabling from site;
- Dismantling and removal of electrical equipment from within the onshore project substation buildings;
- Removal of main onshore project substation building and minor services equipment;
- Demolition of the support buildings and removal of fencing;
- Landscaping and reinstatement of the site (including land drainage); and
- Removal of areas of hard standing.

190. Whilst details regarding the decommissioning of the onshore project substation are currently unknown, it is anticipated that the impacts would be similar or less than to those during construction.

191. The decommissioning methodology would need to be finalised nearer to the end of the lifetime of the project to be in line with current guidance, policy and legislation at that point. Any such methodology would be agreed with the relevant authorities and statutory consultees. The decommissioning works could be subject to a separate licencing and consenting approach.

192. Decommissioning of the onshore project substation is likely to create significant quantities of non-hazardous and inert construction and demolition waste, mainly comprising excavated hardstanding, building waste and excavated soil. Furthermore, the dismantling of power equipment will give rise to electrical and electronic wastes stream, including cables. Options to reuse / refurbish or recycle these wastes will be explored in line with guidelines and recommendations in force at that time.

8.2 Decommissioning Waste Management Measures

193. The measures proposed for waste management during the construction phase of the works will be adhered to during decommissioning.

9 Conclusion

9.1 Construction Phase

194. The estimated excavated waste arisings from the construction phase of the project that can be quantified based upon information available at the time of writing this report are presented in Table 9.1.

Table 9.1 Summary of construction phase excavated waste arisings Scenario 1

Description of activity	Total volume (m^3)	Waste management
Contractor temporary works areas		
Temporary works area at landfall: excavated topsoil that will be reinstated.	1,800	On-site reuse
Temporary works area at onshore project substation: excavated topsoil that will be reinstated.	6,000	On-site reuse
Temporary Necton National Grid substation temporary works area: Excavated topsoil that will be reinstated.	9,000	On-site reuse
Jointing pits		
Excavated soil (topsoil and sub-soil) from jointing pits that will be reinstated.	16,200	On-site reuse
Excavated soil from jointing pits that will require offsite disposal.	10,800	Off-site recovery or disposal
Running track		
Excavated topsoil stripped to construct haul road.	21,600	On-site reuse
Landfall duct installation		
Displaced spoil from installation	1,326	Off-site recovery or disposal
Attenuation ponds		
Onshore project substation attenuation pond	4,050	Off-site recovery or disposal
National Grid Substation Extension attenuation pond	6,300	Off-site recovery or disposal

Table 9.2 Summary of construction phase excavated waste arisings Scenario 2

Description of activity	Total volume (m^3)	Waste management
Contractor temporary works areas		
Temporary works area at landfall: excavated topsoil that will be reinstated.	1,800	On-site reuse
Trenchless works area – launch site: excavated topsoil that will be reinstated.	38,250	On-site reuse
Trenchless works area – Reception Pit: excavated topsoil that will be reinstated.	25,500	On-site reuse
Temporary works area at onshore project substation: excavated topsoil that will be reinstated.	6,000	On-site reuse
Temporary Necton National Grid substation temporary works area: Excavated topsoil that will be reinstated.	13,500	On-site reuse
Mobilisation areas for onshore cable route: Excavated topsoil that will be reinstated.	42,000	On-site reuse
Onshore cable route		
Excavated soil (topsoil and sub-soil) from onshore cable route that will be reinstated.	126,000	On-site reuse
Excavated soil from onshore cable route that will require offsite disposal.	54,000	Off-site recovery or disposal
Jointing pits		
Excavated soil (topsoil and sub-soil) from jointing pits that will be reinstated.	16,200	On-site reuse
Excavated soil from jointing pits that will require offsite disposal.	10,800	Off-site recovery or disposal
Running track		
Excavated topsoil stripped to construct haul road.	108,000	On-site reuse
Trenchless duct installation (including landfall)		
Displaced spoil from installation	8,836	Off-site recovery or disposal
Attenuation ponds		
Onshore project substation attenuation pond	4,050	Off-site recovery or disposal
National Grid Substation Extension attenuation pond	4,200	Off-site recovery or disposal

9.1.1 Inert wastes

195. The proposed waste management measures would reduce the amount of inert wastes by recycling the maximum amount of this material into an engineering standard product in accordance with the Aggregates Quality Protocol for use.

196. Where this cannot be achieved, other on-site uses such as recovery in the construction of site access tracks or backfill would be prioritised over any off-site options. Therefore, the measures would reduce the amount of material requiring off-site management to a minimum; and there are sufficient facilities within the

region to recycle this material. This promotes the waste hierarchy and the proximity principle.

9.1.2 Non-hazardous wastes

197. Excavated material forms the majority all waste arisings. The majority of this material is likely to be non-hazardous because the project area is largely greenfield. The waste management measures proposed for excavated material would promote the reuse of this material in accordance with the rWFD exclusion or CoP, where possible. The proposed use on site would be considered a justifiable option under the waste hierarchy and the proximity principle, because the retention of the material on site would prevent emissions as a consequence of removal from the site. Therefore, the use of the CoP would reduce the quantity waste being managed, because if the principles of the CoP are followed, the excavated material ceases to be waste when used.

198. Any excavated material that is not suitable for use on site or is surplus to requirements for use for construction purposes would be sent off-site in accordance with the waste hierarchy. Options for reuse or recovery, for example to a soil conditioning facility; or beneficial use as restoration material at a local landfill, would be prioritised to ensure that the amount of waste excavated material being disposed to landfill is reduced to an absolute minimum.

199. Biodegradable waste generated from site clearance would be managed by being sent for recovery at a local composting or an anaerobic digestion facility.

200. Waste produced by site workers in site welfare facilities will be dealt with by introducing a policy to require workers to take their own waste home. Receptacles should also be provided to collect different waste streams and allow the separate collection of dry recyclables from residual waste. Segregation of the different waste streams would ensure that the maximum amount of waste is diverted for reuse, recycling and recovery. The food waste should also be separately collected and sent for anaerobic digestion.

201. Metal waste should be collected in containers/skips and removed off site for recycling.

202. Suppliers should be required to take back any packaging associated with their products. Packaging materials that cannot be returned should be kept for on-site use (e.g. use of pallets for storage). Any residual packing that cannot be used on site should be segregated into distinct dry recyclable waste streams and sent for recycling off-site. No waste packaging would be landfilled.

203. Wood should either be recycled at a wood processing facility; or be chipped or treated and prepared for recovery at a biological treatment facility, such as composting; or prepared for use as a fuel in a biomass energy from waste facility.

204. Bitumen based surface planings would be treated at an authorised mobile treatment unit by crushing, grinding and screening, and used again on site in the construction of paving structures similar to those from which the waste arose, in accordance with a 'U1' Waste Exemption (Use of Waste for Construction).

9.1.3 Hazardous wastes

205. The waste management measures proposed would effectively reduce the amount of hazardous excavation waste on site as a consequence of the material ceasing to be waste when reused under the CoP. This would also reduce the amount that requires off-site disposal.

206. Off-site options for surplus material or material that would not be suitable for use would be prioritised towards soil treatment to reduce or remove contaminants to a level that would facilitate the reuse or recovery of the treated material; thereby promoting the waste hierarchy.

207. The region does not have any hazardous waste landfill facilities, therefore any hazardous waste produced as a consequence of the project that requires landfill disposal would have to be exported out of the region. The use of local or regional treatment facilities to treat the soil as an alternative to landfill would promote the proximity principle by avoiding the need to export the material out of the region.

208. There are sufficient facilities within the region to recycle or treat ad hoc hazardous wastes (such as waste oils etc.).

9.2 Operational Phase

209. Limited operational wastes are expected to be generated because of occasional routine maintenance and servicing works at the onshore cable route and onshore project substation.

210. In the event of a cable failure, it may be necessary to excavate a new jointing bay and replace / repair the faulty cable along limited stretches. Excavated material and faulty cable are anticipated in accordance with this activity. Waste cable will be assessed and reused if possible; or will be recycled if not. Waste excavated material that cannot be returned to the trench will be sent for off-site waste management in accordance with the waste hierarchy.

211. The servicing of equipment in the onshore project substation is likely to give rise to small quantities of liquid hazardous waste (used oil, solvents, paints etc.), solid

hazardous waste (oil-contaminated wipes, absorbent, and some specialist electrical equipment and batteries etc.) and non-hazardous waste (packaging, cables, metal waste, plastic waste and WEEE).

212. In order to reduce waste generation, electrical and electronic equipment should be used and services in accordance with manufacturers' instructions in order to extend their lives. WEEE, packaging and batteries should be recycled to fulfil Producer Responsibility requirements.

213. The quantity of oily wastes and rags generated can be reduced by preventing any possible leakage of oil, since the rags are mainly generated by cleaning tools or surfaces contaminated by small accidental spills or leakages. Oily rags can be treated using industrial washing facilities to remove oily residues, allowing the cleaned rags to be reused. The liquid can be collected and treated to recover the oil fraction. There is an active UK-wide market for the recycling of used oils into refined oil or fuel.

214. The reuse of organic paint solvents shall be considered for cleaning painting equipment or thinning paint. A way to re-use paint residuals could be achieved by making excess paints available for a further use by conserving them properly sealed. Solvent-based paint can be blended into a high calorific fuel for use in cement kilns.

215. Although the onshore cable route and onshore project substation will be unmanned, personnel / maintenance engineers will be required to visit the site. Small amounts of solid domestic waste may be generated; however, workers should take their waste home for it to be placed in applicable municipal waste bins for collection.

216. Wastes produced during operation would be managed in accordance with the general principles of the waste duty of care and producer responsibility to ensure effective waste management should they arise.

9.3 Decommissioning Phase

217. No decision has been made regarding the final decommissioning policy for the onshore cables, as it is recognised that industry best practice, rules and legislation change over time. It is likely that the onshore cables will be removed from the ducts and recycled, with the transition pits and ducts capped and sealed then left in situ.

218. Decommissioning of the onshore project substation is likely to create significant quantities of non-hazardous and inert construction and demolition waste, mainly comprising excavated hardstanding, power equipment and cables, building waste and excavated soil.

219. The measures proposed for waste management during the construction phase of the works will be adhered to during decommissioning.

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11 Annex 1 Waste Hierarchy Assessment

11.1 Introduction

11.1.1 Background

220. This Waste Hierarchy Assessment is Annex 1 to Appendix 19.3 Waste Assessment Report and forms part of the ES for the Norfolk Boreas Offshore Wind Farm project (herein 'the project').

221. This annex presents a discussion of the regulatory constraints and an assessment of the waste hierarchical options associated with the management of wastes that are anticipated to be produced because of the onshore construction of the project. It has a particular focus on excavated material (i.e. topsoil and subsoil), which would be the most significant waste stream in terms of quantity generated. Other wastes anticipated to be generated across the construction, operation and decommissioning phases of the project include:

- Biodegradable waste;
- Inert waste (concrete, brick and aggregate);
- Bitumen based surface planings;
- Metal waste; waste cables;
- Waste electrical and electronic equipment (WEEE);
- Waste wood;
- Waste packaging;
- Waste oils, solvents, paints and other ad hoc hazardous wastes;
- Solid waste generated by site workers; and
- Welfare waste.

222. It is a legal requirement in accordance with the Waste (England and Wales) Regulations 2011 to apply the waste hierarchy to assess the most appropriate management option for all wastes that are anticipated to be generated as part of the proposed works.

11.1.2 Existing Conditions at the Site

223. The land use in the onshore project area is predominantly agricultural with urban areas around the coastal fringe and larger settlements of North Walsham, Aylsham, Reepham and Dereham. There are several patches of 'non-agricultural' land, which is comprised of areas of woodland and waterbodies (e.g. rivers, lakes and ponds). There are A-roads (A149, A140 and A1067), B-roads (B1159) and local roads in the search area, as well as numerous Public Rights of Way (PRoW) and National Cycle routes. The Dudgeon Offshore Wind Farm underground cable route comes into the Necton National Grid substation from the north at Necton.

11.1.3 The Project

224. The construction activities for the onshore project area relate to landfall, onshore cable route, onshore project substation and National Grid substation extension. The project description is provided in Chapter 5 Project Description. A brief outline of construction activities for Scenario 1 and 2 are presented below.

11.1.3.1 Scenario 1

- Temporary works areas:
  - Landfall – two 60m x 50m Horizontal Directional Drilling (HDD) compounds to accommodate the drilling rig, ducting and associated materials and welfare facilities, with (maximum) of two transition pits, each 10m x 15m x 5m.
  - Temporary works areas at onshore project substation 200m x 100m, with a total land requirement for the constructed substation of 250m x 300m. Given construction duration, the temporary works areas will likely be tarmacked with some concrete hard standing for heavier plant and equipment, and will accommodate offices, welfare facilities, car parking, workshops and storage areas.
  - National Grid substation extension temporary works area of approximately 200m x 150m. The total constructed extension area would be 142m x 131m. Given construction duration, the works area will likely be surfaced with asphalt with some concrete hard standing for heavier plant and equipment, and will accommodate offices, welfare facilities, car parking, workshops and storage areas.
- Reinstated running track (formed of protective matting, temporary metal road or permeable gravel aggregate) 12km x 6m wide x 0.3m deep, to deliver equipment to the installation site. Temporary bridges or culverting may be employed at crossings to allow continuation of the running track (same 6m width as the running track).
- 150 jointing pits, comprising of an excavated area of 15m x 6m x 2m, with a reinforced concrete floor to allow winching during cable pulling and a stable surface to allow jointing.

11.1.3.2 Scenario 2

- Temporary works areas:
  - Landfall – two 60m x 50m HDD compounds to accommodate the drilling rig, ducting and associated materials and welfare facilities, with (maximum) of two transition pits, each 10m x 15m x 5m.
  - 17 trenchless crossing technique (e.g. HDD) compound pairs 150m x 50m (launch side) and 100m x 50m (reception side) to accommodate the drilling rig, ducting and associated materials and welfare facilities. These

dimensions will be fully determined by site specific constraints and drilling requirements such as cable segregation and drilling depth.

- Temporary works areas at onshore project substation 200m x 100m, with a total land requirement for the constructed substation of 250m x 300m. Given construction duration, the temporary works areas will likely be tarmacked with some concrete hard standing for heavier plant and equipment, and will accommodate offices, welfare facilities, car parking, workshops and storage areas.
- National Grid substation extension temporary works area of approximately 150m x 150m. The permanent extension footprint would be 199m x 142m. Given construction duration, the works area will likely be surfaced with asphalt with some concrete hard standing for heavier plant and equipment, and will accommodate offices, welfare facilities, car parking, workshops and storage areas. Plus, two new permanent overhead line towers will be sited within an area of 9,250m^2.
- 14 mobilisation areas 100m x 100m (or 150m x 100m if combined with a trenchless crossing technique (e.g. HDD) zone) – used to store equipment and provide welfare facilities. Hardstanding will likely comprise of permeable gravel aggregate to a depth of 0.3m underlain by geotextile.

- Temporary strip width to a maximum of 35m, with permanent strip width a maximum of 13m.
- Running track (formed of protective matting, temporary metal road or permeable gravel aggregate) 60km x 6m wide x 0.3m deep, to deliver equipment to the installation site. Temporary bridges or culverting may be employed at crossings to allow continuation of the running track (same 6m width as the running track).
- 2x cable trenches 1m wide x 1.5m deep x 60km length (maximum width of cable trench is 5m considering two adjacent trenches excavated as a single trench). Minimum 1.05m depth from the surface to the top of the duct target. A stabilised backfill such as CBS (Cement Bound Sand) will be installed at the base of the trench to a depth of approximately 100mm above the cable ducts.
- 150 jointing pits, comprising of an excavated area of 15m x 6m x 2m, with a reinforced concrete floor to allow winching during cable pulling and a stable surface to allow jointing.

225. For Scenario 1 the anticipated construction programme, is likely to be over a maximum six year period (2022– 2027) based on current information at this stage of the application process.

226. For Scenario 2, the anticipated construction programme is also likely to be over a six year period which could be started a year earlier, again based on the current information at this stage of the application process.

11.2 Waste Regulation

227. Excavated material can be retained on site for use, but there are specific requirements that need to be considered. The Environment Agency considers that excavated material becomes waste when it is excavated unless it will be reinstated where it came from.

228. Compliance with waste legislation is required to use waste excavated material for construction or for any other beneficial use, such as cover or restoration. This means that an environmental permit or appropriate exemption is required to use the waste excavated material. However, there are non-regulatory procedures that can be followed where the material is being used beneficially, which are described below.

229. The treatment of any waste arisings on-site (such as crushing of inert material) is a waste operation and would need to be carried out in accordance with an appropriate authorisation, such as an environmental permit or a waste exemption.

230. Material that is removed from site is always classed as waste. The removal of waste from the site must comply with waste legislation and the waste Duty of Care.

231. Details of the required regulatory constraints are provided later in this report (see section 11.7 and 11.8).

11.3 Waste Framework Directive

232. The overarching framework for waste management and the definition of waste that is used across the EU is provided by the revised Waste Framework Directive ('rWFD') (2008/98/EC). Waste is defined as anything that has been discarded, or that a person or organisation wants or has to discard.

233. The Waste (England and Wales) Regulations 2011, SI 2011 No. 988 implements the rWFD in England and Wales.

11.4 The Waste Hierarchy

234. The waste hierarchy is set out at Article 4 of the rWFD and has been implemented by The Waste (England and Wales) Regulations 2011.

235. The waste hierarchy is set out at Article 4 of the rWFD. The waste hierarchy requires the producer/holder of a waste to demonstrate that the priorities identified in Table 11.1 have been considered to determine the most suitable waste management option for all wastes prior to removal from site.

Table 11.1 The waste hierarchy

Waste Hierarchy	Relevant Activity
Prevention	Using less material in design and manufacture, keeping products for longer, re-use, using less hazardous materials.
Preparing for re-use	Checking, cleaning, repairing, refurbishing, whole items or spare parts.
Recycling	Turning waste into a new substance or product, includes composting if it meets quality protocols
Other recovery	Includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste, some backfilling.
Disposal	Landfill and incineration without energy recovery.

Table reproduced from Defra website: https://www.gov.uk/waste-legislation-and-regulations

236. It is a legal requirement for waste producers/holders to follow the waste hierarchy when making decisions about waste management options. Waste holders must demonstrate the highest possible hierarchical option for their wastes. Lower hierarchical options cannot be justified by cost alone. They require environmental justification over available higher options, for example the location of a site may justify sending waste to a lower hierarchical option (e.g. local landfill), rather than sending it hundreds of miles to the nearest facility that could provide a higher option.

11.5 Assessment against the Hierarchical Options

11.5.1 Prevention

237. It is inevitable that waste materials will be produced because of the proposed works. Actions would be taken to ensure these are managed in accordance with the highest possible waste hierarchical option.

238. Topsoil stripped during the creation of the temporary works areas, mobilisation areas, cable route/trench, jointing pits and running track will be stockpiled and protected during storage whilst the construction works progress. This material will be reinstated on site, so there will be no waste topsoil arising from these activities.

239. Packaging will be returned intact to suppliers wherever possible.

240. Sustainable procurement measures will be implemented to ensure that the right amount of product will be ordered at the right time. This will reduce wastage from over-ordering; or from deterioration from long-term storage.

11.5.2 Preparing for Re-use

241. The definition of 'prepared for re-use' infers something being repaired or refurbished so it can be used for the original purpose.

242. Given the nature of the excavated material, there are no appropriate treatment operations for it that would meet the strict waste hierarchy definition of 'prepared for re-use'.

243. Empty fuel or oil drums will be retained for re-use on site for storing waste oil, where possible. Pallets will also be assessed to identify if they can be re-used on site. The same will apply to other forms of packaging that cannot be returned to suppliers.

244. Metal trackway and waste cable will be assessed and re-used if possible; or will be recycled if not.

245. The treatment of oily rags using industrial washing facilities will be explored to remove oily residues, allowing the cleaned rags to be re-used. The liquid can be collected and treated to recover the oil fraction.

246. The re-use of organic paint solvents will be considered for cleaning painting equipment or thinning paint. A way to re-use paint residuals could be achieved by making excess paints available for a further use by conserving them properly sealed. Solvent-based paint can be blended into a high calorific fuel for use in cement kilns (this is considered to be a 'recovery' process).

11.5.3 Recycling

247. There are no Quality Protocols specifically for excavated material. It is noted that the Waste & Resources Action Programme (WRAP) Aggregates Quality Protocol includes an entry for inert soil and stones in the list of acceptable wastes, however, it also states: *"For the avoidance of doubt, clays and soils are not considered to be aggregates for the purposes of this Quality Protocol."* This is because it only applies to granular material. Therefore, there are no direct recycling options available for excavated soil. However, excavated hardstanding, granular material removed from piling and other inert concrete/brick waste may be appropriate to be recycled using the Aggregates Quality Protocol. The principles required are identified in section 11.10.

248. The condition of any timber waste would determine whether they can be recycled at a wood processing facility; or whether they would have to be chipped or treated and prepared for recovery at a biological treatment facility, such as composting; or prepared for use as a fuel in biomass energy from waste facility. These options would be called 'Other recovery' – see below.

249. Metal waste (i.e. from overhead line modifications, off-cuts and scrap metal that cannot be reused) should be collected in containers/skips or stored in an allocated area and removed off site for recycling at a metal recycling facility. There are local waste management facilities in the area that could receive metal waste, including those operated by CBC Metal Merchants Ltd, European Metal Recycling Limited, Haller & Sons (Dereham) Ltd and Raymond McLeod (Farms) Ltd.

250. Solid dry recyclable waste and residual wastes can be sent to local household, commercial and industrial (HCI) waste transfer stations (WTS) operated by Drurys Environmental Services Ltd, Carl Bird Limited, Pips Skips Ltd, Norman Wenn Skip Hire, Norfolk Waste Ltd, AE Daniels & Son, JP Skips, and Haller And Sons (Dereham) Ltd. Waste oils, solvents, paints and other ad hoc hazardous wastes can be sent to the hazardous waste transfer station operated by Norse Environmental Waste Services Ltd. These facilities will separate the recyclable items using the appropriate physical or chemical techniques that their permit authorises them to carry out.

11.5.4 Other Recovery

251. Where excavated material is used in construction or for beneficial use, such as cover or restoration, this is technically considered 'other recovery' and would be a lower hierarchical option than recycling. Reuse of the material would prevent the need for using similar quantities of virgin aggregate that would be used for the same purpose, thus saving natural resources.

252. The excavated material could be used for construction purposes, e.g. as low grade fill; or as a defined-specification engineering material, after suitable treatment. On site uses will be explored within the proposed development, particularly at the substation works, where the material can be demonstrated to be suitable for use. However, off-site uses may be required if there is surplus material. Preference will be given to on-site uses rather than off-site uses. Both are considered 'other recovery' and have equal weight according to the waste hierarchy, however, the former promotes the proximity principle and is therefore preferred.

253. There are local waste management facilities in the area that could receive excavated soil for 'reclamation' or 'recovery' operations including those operated by Raymond McLeod (Farms) Ltd, East Anglian Stone Ltd and Timothy Barber.

254. The material could also be sent to a soil treatment centre where it is processed via treatment into a material that can be used for soil conditioning. This is also considered 'other recovery'. There are local waste management facilities in the area that could receive excavated soil for treatment to produce soil including those operated by Aylsham Plant Hire Limited, Frimstone Limited, East Anglian Stone Limited and Middleton Aggregates Ltd.

255. Vegetation removed from the site clearance works, food waste from welfare facilities and timber not deemed suitable for recycling could be sent for recovery at a biological treatment facility e.g. composting or anaerobic digestion, as applicable. There are local composting facilities in the area that could receive biodegradable waste including those operated by Norse Environmental Waste Services Ltd, ORM North Norfolk Limited and TMA Bark Supplies Ltd.

11.5.5 Disposal

256. The lowest hierarchical option for the excavated material would be to dispose of it. It is contrary to the waste hierarchy to justify landfilling by means of convenience or cost.

257. Landfill would only be a justifiable alternative if there were no on-site; or available local or regional development projects that could use the excavated material; or if there were no local or regional facilities that could receive the material for treatment or recovery.

258. Any waste wood that is in a deteriorated condition that rules out the potential for recycling or recovery could also be landfilled.

259. Non-hazardous landfill sites in the local area that could receive waste including those operated by Norfolk County Council, Biffa Waste Services Ltd and Tarmac Aggregates Limited.

260. The East of England region does not have any hazardous waste landfill facilities; therefore, any hazardous waste produced as a consequence of the project that requires landfill disposal would have to be exported out of the region. However, the waste management measures proposed could effectively reduce the amount of hazardous excavated material on site by promoting reuse where it is suitable for use. This would also reduce the amount that requires disposal off-site. Off-site options for surplus material or material that would be not suitable for use would be prioritised towards soil treatment to facilitate the reuse or recovery of the treated material; thereby promoting the waste hierarchy and proximity principle by avoiding the need to export out of the region for landfilling. There are sufficient facilities within the region to recycle or treat these wastes.

11.5.6 Conclusion

261. The installation and operation works would accommodate the minimisation of waste wherever possible. Topsoil would be stripped, stockpiled and protected during storage whilst the construction works progress. This material will then be reinstated once activities are completed. Subsoil will also be reinstated wherever possible up to

the amount restricted using Cement Bound Sand (CBS) around the cable ducts for thermal resistivity.

262. Empty fuel or oil drums, oily rags, organic paint solvents, metal trackway and waste cable will be assessed and reused if possible.

263. Recycling represents the most appropriate hierarchical option for the metal waste; waste timber in reasonable condition; dry recyclable solid waste; and for excavated hardstanding and inert waste where the Aggregates Quality Protocol can be applied.

264. Recycling represents the most appropriate hierarchical option for the waste timber. However, their condition may dictate that recovery or potentially landfill (for the most deteriorated wood) may be the most appropriate option. These would need to be determined at the point of removal by the contractor.

265. Other recovery represents the highest waste hierarchical option for waste excavated soil and made ground. There are two general approaches:

266. Use of excavated material as backfill or for landscaping on site or at another project within the wider area; or

267. Recovery of the material at a permitted facility, e.g. into a secondary material at a soil conditioning facility or aggregate processing facility; or beneficial use as cover or restoration at a landfill.

268. Vegetation removed from the site clearance works and food waste form welfare facilities would be sent for recovery at a biological treatment facility.

269. A Site Waste Management Plan (SWMP) will be prepared to record any decisions given to materials resource efficiency when designing and planning the works.

11.6 Recovery or Disposal

270. If any waste material is proposed to be put to beneficial use, for example construction or restoration purposes, the type of activity or use is subject to criteria that define whether the activity is disposal or recovery. This is significant, because disposal operations require more stringent regulatory controls; and represents a lower hierarchical option.

271. The term ‘recovery’ has been debated across EU Member States and has been the subject of case law at a European level. In ruling on the Abfall case (Abfall Service AG ASA) C-6/00), the European Court stated that “the essential characteristic of a waste recovery operation is that its principal objective is that the waste serve a useful purpose in replacing other materials which would have been used for that purpose, thereby conserving natural resources”.

272. The EA has provided online guidance[4] to define when the deposit on land is recovery. Furthermore, principles are also provided in EA, Regulatory Guidance Series No. EPR13, v1.0 ('RGN13')[5].

- For the proposed activity to be considered a recovery process, evidence must be provided to demonstrate that the following criteria are achieved:
- Is there a clear benefit from the activity?
- Is the waste material suitable for its intended use?
- Is the minimum amount of waste being used to achieve the intended benefit?
- Is the waste being used as a substitute for non-waste material?
- Will the proposal be completed to an appropriate standard?

273. These principles must be demonstrated in all of the appropriate regulatory or non-statutory approaches for using any excavated material in construction or for beneficial use, such as cover or restoration. A recovery plan must be provided for regulatory approaches.

274. If the proposed activity does not meet all of the required 'recovery' criteria as part of the proposed use, it will be considered a disposal operation and an environmental permit for landfill would be required to deposit the excavated material on land.

11.7 Regulatory Requirements for Re-use on Site

11.7.1 Naturally Occurring, Uncontaminated Excavated Material

275. Naturally occurring, uncontaminated material is excluded from the scope of the waste regulatory framework. This is because of the rWFD. Article 2(1)(c) of the rWFD states that "uncontaminated soil and other naturally occurring material excavated during construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated" is excluded from the scope of the rWFD. Such material may still be waste, but it is not subject to any waste regulatory controls.

276. Therefore, where a site comprises naturally occurring uncontaminated material, it can be used on the site from where it was excavated for construction purposes without needing to comply with waste legislation. No environmental permit is required. But note that although this position excludes the application of waste legislation and controls, the material is still considered waste.

277. The exclusion does not apply to any material removed from the site. The full remit of waste legislation and control would then be applied.

[4] https://www.gov.uk/guidance/waste-recovery-plans-and-permits
[5] Note that this guidance was withdrawn in February 2016; however, the principles still represent good practice.

278. The rWFD does not define 'uncontaminated'. However, the EA has a strict interpretation based on environmental risk: "At its most basic or general, in this context, 'contamination' means the presence of substances in soil that produce a risk of harm or pollution'. In the EA's opinion, the presence or absence of "contamination" has to be assessed on a site-specific basis having regard to a risk assessment e.g. some soil may not be considered contaminated for one land use but may be for another. It is not just a matter of what levels of substances are present within a soil but where and how that soil is used.

279. Appendix 19.2 Land Quality Phase 1 Preliminary Risk Assessment (PRA) was undertaken to identify whether there are potentially unacceptable risks to human health or the environment posed by the site and the immediate surroundings (250m buffer), which warrant further investigation. A site walkover survey of the whole survey area was also undertaken in February 2017 to verify current conditions at the site. The PRA concludes that:

- Further assessment or investigation of potential Made Ground in the on-site source areas at dismantled railway lines is undertaken to establish the risk to construction and the suitability of soils for re-use.
- Protocols for dealing with unexpected contamination should be set in place prior to construction to ensure that procedures are known and agreed with the Regulators should contaminated materials be encountered.

11.7.2 Conclusion

280. Therefore, professional assumption is that chemical testing should be undertaken, and a site-specific risk assessment undertaken, on any soils designated for reuse within the project to determine if it meets the requirements of the rWFD exclusion for naturally-occurring uncontaminated material; or suitable for use criteria if not (see below).

11.8 Use of Waste in Construction as a Waste

11.8.1 Waste Exemption

281. The use of waste for the purposes of construction is considered to be a waste operation and will require an environmental permit, unless it can be demonstrated that an appropriate exemption applies; or evidence can be provided to demonstrate that the material is not waste when it is used (see section 11.9 and section 11.10).

282. A waste exemption is a waste operation that is exempt from needing an environmental permit in accordance with the Environmental Permitting (England & Wales) Regulations 2010 ('EPR 2010') (as amended). Waste exemptions can involve the use, treatment, disposal or storage of waste.

283. The waste exemption 'U1 – Use of waste in construction' allows for the use of up to 1,000 tonnes of waste in small scale construction instead of using virgin raw materials. The operator of the exemption must be able to demonstrate that the waste will be used beneficially as part of a defined construction project (i.e. a recovery operation). Waste is not allowed to be disposed under this exemption.

284. Conclusion: A U1 exemption would not be acceptable to authorise the use of excavated material from the proposed development because the anticipated quantity of excavated material that would be produced will exceed the exemption criteria. However, bitumen based surface planings could be treated at an authorised mobile treatment unit by crushing, grinding and screening, and used again on site in the construction of paving structures similar to those from which the waste arose, in accordance with a 'U1' exemption, where the quantity thresholds are not exceeded.

11.8.2 Environmental Permits for Using Waste in Construction

285. An environmental permit is required where a waste operation does not meet the requirements of an exemption. The permit sets the conditions that must be followed by the operator to prevent the operation from causing harm to human health or the environment.

286. There are two tiers of environmental permit available in England and Wales: Standard Rules Permits and Bespoke Permits.

11.8.2.1 Standard Rules permits

287. The first tier is a Standard-Rules permit and these generally apply to lower risk activities. This is an 'off-the-shelf' permit that is not site specific and contains a standard set of rules that are applicable to particular waste management operations regardless of location. The rules cannot be varied and exclude waste operations in sensitive locations. A Standard Rules permit does not allow the discharge of any emissions into surface waters or groundwater. None of the Standard Rules permits allow the use of hazardous waste for construction.

288. Standard Rules permit 'SR2015 No39[6]: Use of waste in a deposit for recovery operation (Construction, reclamation, restoration or improvement of land other than by mobile plant)' allows the use of waste excavated material for construction purposes. The maximum quantity of waste that can be stored and subsequently used at the site under these standard rules is 60,000m^3. "Construction work" means the carrying out of any building, civil engineering or engineering work and includes the

[6] https://www.gov.uk/government/publications/sr2015-no39-use-of-waste-in-a-deposit-for-recovery-operation

building, alteration, conversion, repair, upkeep or other maintenance of a structure and the preparation of a site for an intended structure. It includes drainage works.

289. The main points are that waste shall only be accepted if:

- It is not a hazardous waste;
- It is of a type listed in a table within the standard rules;
- It has been identified as a suitable waste type in the approved waste recovery plan;
- It conforms to the description in the documentation supplied by the producer and holder;
- Its chemical, physical and biological characteristics make it suitable for its intended use in the site;
- Any excavated material from potentially contaminated sites has been shown by prior chemical analysis and assessment to be suitable for the intended use without significant risk of pollution; and
- It is visually inspected on arrival and at the point of deposit to ensure that it complies with these standard rules.

290. In terms of sensitive locations, the activities shall not be within:

- 500m of a European Site or a Site of Special Scientific Interest (SSSI); or 250 metres within the presence of Great Crested Newts where it is linked to the breeding ponds of the newts by good habitat;
- groundwater Source Protection Zones 1 and 2, or if a source protection zone has not been defined then not within 250m of any well, spring or borehole used for the supply of water for human consumption. This includes private water supplies;
- 50m of any spring or well, or of any borehole not used to supply water for domestic or food production purposes;
- 50m of a site that has species or habitats protected under the Biodiversity Action Plan that the Environment Agency considers at risk to this activity;
- 50m of a National Nature Reserve (NNR), Local Nature Reserves (LNR), Local Wildlife Site (LWS), Ancient woodland or Scheduled Ancient Monument;
- within a specified Air Quality Management Area (AQMA) for particulate matter less than 10 microns (PM10); or
- On any landfill whether historical, closed, or operational.

291. If the proposed use is within any of the above criteria, a Bespoke Permit will be required.

11.8.2.2 Bespoke permits

292. A bespoke permit is site specific and involves a much more rigorous application process and compliance conditions.

293. A bespoke permit would be required for any waste operation that is not covered by a waste exemption or standard permit activity. A bespoke permit application requires a dedicated and thorough risk assessment in accordance with the Environment Agency's online guidance on risk assessments for environmental permit[7] (this guidance replaced the H1 Environmental risk assessment for permits: overview and annexes [8] guidance in February 2016). The activities must be operated in accordance with procedures written in an environmental management system, which must provide a control system to ensure that the proposed activities will not cause unacceptable harm to human health or the environment. This means higher fees associated with application, subsistence and surrender, because the Environment Agency applies a greater amount of resource to determine the application.

294. The subsistence fees are calculated according to the level of risk, according to the Environment Agency's charging scheme and are bespoke to each application.

295. It is not recommended to use the environmental permitting option for the use of excavated material for construction unless strictly necessary because of the bureaucratic and administrative requirements associated with applying for; managing; and surrendering an environmental permit.

11.9 Use of Waste in Construction as a Non-waste

11.9.1 The CL:AIRE Code of Practice (CoP)

296. The EA has a view that excavated material and waste from piling is waste, unless it is replaced where it was excavated from. Waste management control would normally apply to using such material for construction. However, in the interests of sustainability and pragmatism, the EA has recognised the value of using excavated material in developments. The organisation Contaminated Land: Applications In Real Environments (CL:AIRE) has written a Code of Practice (CoP) Definition of Waste – Development Industry Code of Practice (version 2 March 2011) for using excavated material, which has the support of the Environment Agency.

297. The CoP could apply to the use of the excavated material within the project; or another local development scheme, where there is a need for the material and all of the principles in the CoP can be met.

[7] https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit
[8] https://www.gov.uk/government/publications/h1-environmental-risk-assessment-for-permits-overview

298. The CoP is subject to self-regulation via the use of an independent assessment by a Qualified Person, who is a person that fulfils the required experience, qualifications and professional membership criteria set by CL:AIRE. It sets out the principles for achieving a non-waste status through a risk-based approach. If these principles are followed, the excavated material will not be waste when used; therefore, waste regulatory controls would not apply at the point of use.

299. Regular liaison with the regulatory authorities (the Environment Agency and the local authority) is required throughout the process to ensure that all parties are aware of the application of the CoP on the development. Appropriate lines of evidence are required to ensure that the CoP principles can be met.

300. Re-use of excavated material on site (where the rWFD exclusion does not apply) would have to comply with the principles of the CoP for the material to be able to be re-used outside of the regulatory framework. The principles are as follows:

11.9.1.1 The proposed use of the material must not cause any harm to human health or the environment

301. This requires a risk assessment, at the appropriate level of the development area to demonstrate that the use will not create an unacceptable risk to human health or the environment. A risk assessment for the specific end use should follow the principles defined in EA Contaminated Land Report 11, ('CLR11'). This will find out whether any contaminants from anthropogenic and/or natural sources present an unacceptable level of risk to human health, controlled waters, ecosystems and/or the built environment, based on the available pathways and receptors. If the level of risk is unacceptable, the CoP principles cannot be achieved, therefore, the material would be waste and an environmental permit would be required to allow use of the excavated material for construction.

11.9.1.2 The excavated material is suitable for its proposed use

302. The chemical and geotechnical properties of the material must be demonstrated to be suitable for the intended use. This means that there must be a specification provided for use of the excavated material as construction material.

303. The material must be suitable for use in all respects without treatment. If it requires treatment, it is waste. However, if treatment is required, the material can be used in accordance with the principles of the CoP after this treatment has been carried out where no further treatment is required and the material meets all of the other CoP principles.

11.9.1.3 The use of the material is certain

304. The developer at the receiving facility must be able to demonstrate that the excavated material would be used in accordance with defined quantities provided in

the scheme design prior to use. They must be able to demonstrate that all of the material would be used and that use is a certainty, not a probability.

305. The use of the excavated material must form part of the final design, so it can be clearly identified where in the scheme the material would be used; and how much would be used. This requires a Materials Management Plan (MMP) to be prepared to show: how and where all materials on the ground are to be dealt with; a tracking system to monitor any waste/material movements; and contingency measures (i.e. who takes responsibility and what happens if the material is not suitable for use).

11.9.1.4 Only a sufficient quantity of material will be used

306. The quantity of material required must be known prior to construction. If excess excavated material is deposited this is taken to be an indication that it is being discarded and it would be waste.

307. The CoP outlines the minimum standard for a MMP, which provides the control mechanism to ensure compliance with the CoP principles. In summary, the MMP must provide:

- Details of the parties that will be involved with the implementation of the MMP.
- A description of the materials in terms of potential use and relative quantities of each category.
- The specification for use of materials against which proposed materials will be assessed, underpinned by an appropriate risk assessment related to the place where they are to be used.
- Details of where and, if appropriate, how these materials will be stored.
- Details of the intended final destination and use of these materials.
- Details of how these materials are to be tracked.
- Contingency arrangements that must be put in place prior to movement of these materials.
- A Verification Plan to identify how the placement of materials is to be recorded and the quantity of material to be used relate to the design objectives.

308. The CoP requires that the MMP is independently reviewed by a Qualified Person.

309. The Qualified Person must provide a Declaration that the principles of the CoP have been complied with before construction can begin.

310. There is a fee associated with the use of excavated material in accordance with the CoP. The Declaration fee system currently applies only to projects over 5,000m^3 and is charged £10 per 1,000m^3. An administration fee of £40 per Declaration also applies to cover the cost of issuing Declaration receipts.

11.10 The Aggregates Quality Protocol Requirements

311. A 'Quality Protocol' sets out end of waste criteria for the production and use of a product from a specific waste type. Compliance with these criteria is considered sufficient to ensure that the fully recovered product may be used without undermining the effectiveness of the rWFD and therefore without the need for waste management controls.

312. The Quality Protocol indicates how compliance should be demonstrated and points to good practice for the storage, transportation and handling of the fully recovered product. The Quality Protocol further aims to provide increased market confidence in the quality of products made from waste and so encourage greater recovery and recycling. The Quality Protocol is potentially suitable for the processing of inert material into secondary aggregate.

313. Aggregate prepared from inert waste will normally be regarded as having ceased to be waste, and therefore no longer subject to waste management controls, provided:

- It conforms to the requirements of the European standard appropriate to the use it is destined for;
- The aggregate is produced under Factory Production Control;
- Inputs are limited and controlled within Factory Production Control;
- It requires no further processing, including size reduction, for the use it is destined for;
- It is destined for a use within designated market sectors; and
- It conforms with CE conformity marking requirements contained in the Construction Products Regulations, which applies to all aggregates placed on the market to harmonised European Aggregates Standards from July 2013.

314. Control procedures must be in place to ensure that only the appropriate types of inert materials are received (these are listed in Appendix C of the Quality Protocol), therefore, waste acceptance criteria and procedures are required.

315. The acceptance criteria must include:

- A list of the types of waste that are accepted (including waste codes);
- Source/place of origin of the waste;
- Supplier and transporting agent; and
- Method of acceptance.

316. Every load must be inspected visually, both on initial receipt and after tipping, to ensure compliance with the acceptance criteria. A procedure for dealing with non-conforming incoming waste must be set up, for example, rejection of loads, quarantine or disposal. Records must be kept of how the procedure has been implemented.

317. The facility that receives the inert waste for processing into the aggregate must have an environmental permit. The processing of the inert waste must be carried out in accordance with the environmental permit and under Factory Control Procedures.

318. A rigorous sampling and testing regime is required to ensure that the processed material meets the required market specification according to the type of product produced.

319. To be able to demonstrate compliance with the Quality Protocol, producers must maintain delivery documentation for every load of recycled aggregate despatched.

320. Delivery documentation must include:

- Date of supply;
- Customer's name and contact details;
- Product description to aggregates standard and customer specification;
- The name and contact details of the producer, including the address of the site of production;
- Quantity supplied by weight/volume; and
- A statement that the product was produced in compliance with the Quality Protocol.

321. Where requested by the purchaser further documentation should also include:

- Test results and procedures in accordance with the relevant aggregate industry standard or specification and for any further tests required to assess suitability for a particular end use;
- Outline details of the Factory Production Control manual; and
- Information on good practice relating to the storage, transportation and handling of aggregate.

322. For the purposes of the Quality Protocol the producer must keep and retain specified records for a minimum of two years; and make them available for inspection by the regulator (if requested).

323. It is important to note that even if the Quality Protocol is complied with, the material will become waste again and subject to waste management controls at any stage if it is discarded or there is an intention or requirement to discard. For example, if it is:

- Disposed; or
- Stored indefinitely with little prospect of being used.

11.11 Regulatory Requirements for Transfer of Material Off-site

11.11.1 Duty of Care Requirements

324. The waste Duty of Care applies to all holders of waste material. The requirements of the waste Duty of Care are implemented by the Waste (England and Wales) Regulations 2011.

325. This requires several basic considerations:

- Comply with environmental legislation.
- Know whether wastes are hazardous or non-hazardous.
- Know the waste codes for all wastes being held.
- Store wastes securely to prevent release.
- Check that the wastes are transferred by only those who hold an appropriate environmental authorisation and received by a facility that holds an appropriate environmental permit or exemption.
- Provide documentation with any waste transfer to fully describe the waste and identify any special handling requirements that could affect future waste management options on the waste.
- Keep records of all waste transfers in a register.

326. To maximise recycling and recovery opportunities, each distinct waste stream should be segregated.

11.11.2 Hazardous Waste Assessment

327. The assessment process for identifying whether a waste is hazardous or non-hazardous is provided in Technical Guidance WM3 'Guidance on the classification and assessment of waste, (1st edition 2015[9])'.

328. No recent samples of made ground and soil material have been provided for analysis and assessment for hazardous waste classification.

329. Appendix 19.2 Land Quality Phase 1 PRA identifies several potential sources of anthropogenic pollution. Therefore, these may give rise to contamination hotspots that could give rise to a classification of hazardous waste.

330. It is illegal to mix hazardous and non-hazardous waste. Therefore, site segregation controls must be applied to separate any hazardous waste excavated material (including any piling waste that is contaminated), from non-hazardous material.

[9] Note that this edition will be updated in July 2018 to accommodate changes to the assessment methodology for the Ecotoxic hazardous property (HP14).

331. Bitumen surface plainings and subsoil are likely to be non-hazardous waste. All of the other wastes (e.g. waste wood and waste metal) associated with the works are non-hazardous. The inert concrete hardstanding would be dealt with as inert waste.

332. Recommendation: It is recommended that the appointed contractor commissions the sampling and analysis of made ground and soil material to confirm concentrations of any contaminants; and that the data is assessed in accordance with WM3. This would ensure full compliance with the waste duty of care. It is noted that this information would be required from any authorised facility that would be used to receive the waste prior to any off-site transfer of any waste.

11.11.3 Disposal to Landfill

333. Disposal to landfill is the lowest option of the waste hierarchy and it would require justification by the waste holder to confirm why this option was chosen. The fact that it might be the cheapest option is not satisfactory. If landfill is justified, there are also further considerations that are identified below.

334. For wastes to be deposited in a landfill they require an assessment against the waste acceptance criteria (WAC). The producer of the waste will have to provide the basic characterisation requirements that appropriately describe the waste. Evidence to demonstrate that it is non-hazardous or hazardous would be required – this is a fundamental requirement of basic characterisation.

11.11.3.1 Waste Acceptance Criteria (WAC) - Chemical testing

335. Chemical WAC tests are leachate tests that are only required for wastes where landfill disposal has been determined as the appropriate option in accordance with the waste hierarchy. A WAC test will not identify whether a waste is hazardous or not. The waste classification assessment has different analytical requirements and must be determined before carrying out WAC tests.

336. Non-hazardous waste is not required to undergo chemical WAC tests before it can be deposited in a non-hazardous class of landfill.

337. For non-hazardous excavated material, there is only one scenario when WAC testing is required: If the excavated material is non-hazardous AND has very low concentrations of contamination, it may be landfilled in an inert class of landfill, if it meets inert WAC.

338. It is likely to be much cheaper to dispose of the excavated material in an inert class of landfill compared to a non-hazardous class of landfill because it may qualify for the lower rate of landfill tax (Landfill tax £88.95 per tonne for standard rate material and £2.80 for lower rate- rate from 1st April 2018).

339. If a waste is hazardous and landfill disposal has been justified, then it can only be deposited in a hazardous class of landfill. However, it must be tested to ensure that it meets the hazardous WAC before it can be landfilled. If any material fails the hazardous WAC, it cannot be landfilled unless it is chemically treated to ensure the hazardous WAC can be met. It is illegal to dilute excavated material by mixing hazardous and non-hazardous excavated material to meet hazardous WAC.

11.11.3.2 Pre-treatment

340. It is a legal requirement that all wastes going for landfill must be pre-treated, unless treatment is not technically possible (note, this applies to inert wastes only); or if treatment would not reduce the quantity or the hazards that it poses to human health or the environment. The proposed pre-treatment option must comply with the definition of 'treatment'. This involves a 'three-point test':

- It must be a physical, thermal, chemical or biological process including sorting.
- It must change the characteristics of the waste. and
- It must do so to:
  - Reduce its volume; or
  - Reduce its hazardous nature; or
  - Facilitate its handling; or
  - Enhance its recovery.

341. The purpose of this pre-treatment is to reduce the amount of waste going to landfill; and reduce the impact of waste when it is landfilled.

342. The segregation of material into that which is suitable for beneficial use, either on or off site, from that which is not suitable for use and requires off-site disposal, would meet the criteria of the three-point test.

343. The segregation of waste timber that is suitable for recycling or recovery, from deteriorated wood that cannot be recycled or recovered and is anticipated to be landfilled would also meet the test.

11.12 Conclusions and Recommendations

344. The construction and operation works have accommodated the minimisation of waste wherever possible, for example topsoil stripped will be stockpiled and protected during storage whilst works progress. This material will then be reinstated once activities are completed.

345. Packaging will be returned intact to suppliers wherever possible, whilst sustainable procurement measures will be implemented to ensure that the right amount of product will be ordered at the right time. This will reduce wastage from over-ordering; or from deterioration from long-term storage.

346. Empty fuel or oil drums will be retained for re-use on site for storing waste oil, where possible. Pallets will also be assessed to identify if they can be re-used on site. The same will apply to other forms of packaging that cannot be returned to suppliers.

347. Metal trackway and waste cable will be assessed and re-used if possible; or will be recycled if not.

348. The treatment of oily rags using industrial washing facilities will be explored to remove oily residues, allowing the cleaned rags to be re-used. The liquid can be collected and treated to recover the oil fraction.

349. The re-use of organic paint solvents will be considered for cleaning painting equipment or thinning paint. A way to re-use paint residuals could be achieved by making excess paints available for a further use by conserving them properly sealed. Solvent-based paint can be blended into a high calorific fuel for use in cement kilns – this is recovery.

350. Recycling represents the most appropriate hierarchical option for the metal waste; solid dry recyclable waste; and for crushed excavated inert material (such as concrete, or excavated hardstanding) where the Aggregates Quality Protocol can be applied.

351. Recycling represents the most appropriate hierarchical option for the waste timber. However, their condition may dictate that recovery or potentially landfill (for the most deteriorated wood) may be the most appropriate option. These would need to be determined at the point of removal by the contractor.

352. Metal waste should be collected in containers/skips or stored in an allocated area and removed off site for recycling at a metal recycling facility.

353. Solid dry recyclable waste and residual wastes can be sent to local HCI waste WTS. Waste oils, solvents, paints and other ad hoc hazardous wastes can be sent to the hazardous WTS. These facilities will separate the recyclable items using the appropriate physical or chemical techniques that their permit authorises them to carry out.

354. Other recovery represents the highest waste hierarchical option for waste excavated soil and made ground; and waste from piling. Where there is scope for the re-use of excavated material on site, this can be carried out in accordance with the CL:AIRE Code of Practice. For all surplus material, it is likely that the beneficial use of this material as daily cover or restoration material at a local landfill would provide the most appropriate solution.

355. Vegetation removed from the site clearance works, food waste from welfare facilities and timber not deemed suitable for recycling could be sent for recovery at a biological treatment facility e.g. composting or anaerobic digestion, as applicable.

356. Appendix 19.2 Land Quality Phase 1 PRA identifies several potential sources of anthropogenic pollution. Therefore, it is recommended that the contractor arranges for sampling and analysis of made ground and soil material before it is to be removed for a full waste classification assessment to be carried out.