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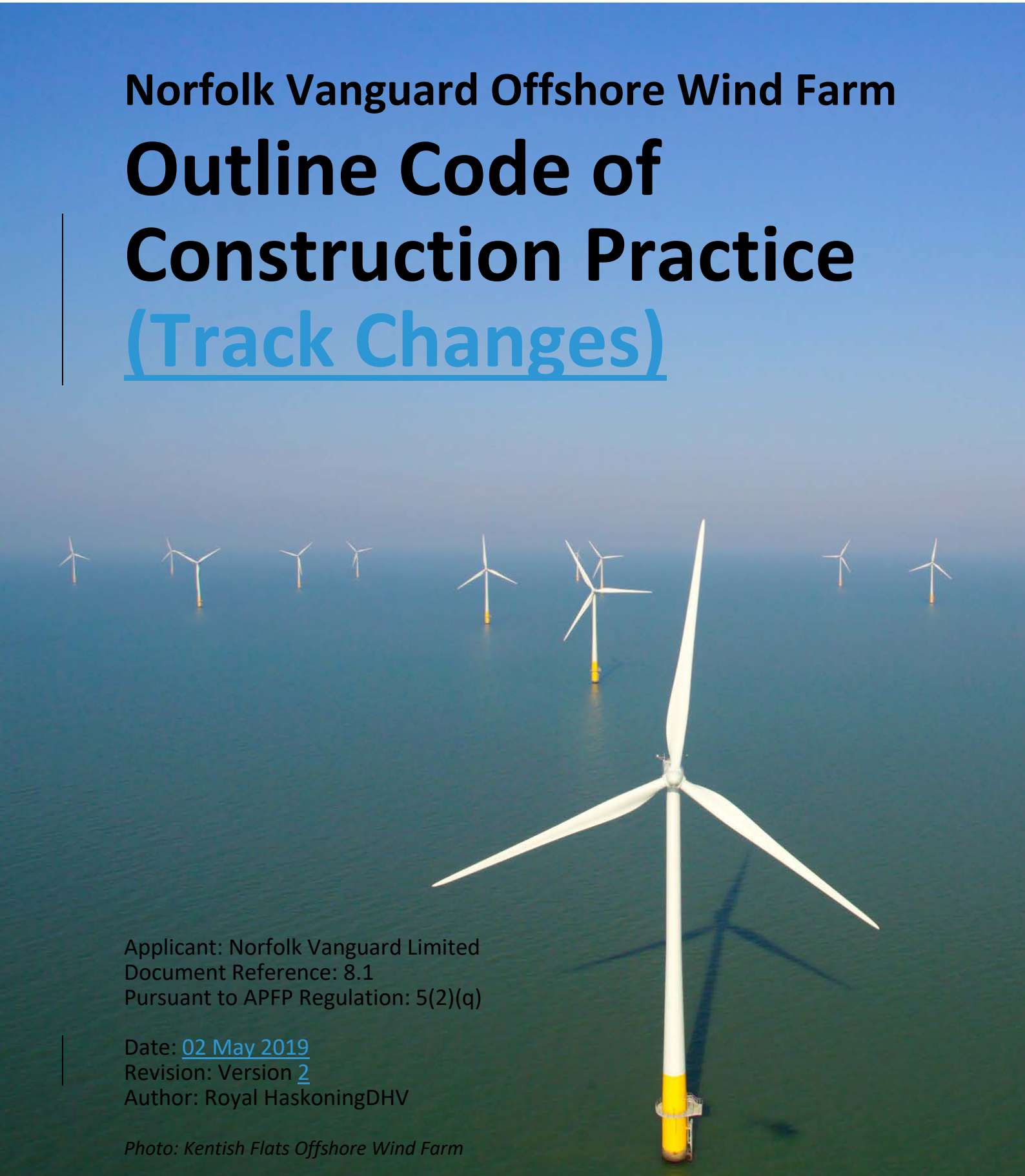
Norfolk Vanguard Offshore Wind Farm

Outline Code of Construction Practice

(Track Changes)



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For and on behalf of Norfolk Vanguard Limited

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Glossary of acronyms

ALO	Agricultural Liaison Officer
AQMP	Air Quality Management Plan
BPM	Best Practicable Means
CCS	Considerate Constructors Scheme
CDM	Construction Design & Management
CIRIA	Construction Industry Research and Information Association
CoCP	Code of Construction Practice
DCO	Development Consent Order
ECoW	Environmental Clerk of Works
EMFP	Environmental Management Framework Plan
EMS	Environmental Management System
ES	Environmental Statement
EWC	European Waste Catalogue
HDD	Horizontal Directional Drilling
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
MA	Mobilisation Area
MLWS	Mean Low Water Springs
MMP	Materials Management Plan
MPA	Mineral Planning Authority
OCoCP	Outline Code of Construction Practice
OLEMS	Outline Landscape and Ecological Management Plan
PPG	Pollution Prevention Guidance
PRoW	Public rights of way
SPZ	Source Protection Zone
SUDS	Sustainable Urban Drainage Schemes
SWMP	Site and Excavated Waste Management Plan
WAC	Waste Acceptance Criteria

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1 INTRODUCTION

1.1 Background

1. Norfolk Vanguard Limited ('the Applicant', an affiliate company of Vattenfall Wind Power Ltd (VWPL)) is seeking a Development Consent Order (DCO) for the Norfolk Vanguard offshore wind farm (herein referred to as 'the project' or 'Norfolk Vanguard').

2. The OWF comprises two distinct areas, Norfolk Vanguard East and Norfolk Vanguard West located in the southern North Sea. The offshore wind farm will be connected to the shore by offshore export cables from the wind farm to a landfall point at Happisburgh South, Norfolk. From there onshore cables will transport power over approximately 60km to the onshore project substation at Necton, Norfolk. A full project description is given in the Environmental Statement (ES), Chapter 5 Project Description.

1.2 Purpose of this document

3. This Outline Code of Construction Practice (OCoCP) forms part of a set of documents that support the DCO application to be submitted by Norfolk Vanguard Limited to the Planning Inspectorate for consent to construct and operate the project.

4. This OCoCP is provided as part of the DCO application in order to demonstrate the linkages between the impact assessments for the onshore components of Norfolk Vanguard (detailed in ES Chapters 19 to 31), onshore development activities, and likely requirements associated with any development consent. An Outline Project Environmental Management Plan (document reference 8.14) is provided with the DCO application to provide information relating to the offshore works.

5. A final detailed CoCP will be produced prior to construction of the project and will be based on the content of this OCoCP and the final design of the project. Both the OCoCP and the CoCP are secured by Requirement 20 of the draft DCO, which states:

    a. No stage of the ~~connection~~ onshore transmission works may commence until for that stage a code of construction practice ~~(which must accord with the outline code of construction practice)~~ has been submitted to and approved by the relevant local planning authority, in consultation with Norfolk County Council and the Environment Agency.

    b. The code of construction practice must accord with the outline code of construction practice and include details, as appropriate to the relevant stage, on—

        (a) r~~R~~elevant health, safety and environmental legislation and compliance;

(b) local community liaison responsibilities;
(c) artificial light emissions;
(d) contaminated land and groundwater;
(e) construction noise and vibration;
(f) soil management;
(g) construction method statements;
(h) site and excavated waste management;
(i) construction surface water and drainage;
(j) materials management ~~plan~~;
(k) screening, fencing and site security;
(l) air quality; ~~and~~
(m) invasive species management; and~~.~~
~~(m)~~(n) proposals for managing public rights of way.

c. The code of construction practice approved in relation to the relevant stage of the connection works must be followed in relation to that stage of the connection works.

~~c.~~d. Pre-commencement screening, fencing and site security works must only take place in accordance with a specific plan for such pre-commencement works which must accord with the relevant details for screening, fencing and site security set out in the outline code of construction practice, and which has been submitted to and approved by the relevant planning authority.

6. The CoCP provides a key mechanism, enforceable via Requirement 20, through which the relevant regulatory authorities can be assured that environmental impacts associated with the construction of the onshore infrastructure will be formally controlled and mitigated.

7. This OCoCP reinforces commitments made in the ES and complements other requirements set out in the DCO. A Schedule of Mitigation (document reference 6.5) is also provided with the DCO application, outlining the approach to mitigation for Norfolk Vanguard. The Schedule of Mitigation (document reference 6.5) also specifies a number of embedded mitigation measures, which have been designed into the project to ensure that their delivery is secured.

1.3 Scope

8. The OCoCP sets out the management measures which Norfolk Vanguard Limited will require its contractors to adopt and implement for any onshore construction works for the project and related off-site activities. Works and locations within the scope of this document include site preparation works, infrastructure construction, and commissioning phases of the project for onshore works (from the landfall at Mean

Low Water Springs (MLWS) to the grid connection at Necton) and are defined to include:

- Landfall;
- Onshore cable route, accesses, trenchless crossing technique (e.g. horizontal directional drilling (HDD)) zones and mobilisation areas;
- Onshore project substation; and
- National Grid substation extension and associated overhead line modifications.

9. The offshore project may be constructed as one or two phases and elements of the onshore construction will also be phased to reflect this:

    i. Cable ducts would be installed in one phase regardless of the offshore strategy;
    ii. Cable pull through would be done in one or two phases depending on the commissioning of the offshore wind turbines;
    iii. The onshore project substation ground preparation and main construction works would be done in one phase; and
    iv. The required electrical infrastructure and plant within the onshore project substation could then be installed as required for each phase of offshore construction.

10. This document is relevant to the construction of the project whichever approach is taken.

11. The term 'construction' in the OCoCP includes all onshore site preparation, material delivery, excavated material disposal, waste removal and all related engineering and construction activities as assessed in the ES.

2 GENERAL PRINCIPLES

2.1 Environmental Management Principles

~~11.~~12. Norfolk Vanguard Limited operates an Environmental Management System (EMS) based on the requirements of IS0 14001:2015, that describes the processes and procedures by which Norfolk Vanguard Limited identifies and manages significant risks associated with its operations. The EMS is a primary mechanism by which environmental policy commitments, such as compliance with relevant legislation and standards, pollution prevention and continual improvement in environmental performance are delivered. Norfolk Vanguard Limited will be compliant with the requirements of the EMS.

~~12.~~13. Through the EMS, contractors undertaking work on behalf of Norfolk Vanguard Limited are screened and selected using a variety of criteria that include environmental credentials.

~~13.~~14. The relevant management plans will set out how the appointed contractor will manage environmental risks associated with construction activities and will set out specific control measures necessary to deliver the requirements of the CoCP and any other mitigation measures that have been committed to by Norfolk Vanguard Limited that relate specifically to the construction phase of the project.

~~14.~~15. A number of environmental plans and strategies for construction management relevant to the project will be prepared and implemented; these are detailed in the sections below. These plans may be captured by Requirement 20 of the DCO as a subsidiary of the COCP and/or certain plans and strategies are individual Requirements in their own right. An outline description of the plans is provided below in Table 2.1.

Table 2.1 Code of Construction Practice – subsidiary and related plans

Description	Section of OCoCP	DCO Requirement
Within the CoCP		
A **Health, Safety and Environmental Legislation and Compliance** Plan	2.2	Requirement 20 (2)(a)
A **Community Liaison Procedure** will be prepared.	2.4	Requirement 20 (2)(b)
An **Artificial Light Emissions Management Plan** will be prepared and implemented. The plan will detail the appropriate mitigation measures to be taken to manage artificial light emissions.	3.7	Requirement 20 (2)(c)
A **Contaminated Land and Groundwater Plan** will be prepared.	6	Requirement 20 (2)(d)

Description	Section of OCoCP	DCO Requirement
A **Construction Noise Management Plan** for construction will be prepared.	9	Requirement 20 (2)(e)
A **Soil Management Plan** will be prepared.	8	Requirement 20 (2)(f)
Construction Method Statements will be prepared.	2.3.1	Requirement 20 (2)(g)
A **Site and Excavated Waste Management Plan** will be prepared and implemented. The plan will manage construction waste across the project in accordance with a waste hierarchy to minimise, reuse and recycle waste materials.	7	Requirement 20 (2)(h)
A Construction **Surface Water and Drainage Plan** will be prepared pre-construction and implemented during construction. The plan will include the approach to surface water and foul water drainage, and water supply during construction. This will include details of existing drainage.	11	Requirement 20 (2)(i)
A **Materials Management Plan** will be prepared to cover the use of material during construction.	6	Requirement 20 (2)(j)
A **Construction Screening, Fencing and Site Security Plan** will be prepared.	3.3	Requirement 20 (2)(k)
An **Air Quality Management Plan** will be prepared and implemented incorporating emission control measures outlined in best practice guidance.	10	Requirement 20 (2)(l)
An **Invasive Species Management Plan** will be prepared to cover the approach to managing invasive species on site and any biosecurity protocols.	5	Requirement 20 (2)(m)
A **Public Rights of Way (PRoW) Strategy** has been prepared.	4 and Document 8.4	Requirement 20 (2)(n)
Separate requirements outwith the CoCP		
An Archaeology **Written Scheme of Investigation** (Onshore) will be prepared.	n/a	Requirement 23
An **Outline Landscape and Ecological Management Strategy** has been prepared and will set out the overarching principles of landscape and ecological management to be adhered to. An Ecological Management Plan and a Landscape Management Scheme (LMS) will be prepared based on the principles contained in the OLEMS.	n/a	Requirement 24 (EMP) and Requirement 18 (LMS)
~~A **Public Rights of Way (PRoW) Strategy** has been prepared.~~	~~Document 8.4~~	
A **Traffic Management Plan** will be prepared. An Outline Traffic Management has been prepared and submitted with the DCO.	n/a	Requirement 21 (1) (a)
A **Travel Plan** will be prepared. An Outline Travel has been prepared and submitted with the DCO.	n/a	Requirement 21 (1) (b)

Description	Section of OCoCP	DCO Requirement
An **Access Management Plan** will be prepared. An Outline Access Management has been prepared and submitted with the DCO.	n/a	Requirement 21 (1) (c)
A **Design and Access Statement** has been prepared.	n/a	Requirement 16 (4)

~~15.~~16. The EMS will, inter alia, provide for the preparation and implementation of a programme of environmental monitoring and auditing to ensure that Norfolk Vanguard Limited environmental standards are being adhered to. A number of positions (relating to clerks of works, officers etc.) are specified by this OCoCP and the other plans within Table 2.1.

~~16.~~17. Prior to the commencement of each phase of construction works, the CoCP for that phase will be sent out to the relevant local authorities for review and approval (Requirement 15 Stage of Authorised development onshore).

2.2 Health and Safety Principles

~~17.~~18. Norfolk Vanguard Limited recognises that its decisions and activities have a direct impact on the health, safety and welfare of those working for Norfolk Vanguard Limited and on their behalf. Norfolk Vanguard Limited will set specific health and safety goals and monitor performance in relation to the construction, operation and maintenance of their renewable energy generating projects. The final CoCP will include a health and safety plan, within which Norfolk Vanguard Limited will:

- Demonstrate commitment to health and safety by their actions and behaviours.
- Ensure that Health and Safety issues are fully considered as an integral part of project management throughout the project life; from design, through construction, operation and maintenance, and future demolition.
- Require all designers to consider and include the control measures necessary to minimise the risks to the health and safety of all those engaged in construction, maintenance (and demolition) of the project or to others who may be affected.
- Ensure that suitably competent Norfolk Vanguard Limited employees and other designers, engineers, supervisors and contractors from other organisations are engaged to undertake the responsibilities associated with the project.
- Ensure that all products, materials and processes used in construction, operation and maintenance present no significant risk to the health and safety of persons carrying out those duties or to others who may be affected by that activity.
- Ensure that suitable and sufficient resources, (including labour, materials, time and finances), are made available to effectively manage the health and safety requirements.

- Require that all those parties involved in the construction or operation and maintenance or demolition of their renewable energy generating projects (Client, Designer, CDM[1] Coordinator, Principal Contractor and all other Contractors), fulfil their roles and responsibilities both legal and organisational to health, safety and welfare.
- Require that parties involved in their renewable energy generating projects have, where appropriate, a readily available, valid, suitable and sufficient Pre- Construction Information document and Health and Safety Plan as defined in the Construction (Design and Management) Regulations 2015.
- Ensure that upon completion of construction activity a suitable and sufficient Health and Safety File is completed and transferred, where appropriate, to the ultimate owner.

2.3 Construction Principles

~~18.~~19. The appointed Norfolk Vanguard Limited Construction Manager and associated management team will be responsible for implementation of the CoCP provisions, and for ensuring that the various construction contractors are in compliance with these requirements. The practical implementation arrangements and responsibilities conferred to the construction contractors will be detailed in further management protocols to be developed, such as the associated plans as identified in section 2.1.

~~19.~~20. The provisions of the OCoCP / CoCP will be incorporated into the contracts for the construction of the project and will be required to be adhered to as a requirement of the DCO. Norfolk Vanguard Limited and its implementing contractors will be required to comply fully with the terms of the CoCP.

~~20.~~21. Aims of the OCoCP/CoCP include mitigation of nuisance to the public and to safeguard the environment during construction. Construction activities will be monitored and policed by an Environmental Clerk of Works (ECoW) supported by other specialists as necessary (such as ecological, archaeological, auditing specialists). In addition, a pre-construction land survey would be undertaken by a qualified Agricultural Liaison Officer (ALO) to record details of crop regimes, position and condition of field boundaries, existing drainage and access arrangements, and private water supplies.

[1] Co-ordinator required on projects falling within certain parameters as defined in the Construction (Design and Management) Regulations 2015

~~21.~~22. In addition to the arrangements under this OCoCP, the appointed contractors will be encouraged to register with the Considerate Constructors Scheme (CCS) which is a voluntary code of practice that seeks to:

- Enhancing the appearance of the site;
- Securing everyone's safety;
- Respecting the community;
- Caring for the workforce; and
- Protecting the environment.

~~22.~~23. The scheme requires constructors to adhere to the Scheme's Code of Considerate Practice.

2.3.1 Construction Method Statements

~~23.~~24. Detailed Construction Method Statements will be developed by the Principal Contractor for relevant construction operations. Relevant Construction Method Statements will be included as part of the final CoCP for each stage of the works.

~~24.~~25. Each Construction Method Statement will follow construction industry good practice guidance and adhere to the following measures:

- PPG01 – General guide to the prevention of water pollution
- PPG05 – Works near or liable to affect watercourses
- PPG06 – Working at construction and demolition sites
- PPG08 – Storage and disposal of used oils
- PPG11 – Preventing pollution at industrial sites
- PPG20 – Dewatering of underground ducts and chambers
- PPG 21 – Pollution incident response planning
- The Sustainable Drainage System (SuDS) Manual, C697, CIRIA (2007) Site Handbook for the Construction of SuDS, C698, CIRIA (2007)
- CIRIA Report C502 Environmental Good Practice on Site
- CIRIA Report C532 Control of Water Pollution from Construction Sites
- CIRIA Report C648 Control of Pollution from Linear Construction Project Technical Guidance
- CIRIA Handbook C692 Environmental Good Practice on Site
- CIRIA Handbook C651 Environmental Good Practice on Site Checklist.

2.4 Local Community Liaison

~~25.~~26. Norfolk Vanguard Limited will ensure effective and open communication with local residents and businesses that may be affected by noise or other amenity aspects caused by the construction works. Communications will be co-ordinated on site by a

designated member of the construction management team. A proactive public relations campaign will be maintained, keeping local residents informed of the type and timing of works involved, paying particular attention to potential evening and night time works and activities which may occur in close proximity to receptors. A combination of communication mechanisms such as posters and parish meetings will be employed to keep local residents informed.

~~26.~~27. A designated Norfolk Vanguard Limited local community liaison officer will respond to any public concerns, queries or complaints in a professional and diligent manner as set out by a project community and public relations procedure which will be submitted for comment to the Local Authorities.

~~27.~~28. Parish Councils in the relevant area will be contacted (in writing) in advance of the proposed works and ahead of key milestones. This information will include indicative details for timetable of works, a schedule of working hours, the extent of the works, and a contact name, address and telephone number in case of complaint or query. Enquiries will be dealt with in an expedient and courteous manner. Any complaints will be logged, investigated and, where appropriate, rectifying action will be taken.

29. The above will be captured in a communications plan as part of the final CoCP.

30. In the event that Norfolk Vanguard and Hornsea Project Three have concurrent construction works in the vicinity of Oulton and Cawston parishes, the Norfolk Vanguard communication plan will set out the following:

- Procedures for engaging with Hornsea Project Three;
- Procedures for Norfolk Vanguard and Hornsea Project Three to engage with the Local Highway Authority; and
- Measures that Norfolk Vanguard and Hornsea Project Three will initiate if any complaints are made by the local community which provide how these are communicated between the two developers.

2.5 Embedded Mitigation Measures

~~28.~~31. Norfolk Vanguard Limited has made a decision on a number of techniques and engineering designs/modifications inherent as part of the project, during the pre-application phase, in order to avoid a number of impacts or reduce impacts as far as possible. Embedding mitigation into the project design is a type of primary mitigation and is an inherent aspect of the EIA process.

~~29.~~32. The following embedded mitigation measures are project commitments and are stated here to ensure that they are captured and that their delivery is secured.

2.5.1 Duct installation

~~30.~~33. The onshore cable duct installation strategy is proposed to be conducted in a sectionalised approach in order to minimise impacts. Construction teams would work on a short length (approximately 150m section) and once the cable ducts have been installed, the section would be back filled and the top soil replaced before moving onto the next section. This would minimise the amount of land being worked on at any one time and would also minimise the duration of works on any given section of the route.

2.5.2 Long HDD at Landfall

~~31.~~34. Use of long HDD at landfall to avoid restrictions or closures to Happisburgh beach and retain open access to the beach during construction. Norfolk Vanguard Limited has also agreed to not use the beach car park at Happisburgh South.

2.5.3 Trenchless Crossings

~~32.~~35. Commitment to trenchless crossing techniques at the following locations:

- Wendling Carr County Wildlife Site;
- Little Wood County Wildlife Site;
- Land South of Dillington Carr County Wildlife Site;
- Kerdiston proposed County Wildlife Site;
- Marriott's Way County Wildlife Site / Public Right of Way (PRoW);
- Paston Way and Knapton Cutting County Wildlife Site;
- Norfolk Coast Path;
- Witton Hall Plantation along Old Hall Road;
- King's Beck;
- River Wensum;
- River Bure;
- Wendling Beck;
- Wendling Carr;
- North Walsham and Dilham Canal;
- Network Rail line at North Walsham that runs from Norwich to Cromer;
- Mid-Norfolk Railway line at Dereham that runs from Wymondham to North Elmham;
- Trunk Roads including A47, A140, A149; and
- Crossing with Hornsea Project Three (if required).

2.5.4 Hedgerow and Watercourse Crossings

~~33.~~36. The working width at hedgerow and watercourse crossings is 20m, following the selection of a HVDC electrical solution.

~~34.~~37. Where hedgerow gaps are required beyond the two-year duct installation phase (i.e. for the duration of the subsequent two-year cable pull phase), the number of gaps required will be minimised as far as possible and will be no wider than 6m.

2.5.5 Cable pulling phase

~~35.~~38. During the cable pulling phase, short sections of the running track are required to be retained or reinstated for access to the works. In total this will comprise approximately 20% of the running track that was required for cable duct installation~~a reduced 12km by 6m strip along the onshore cable route~~. At each location where the running track is retained or reinstated this would only be required ~~is anticipated to be lost~~ for up to approximately 16 weeks during the cable pull ~~for the running track~~; thus minimising the number of hedgerow gaps required for the duration of construction down to approximately 20%.

3 GENERAL SITE OPERATIONS

3.1 Working Hours and Timing of Works

39. Onshore working hours (and exceptions to these) are specified in Requirement 26 of the DCO. Onshore construction activities would normally be conducted during working hours of 7am to 7pm Monday to Friday and 7am to 1pm Saturdays.

40. Evening or Saturday pm / Sunday working may be required to maintain programme progress and for specific time critical activities such as transformer oil filling and processing, concrete pouring or trenchless drilling; however, these would be kept to a minimum and would be subject advance notification and approval by the relevant local planning authority.

41. Up to one hour before and after the consented working hours, start-up and shut-down activities may be undertaken. During these periods, the contractor may undertake the following activities:

- Arrival and departure of the workforce at the site and movement to and from areas across the project;
- Site inspections and safety checks;
- Site meetings (briefings and quiet inspections/walkovers);
- Site clean-up (site housekeeping that does not require the use of plant); and
- Low-key maintenance including site maintenance, safety checking of plant and machinery (provided this does not require or cause hammering or banging).

42. Start-up and shut-down does not include heavy good vehicle (HGV) movements into and out of mobilisation areas, i.e. HGV deliveries to mobilisation areas would only occur during the consented working hours unless otherwise agreed, alth~~n~~ough suppliers can make use of the wider highway network outside of these hours to travel.

~~36.~~43. Perimeter and site lighting would be required during working hours and a lower level of lighting would remain overnight for security purposes.

~~37.~~44. Works at the landfall would require 12 hour (7am to 7pm), 7 day shifts. 24 hour operation can be employed for drilling activities subject to advance notification.

~~38.~~45. Where works are undertaken outwith consented hours in response to emergency situations, the local authorities will be advised as soon as practical, outlining the circumstances for the works, the likely duration and the mitigation measures implemented.

~~39.~~46. Norfolk Vanguard Limited will use best endeavours to minimise the duration of, and sensitively time, construction activities. The relevant local planning authorities will be advised of the likely timetable of works. This timetable will also be shared with affected communities through the local community liaison officer.

3.2 Construction Site Layout and Housekeeping

~~40.~~47. The final CoCP will include a site layout showing the location of mobilisation areas, trenchless crossing technique (e.g. HDD) compounds, onshore project substation temporary works area and National Grid substation extension temporary works area and main features of these sites. Ahead of construction, further site investigations will be required for the project. Prior to any intrusive investigation or construction work, all existing service plans would be consulted and a comprehensive service line location survey carried out in order to ensure that existing services are not disrupted. This would include radio detection, ground penetration radar and vacuum excavation where necessary.

~~41.~~48. A good housekeeping policy will be applied across all construction areas throughout the construction period. This will include the following requirements:

- All working areas will be kept in a clean and tidy condition.
- All site compound areas will be non-smoking. Specific areas within the worksites will be designated as smoking areas and will be equipped with containers for smoking waste. These will not be located at the boundary of working areas or adjacent to areas deemed sensitive to local residents, workers or visitors.
- Open fires and burning of rubbish are prohibited at all times.
- Music shall not be played through speakers on any worksite.
- Site waste susceptible to spreading by wind or liable to cause litter will be stored in enclosed suitable containers and waste will be removed at frequent intervals and the site kept clean and tidy.
- Static plant will have suitable drip tray protection.
- Hoardings and boundary fences will be frequently inspected, repaired and repainted as necessary.
- Adequate welfare facilities will be provided for all site staff and visitors.

~~42.~~49. In addition, where working areas are within Flood Zone 2 or 3 (relevant to the onshore cable route only) additional measures will be taken to minimise pollution risk during periods of extreme weather (i.e. flooding) by including:

- Staff toolbox talks on pollution prevention and spill procedures.
- The Contractor will be required to sign up to the Environment Agency 'Floodline' flood warning service.

- Stores of fuels, oils and chemicals will be surrounded by an impervious bund wall. The volume of the bunded compound will be at least equivalent to the capacity of the tank or tanks plus 10%. This should constitute general site practice for the prevention of spills. In addition, the bunded installation will be installed in the remotest location possible from rising water and the walls of sufficient height and structural soundness to withstand flood water ingress.
- Debris will be safely contained, reducing the risk of large items entering the flood flow.
- Machinery will be stored or returned to areas of hard standings, preferably remote from flood waters, or where this is not possible, sufficiently constrained so as not to wash away.

~~43.~~50. Where working areas are adjacent to watercourses or cross Flood Zone 2 or 3 (relevant to cable route only), the following measures will be implemented:

- Spoil will not be stored in the functional floodplain (Flood Zone 3b).~~storage will be laid out with gaps at regular intervals to minimise impact on flood waters~~
- There shall be no storage of spoil directly on watercourse banks. Where possible, spoil will be set back from watercourses by 5m. This will prevent excessive loading on the watercourse banks and minimise the risk of stored material entering the watercourses.

3.3 Screening and Fencing

~~44.~~51. Site fencing requirements are controlled under Requirement 20 (2)(k) of the DCO, which requires details of permanent and temporary fencing, walls and other means of enclosure to be submitted to the relevant planning authorities for approval before the relevant stage of connection works can commence. A Construction Fencing Plan will be included within each CoCP based on the following:

~~45.~~52. The landfall HDD temporary construction compound will be securely fenced and access from the local road network, suitable for haulage equipment, will be installed along the onshore cable route to the drilling site.

~~46.~~53. During construction of the onshore cable route, fencing will be installed to demarcate the working area. Stock fencing will be used where necessary; post and wire or similar will be used otherwise.

~~47.~~54. Once each work area is completed, it may be possible to bring the fences in to the sides of the running track so that the land occupied by the trenches and soil storage areas can be returned to normal use.

~~48.~~55. The onshore project substation will be enclosed by a temporary perimeter fence for the duration of the construction period with a permanent fence installed as part of the construction works.

3.3.1 Woodland/Hedgerow Protection

~~49.~~56. Full details showing the position of fencing to protect all woodland areas, trees and hedgerows shown to be retained within the development will be submitted to the local authorities for approval prior to construction. The protective fencing will comply with BS 5837, and will be erected to demarcate the canopy spread of the trees and hedgerows. Further detail on fencing in relation to hedgerows and woodland will be contained within the Outline Landscape and Ecological Management Strategy (OLEMS) (document reference 8.7), secured under Requirement 18.

3.4 Site Induction

~~50.~~57. The construction of Norfolk Vanguard will require all personnel working on site to have a site induction that includes an environmental protection and good practice component. Prior to commencing work on site, personnel must attend the site induction. Site inductions will include reference to compliance with relevant planning / licence conditions, client environmental requirements (including the CoCP), environmental management structure and contacts, site specific environmental sensitivities, waste management arrangements, water and wastewater management, hazardous material management, fuel, oil and chemical management; spill contingency and environmental emergency response, reporting of incidents and complaints. More specific information will be provided to staff according to their role.

3.5 Site Security

~~51.~~58. Adequate security will be provided by contractors working on behalf of Norfolk Vanguard Limited to protect the public and staff, prevent theft from or damage to the works, and prevent unauthorised entry to or exit from the site. Site gates will be closed and locked when there is no site activity and appropriate security measures shall be implemented. Further details on site security measures will be provided in the final CoCP.

3.6 Welfare

~~52.~~59. The construction areas will be serviced by temporary construction offices and necessary welfare facilities, including mess rooms, locker rooms, showers and toilet facilities, plus facilities for mobile construction teams. These will be in compliance

with relevant legislation and codes of practice and will be sited at the mobilisation areas.

3.7 Artificial Light Emissions

~~53.~~60. An Artificial Light Emissions Management Plan will be prepared in accordance with Requirement 20(2)(c) of the DCO.

~~54.~~61. The plan will detail the mitigation measures to be taken to manage emissions from artificial light in accordance with good practice, such as the use of directional beams, non-reflective surfaces and barriers and screens, to avoid light nuisance whilst maintaining safety and security obligations.

~~55.~~62. Details of the location, height, design and luminance of all floodlighting to be used during the construction of the project, together with measures to limit obtrusive glare to nearby residential properties, will be set out in the Artificial Light Emissions Management Plan which will be submitted to the local authorities for approval prior to construction commencing. The approved scheme will be maintained throughout the construction of the relevant works.

~~56.~~63. Site lighting will be positioned and directed to minimise nuisance to footpath users, residents, to minimise distractions to passing drivers on adjoining public highways and to minimise skyglow, so far as reasonably practicable. Lighting spillage will also avoid or minimise impacts on ecological resources, including nocturnal species.

~~57.~~64. So far as is practicable, all power to temporary lighting will be taken from mains supplies rather than from portable generators. Where portable generators are used, industry best practice will be followed to minimise noise and pollution from such generators.

3.8 Reinstatement

~~58.~~65. Once all the trenching for ~~the~~ each approximate 150m workfront section ~~onshore cable route~~ is completed and back-filled, the stored topsoil will be re-distributed over the area of the relevant work section, with the exception of the running track and any associated drainage.

~~59.~~66. Long-term storage of topsoil in bunds or heaps will be avoided where possible. However, some topsoil will have to be reserved for re-covering the final area when the running track is removed at the end of the duct installation phase.

~~60.~~67. Specific replanting measures are also described within the OLEMS (document reference 8.7).

~~61.~~68. In addition to the above mitigation measures, where possible during detailed project design, the project will seek to avoid mature trees within hedgerows through the micro-siting of individual cables, in order to retain as many mature trees as possible.

4 PUBLIC RIGHTS OF WAY

~~62.~~69. A number of public rights of way (PRoWs) which will be impacted during the construction phase of the project have been identified in Chapter 30 Tourism and Recreation of the ES.

~~63.~~70. The onshore elements of the project interact with PRoWs at 45 locations. PRoWs identified include Weavers Way and Paston Way long distance trails, Marriott's Way, Wensum Way, three public bridleways, three restricted bridleways, Regional Cycle Route 30, Regional Cycle Route 33, and National Cycle Routes 1 and 13. These PRoWs are located within the onshore cable route and landfall.

4.1 Control measures

~~64.~~71. During construction, disruption to any PRoW will be managed to ensure continued safe access along the PRoW. The exact method will be agreed in advance with the Local Planning Authority and detailed within the final CoCP. Methods available include:

- Appropriately fenced (unmanned) crossing points;
- Manned crossing points; and
- Temporary alternative routes (assumed be approximately 1 week).

~~65.~~72. There will be no permanent closures of these routes.

~~66.~~73. Soft management techniques will be employed where cycle routes intersect the onshore cable route. These methods will include (but not be limited to) the use of pilot vehicles and stop and go signs.

~~67.~~74. Safety measures will be implemented where running tracks for site access cross a PRoW, including raising awareness of the PRoW to running track users and informing PRoW users of the hazards associated with the running track. Where a PRoW is used as part of a running track, an alternative route for the PRoW will be provided.

~~68.~~75. Following the cessation of construction works, all footpaths and other PRoWs will be reinstated to their original or an improved condition.

~~69.~~76. Precise details for management of PRoWs to remain available during works will be agreed with the relevant Local Planning Authority prior to commencement of the relevant stage of works.

~~70.~~77. For all temporary alternative routes required, the following measures will be followed:

- A pre- and post-construction survey (including identification of surface condition and street furniture) of the PRoW affected will be undertaken. PRoW surveys will be undertaken by an experienced surveyor with scope of coverage and methodology to be agreed with the relevant Local Planning Authority. A qualified ALO will be employed to ensure that information on existing land conditions is obtained, recorded and verified during the rights of way surveys.
- Where impacted by the works, the surveyed PRoW will be restored to its original condition or otherwise as agreed with the relevant Local Planning Authority. The ALO will act as the point of contact for the restoration of the PRoW.
- Norfolk Vanguard Limited will advertise all alternative routes following the Local Planning Authority's standards for advertising temporary closures of PRoW. This will include:
    - Provision of a map showing the extent of the temporary closure and an alternative route;
    - Confirmation that the alternative route is to another PRoW or roads or on land in Norfolk Vanguard Limited control;
    - Confirmation that the alternative route across land in Norfolk Vanguard Limited's control is safe and fit for public use.
- County, District and Parish Councils would be notified in advance (4 – 6 weeks) of temporary closure.
- A notice describing the temporary closure would be published in the press (e.g. Eastern Daily Press) two weeks in advance of closure.
- Advanced site notices (i.e. notices to members of the public warning of diversions ahead) would be posted at appropriate places to minimise likelihood of trespass at obstruction and unnecessary aborted journeys:
    - These site notices would be erected in visible locations on site 1 – 2 weeks in advance of temporary closure;
    - The above notices would describe the duration of temporary closure and the alternative route proposed.
- Any extensions to closure of a PRoW would be discussed with the relevant Local Planning Authority.

5 INVASIVE SPECIES

~~71.~~78. Prior to construction, an Invasive Species Management Plan will be developed. This plan will be agreed with the Environment Agency and Natural England in advance of construction and will include the following:

- A plan of all invasive species locations and extents;
- A protocol for removing the Japanese knotweed stand east of the River Bure and for managing the waste generated;
- Good site practice measures for managing the spread of invasive species, which will include the following measures:
    - Wheel-washing required before plant leaves each 150m workfront;
    - All plant to be disinfected prior to use;
- Good site practice measures for managing the spread of invasive species during works at watercourses, which will include the following measures:
    - All water-based plant to be subject to the Environment Agency's clean / check / dry procedure when leaving site.
    - All equipment in place during trenched water crossings must be checked for the presence of signal crayfish individuals and disinfected prior to reuse using suitable disinfectant (e.g. Vircon).
- A requirement for an ECoW and details of their responsibilities with respect to non-native invasive species, including:
    - Procedure required should invasive species be found during construction, including demarcation of the area, installation of appropriate signage and procedure for updating and communicating the Invasive Species Management Plan;
    - Toolbox talk for contractors prior to construction on the known locations of and the identification of non-native invasive species, including information about other common invasive species and about the measures outlined above.

6 CONTAMINATED LAND AND GROUNDWATER (INCLUDING MATERIALS MANAGEMENT)

~~72.~~79. Chapter 19 Ground Conditions and Contamination of the ES identifies receptors of perturbations to ground conditions (including groundwater) and mitigation measures proposed to reduce impacts. The control measures set out below are to be applied in order to ensure that any potential effects upon these receptors are adequately mitigated.

6.1 Control Measures

~~73.~~80. Good environmental practice shall be followed during the construction phase of the project, in accordance with the Environment Agency's Pollution Prevention Guidance (PPG1, PPG5, PPG6, PPG21 and PPG22)[2].

~~74.~~81. A written scheme dealing with contamination of any land and groundwater will be submitted and approved by the relevant Local Planning Authority before any stage of the project commences (this is secured by Requirement 20(2)(d) in the draft DCO). The scheme will be based upon the model procedures for the management of land contamination (CLR11). The written scheme will also include protocols for dealing with unexpected contamination to ensure that procedures are known and agreed should contaminated materials be encountered.

~~75.~~82. Construction workers will be made aware of the possibility of encountering contaminated soils in made ground through toolbox talks. Safe working procedures will be implemented, good standards of personal hygiene will be observed and appropriate levels of PPE and respiratory protective equipment (RPE) will be provided and utilised as necessary, thereby minimising the risk of exposure to potentially contaminated soils, ground gas and groundwater.

~~76.~~83. Where trenchless crossings or piling are proposed within any SPZ1 or SPZ2 areas, a more detailed hydrogeological risk assessment meeting the requirements of Groundwater Protection Principles and Practice (GP3) (Environment Agency, 2017), and in agreement with the Environment Agency and Anglian Water, would be undertaken.

~~77.~~84. Ground investigations and a hydrogeological risk assessment will be undertaken at each trenchless crossing compound. Trenchless crossing techniques in these

[2] It should be noted that the Pollution Prevention Guidelines are no longer the current documents used by the Environment Agency, although the mitigation presented in the guidelines is still appropriate for managing pollution prevention on construction sites.

locations will ensure that a sufficient thickness of glacial material is present to prevent migration of contaminants into the protected Principal aquifer beneath.

~~78.~~85. A Materials Management Plan (MMP) will be developed post-consent and include information regarding the coordination of planning, sourcing, purchasing, moving, storing and controlling materials in a sustainable manner, for example reusing materials on site where possible. The contractor will have to comply with the MMP during construction.

7 WASTE MANAGEMENT

~~79.~~86. The project waste assessment (ES Appendix 19.2) 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.

7.1 Control Measures

~~80.~~87. A Site and Excavated Waste Management Plan (SWMP) 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, in order 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.

~~81.~~88. The SWMP will provide information on each waste type that is expected to be produced by 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).

~~82.~~89. There are certain principles of waste management that can be applied to the majority of wastes that would be created during the construction phase. These are:

- Adhere to waste legislation for storage and handling on-site; and also 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 considered 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 and cardboard, plastic, glass, wood and metal at welfare facilities within contractor compounds. 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.

~~83.~~90. 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.

8 SOIL MANAGEMENT

~~84.~~91. Chapter 21 Land Use and Agriculture of the ES identifies the soil resource potentially affected by the project. There is the potential for soil compaction and erosion as well as changes to soil drainage during the construction process. Measures will be implemented on site to minimise any effects.

8.1 Control Measures

~~85.~~92. A Soil Management Plan (SMP) would be produced by a competent soil science contractor and agreed with the relevant regulator, in advance of the works. This would be completed pre-construction once an earthworks contractor has been appointed and detailed earthworks phasing information is available. The contractor would be required to comply with the SMP. The SMP will include, but not be limited to, the following measures:

- The separate storage of topsoil and excavated materials, to prevent mixing of subsoil and topsoil, thus improving reinstatement;
- Topsoil will be reinstated where it originated;
- Minimising excavation volumes and disturbance to the surrounding areas, together with the replacement of any soils inadvertently disturbed during excavations in general accordance with their original structure and location;
- Protocols for works in wet weather; ~~and~~
- The setting of vehicular speeds along the construction access routes to minimise soil compaction~~.~~; and
- Reinstatement of soils damaged or compacted during the works following Defra's *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites* (2009). Specifically, measures set out in the *Code for the relief of soil compaction*.

~~86.~~93. Appendix A contains further details of the scope of the SMP.

~~87.~~94. A pre-construction land survey would be undertaken by a qualified Agricultural Liaison Officer (ALO) (refer to Appendix B for further details of the role of the ALO) to record details of crop regimes, position and condition of field boundaries, existing drainage and access arrangements, and private water supplies.

~~88.~~95. Land drainage systems would be maintained during construction, where possible, and reinstated on completion. Consultation with landowners and occupiers would be undertaken to establish existing drainage arrangements, location of drains and any other relevant information. Following construction, field drainage systems and ditches would be fully reinstated where possible in consultation with landowners / occupiers. Refer to Appendix C for further details.

~~89.~~96. Reinstatement as far as practicable of fences, and re-planting sections of hedgerows, hedgebanks, would be undertaken. Reinstatement of ditches and culverts that were removed or disturbed during construction would also be undertaken.

~~90.~~97. Temporary means of access will be provided to severed fields for vehicles and machinery in order to ensure access is maintained wherever practicable.

~~91.~~98. Wherever practicable, appropriate planning and timing of works will be agreed with landowners and occupiers, subject to individual agreements, to reduce conflicts.

9 NOISE AND VIBRATION

~~92.~~99. There is the potential for noise and vibration to be generated during the construction process, especially from heavy plant and machinery. Measures will be implemented on site to minimise any effects and a programme of monitoring may be required.

9.1 Control Measures

~~93.~~100. A Construction Noise (and vibration) Management Plan (CNMP) will be included in the final CoCP, as required under Requirement 20 (2)(e) of the DCO.

101. The ~~Construction Noise Management Plan~~CNMP will apply throughout that stage of construction and will detail standard mitigation (best practical means) and where applicable, enhanced mitigation measures.

9.1.1 Best Practical Means

~~94.~~102. 'Best Practicable Means' (BPM) that the contractor will adopt to minimise noise during construction~~. Measures~~ include:

- Where possible, locating temporary plant so that it is screened from receptors by on-site structures, such as site cabins;
- Using modern, quiet equipment and ensuring such equipment is properly maintained and operated by trained staff;
- Applying enclosures to particularly noisy equipment / plant where possible;
- Ensuring that mobile plant is well maintained such that loose body fittings or exhausts do not rattle or vibrate;
- Avoiding unnecessary revving of engines;
- Avoiding reversing wherever possible;
- Reporting any defective equipment/plant as soon as possible so that corrective maintenance can be undertaken;
- Ensuring plant machinery is turned off when not in use;
- Any plant found to be requiring interim maintenance to be taken out of use;
- Providing local residents with 24-hour contact details for a site representative in the event that disturbance due to noise from the construction works is perceived; and
- Establishing a community engagement process including informing local residents about the construction works, detailing the timing and duration of any particularly noisy elements, and providing a contact telephone number to them;
  Keeping noisy deliveries to the middle of the day where possible.

9.1.2 Enhanced Mitigation

103. In order to ensure that any identified residual impacts that remain following the application of standard mitigation are reduced to non-significant additional site specific solutions such as increased separation distance of noisy plant and the use of temporary noise barriers will be applied.

Construction plant mitigation

104. Careful scrutiny of plant selection at procurement stage will ensure that the potential noise impact of the modelled plant is reduced as much as reasonably possible.

Localised screening/temporary noise barriers

105. Noise barriers may be installed within the Order limits to further reduce noise emissions in proximity to noise sensitive receptors, such as residential properties. The exact specification of any noise barriers that may be required to mitigate significant residual construction noise will be determined during detailed design. Noise barriers will be introduced with the appropriate specification for the location and noise reduction required.

106. As an example of the relative effectiveness of applying a temporary localised noise barrier BS 5228 states:

"as a working approximation, if there is a barrier or other topographic feature between the source and the receiving position, assume an approximate attenuation of 5 dB when the top of the plant is just visible to the receiver over the noise barrier, and of 10 dB when the noise screen completely hides the sources from the receiver. High topographical features and specifically designed and positioned noise barriers could provide greater attenuation."

10 AIR QUALITY

~~95.~~107. Chapter 26 Air Quality of the ES identifies receptors that are potentially sensitive to air and dust emissions. The control measures set out below are to be applied in order to ensure that any potential effects upon these receptors are adequately mitigated.

10.1 Control Measures

~~96.~~108. A number of mitigation measures in relation to the emission of dust and other emissions during construction works have been identified.

~~97.~~109. The name and contact details of person(s) accountable for air quality and dust issues shall be clearly displayed at suitable positions along the site boundary. This would generally be the environment manager/engineer or the site manager. In addition, it is recommended that contact information for the contractor's head or regional office is also clearly displayed.

10.1.1 Dust management

~~98.~~110. Throughout the construction works, the following dust management measures shall be implemented to maintain suspended particulates to suitable levels.

- A complaints log shall be made available to the local authority, if requested.
- Any exceptional incident that causes dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation shall be recorded in the log book.
- In-combination effects with other ongoing developments within 500m of the site boundary shall be managed through liaison with other sites to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. Measures may include consideration of the local road network and delivery routes.
- Daily onsite and offsite inspections shall be conducted where there are nearby receptors. Collected data is to be recorded in a log book which shall be made available to the local authority to audit on request. This log book shall also include recordings of regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary (subject to landowners' approval).
- Should a certain construction activity be considered to have a high potential to produce dust, or during prolonged periods of dry or windy conditions, the frequency of site inspections by the person accountable for air quality and dust issues on site shall increase.
- Any stockpiles of excavated material shall be covered, seeded or fenced to prevent wind whipping.

- Wherever practicable, battery powered equipment shall be used over petrol or diesel powered options. The use of petrol or diesel powered generators should be avoided where possible.
- A Traffic Management Plan (TMP), secured under Requirement 21 of the draft DCO, shall be produced in accordance with the Outline TMP (Document 8.8) to manage the sustainable delivery of goods and materials to and from site. An accompanying Travel Plan, secured under Requirement 21 of the draft DCO, shall also be developed in accordance with the Outline Travel Plan (Document 8.9) that supports and encourages sustainable travel for contractor operatives and staff (public transport, cycling, walking and car-sharing).
- An adequate water supply must be provided onsite for effective dust suppression measures. Water should be non-potable water wherever possible.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
- Ensure sand, other aggregates, bulk cement and other fine powder material are stored in a controlled and well-managed manner.
- For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust release.

10.2 Measures specific to earthworks

~~99.~~111. Measures specific to earthworks include:

- Avoid dry sweeping of large areas.
- Inspect running track for integrity and instigate necessary repairs to the surface as soon as reasonably practicable and regularly dampen down with fixed or mobile sprinkler systems, or mobile water bowsers, where necessary.
- Record all inspections of the running track and any subsequent action in a site log book.
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. Locate site access gates at least 10m from receptors where practicable.

11 PROTECTION OF SURFACE AND GROUNDWATER RESOURCES

~~100.~~112. Chapter 20 Water Resources and Flood Risk of the ES includes applicable mitigation measures for the construction and operational phases of the project. The measures have been provided to reduce the impact of the project on the surface and groundwater resources. In particular, the control measures are designed to manage flood risk. Control measures identified are set out below.

11.1 Control Measures

11.1.1 Sediment Management - all onshore areas

~~101.~~113. To minimise potential impacts from the construction phase on land, surface water or groundwater receptors, Norfolk Vanguard Limited has committed to the following measures:

- The area of open ground at any one time within one sub-catchment will be restricted, across a notional 5 km length, to 2 working areas (configured as 45m x 300m strips); with the assumptions that 50% of one mobilisation area, 50% of one set of trenchless crossing compounds and 25% of 5km running track will be open ground. This represents a maximum area of disturbed open ground of 0.068 km^2 per 5km of cable at any one time.
- Topsoil would be stripped from the entire width of the onshore cable route for the length of each approximately 150m workfront and stored and capped to minimise wind and water erosion within the onshore cable route.
- Once all the trenching is completed and back-filled within each workfront, the stored topsoil will be re-distributed over the area of the workfront, with the exception of the running track and any associated drainage.
- Mobilisation areas within the onshore project area will comprise hardstanding of permeable gravel aggregate underlain by geotextile, or other suitable material.
- Subsoil exposure will be minimised and strips of undisturbed vegetation will be retained on the edge of the working area where possible.
- Where surface vegetation has been removed (with the exception of arable crops), this will be reseeded to prevent future runoff.
- On-site retention of sediment will be maximised by routing all drainage through the site drainage systems.
- The drainage system will include silt fences at the foot of soil storage areas to intercept sediment runoff at source. Where practicable, runoff will be routed into swales, which incorporate check dams to further intercept sediment and/or attenuation ponds which incorporate sediment forebays. Suitable filters will be used to remove sediment from any water discharged into the surface drainage network.

- Additional silt fences will be included in parts of the working area that are in proximity to surface drainage channels.
- Soil and sediment will not be allowed to accumulate on roads. Traffic movement would be restricted to minimise the potential for surface disturbance.

11.1.2 Sediment management – works within the functional floodplain and with particular reference to the Wensum catchment

114. In addition to the measures set out in section 11.1.3 additional measures will be introduced for works within a functional floodplain. The extent of functional floodplain is shown on Figure 20.5 of ES Cha~~ah~~pter 20 Water Resources and Flood Risk:

- The preferred way of working within the functional floodplain will be to place geotextile on top of the existing pasture grassland. Whilst it is accepted that grass covered by geotextile will die back, it will not expose bare soils beneath and the grass will recover more quickly than reseeding or natural regeneration in the case of topsoil stripping.
- Where a topsoil strip is required, for existing grassland located within the functional floodplain, this will be undertaken using a turf cutter. Turf rolls will be retained and reinstated after the works within the functional floodplain are complete (approximately eight weeks) to maximise the potential for reinstatement / restoration to be effective.
- Removed topsoil and turf will be stored outside of the functional floodplain.
- Any damage to ground conditions caused by vehicle tracking will be rectified prior to the reinstatement of topsoil/turf – see section 8.1.
- Construction drainage will be introduced along the onshore cable route in advance of the works.
- Temporary construction accesses within the functional floodplain at the River Wensum crossing are only required if the third trenchless crossing compound (north of Penny Spot Beck) is used. Any topsoil removal and subsequent post-construction reinstatement will follow the steps outlined above.

11.1.3 Sediment management – works within the Wensum catchment but outside the functional floodplain

The measures for turf stripping and reinstatement of grassland within the functional floodplain, as set out in section 11.1.2 will also be implemented for all grassland habitats located within 10m of any watercourse within the River Wensum catchment.

~~11.1.2~~11.1.4 Pollution Prevention

~~102.~~115. Concrete and cement mixing and washing areas will be situated at least 10m away from the nearest watercourse. These will incorporate settlement and recirculation systems to allow water to be re-used. All washing out of equipment will be undertaken in a contained area, and all water will be collected for off-site disposal.

~~103.~~116. All fuels, oils, lubricants and other chemicals will be stored in an impermeable bund with at least 110% of the stored capacity. Damaged containers will be removed from site. All refuelling will take place in a dedicated impermeable area, using a bunded bowser. Biodegradable oils will be used where possible.

~~104.~~117. Spill kits will be available on site at all times and staff will be trained in their use. Sand bags or stop logs will also be available for deployment on the outlets from the site drainage system in case of emergency spillages.

~~105.~~118. Suitable biosecurity protocols (such as those outlined by the Non-Native Species Secretariat (NNSS)) would be put in place during the works in order to minimise the risk of contamination and the spread of the invasive non-native species (INNS), including the spread of crayfish plague. This includes the implementation of strict biosecurity protocols such as stringent 'Check, Clean, Dry' working methodology for plant, equipment and construction crews.

~~11.1.3~~11.1.5 Watercourse Crossings

~~106.~~119. Trenchless crossing techniques will be employed at the following major watercourses: River Wensum, River Bure, King's Beck, Wendling Beck (two crossing points), and the North Walsham and Dilham Canal.

~~107.~~120. Stop ends would be employed on the running track at each of the trenchless crossing points outlined above, with the exception of the crossing of Wendling Beck at Bushy Common.

~~108.~~121. Reinstatement of the channel would achieve the pre-construction depth of the watercourse, and the dams removed.

~~109.~~122. The width of the running track at watercourse crossings will be minimised from 6m to 3m to limit the area of direct disturbance.

~~110.~~123. The specific method of the dam and divert for larger watercourses will be agreed at detailed design in consultation with internal drainage boards and flood management agencies.

~~111.~~124. In order to ensure that there are no adverse impacts resulting from the installation of temporary dams, the following measures would be employed:

- Restricting the amount of time that temporary dams are in place, e.g. typically no more than one week;
- Fish rescue will be undertaken in the area between the temporary dams prior to dewatering;
- Ensuring that any pumps, flumes (pipes) or diversion channels are appropriately sized to maintain flows downstream of the obstruction whilst minimising upstream impoundment;
- Where appropriate, selecting a technique that can allow fish passage to be maintained in watercourses which support migratory fish species such as brown trout; and
- Where diversion channels are used, geotextiles or similar techniques will be used to line the channel and prevent sediment entering the watercourse.

~~112.~~125. Potential impacts resulting from the use of culverts at watercourse crossings will be mitigated through:

- Ensuring that the culvert is adequately sized to avoid impounding flows (including an allowance for potential increases in winter flows as a result of projected climate change);
- Installing the culvert below the active bed of the channel, so that sediment continuity and movement of fish and aquatic invertebrates can be maintained; and
- Where appropriate (e.g. where culvert installation is likely to have an impact on channel morphology and ecology), alternative techniques such as temporary bridges will be considered.

~~113.~~126. Cable ducts would typically be installed 2m below the bed of the watercourse, allowing the necessary water volumes and flows (sufficient to account for climate-related changes in fluvial flows and erosion). This would be dependent upon local geology and associated risks, and other associated risks, to prevent geomorphological impacts (e.g. bed scour and channel instability) and avoid exposure during periods of higher energy flow where the bed could be mobilised.

~~114.~~127. Where possible, localised improvements to the geomorphology and in-channel habitats supported by watercourses that would be crossed using open cut techniques, through the sympathetic reinstatement of banks (e.g. by replacing resectioned banks with more natural profiles that are typical of the natural geomorphology of the watercourse) will be considered. Note that any improvements would be restricted to within the working area of the project.

11.1.6 Bentonite Breakout

128. Bentonite is an inert clay based material (comprising 95% water and 5% clay) used as a lubricant at the drill head for trenchless crossing techniques. It does not represent a pollutant but can cause smothering of habitats.

129. For small breakouts it may cause more damage to habitats to attempt to contain the breakout and remove the escaped material, i.e. trampling of grassland associated with responding to the breakout and the potential for exposing bare ground. A breakout contingency plan will be developed and will be included in the final CoCP, which will define the approach for responding to breakouts. The steps of the contingency plan will include:

- Measures to ensure drilling stops once a breakout is reported (there will be a drop in pressure at the drill head);
- Measures to contain the breakout, for example sand bags, to minimise the extent of any smothering;
- Measures to remove the released bentonite if a significant volume of material is contained – for example pumped back to the bentonite lagoon within the trenchless crossing compound, or pumped to the interceptor drains, or pumped to the mobile settling tanks that will be used for managing sediment traps; and
- The exact specification for the contingency plan will be informed by further ground investigation and the specific design of the trenchless crossing.

~~11.1.4~~11.1.7 Surface Water Drainage

~~115.~~130. During construction, the onshore cable route will be bounded by drainage channels (one on each side) to intercept drainage from within the working corridor. Additional drainage channels will be installed to intercept water from the cable trench. Depending upon the precise location, water from the channels will be infiltrated or discharged into the surface drainage network.

~~116.~~131. Furthermore, the sectionalised duct installation method (excavate, lay and reinstate approximately 150m/week) is designed to minimise water ingress to the trenches.

132. A Construction Surface Water and Drainage Plan (Requirement 20 (2)(i) will be developed, agreed with the relevant regulators and implemented to minimise water within the cable trench and other working areas and ensure ongoing drainage of surrounding land. This typically includes interceptor drainage ditches being temporarily installed parallel to the trenches and soil storage areas to provide interception of surface water runoff and the use of pumps to remove water from the trenches during cable installation.

133. The Construction Surface Water Drainage Plan will include the following measures:

- Any pumps, flumes or channels will be designed to have sufficient capacity to convey the required range of flows at each location.
- Interceptor drains for the settlement of sediment (sediment traps). Sediment traps are locally wider/deeper areas of the drains that will encourage passive sediment deposition.
- Weekly monitoring of sediment traps (visual inspection) with increased monitoring during inclement weather. If required these traps can be pumped via settling tanks to remove sediment, based on a pre-defined level / depth of sediment.
- Where water enters the construction areas, this will be pumped via settling tanks or ponds to remove sediment before being discharged into local ditches or drains via the interceptor drains in order to prevent increases in fine sediment supply to the watercourses.
- When the interceptor drains and associated sediment traps are decommissioned any standing water within the drains would be pumped out to settling tanks as described above. Sediment that has settled out within the interceptor drain would be left in place. Soils would be replaced in the reverse order that they were removed and turf reinstated.

~~117.~~134. Existing land drains along the onshore cable route and at the onshore project substation will be reinstated following construction. A local specialised drainage contractor will undertake surveys to locate drains and create drawings both pre- and post-construction and ensure appropriate reinstatement (refer to Appendix C). The pre-construction drainage plan will include provisions to minimise water within the working area and ensure ongoing drainage of surrounding land.

~~11.1.5~~11.1.8 Foul Drainage

~~118.~~135. During the construction phase, foul drainage at the onshore project substation and mobilisation areas will be collected through a mains connection to existing local authority sewer system (if available) or septic tanks located within the development boundary. Foul drainage from welfare facilities along the cable route will be collected in septic tanks and taken off site for disposal at a licensed site.

~~11.1.6~~11.1.9 Licences

~~119.~~136. Table 11.1 sets out the additional licences or permits necessary prior to construction in relation to water resources and flood risk.

Table 11.1 Licences or permits necessary prior to construction in relation to water resources and flood risk

Issuing body	Name of consent	Applicable to
Environment Agency	Environmental Permit for flood defence or flood risk activity works	Any proposed works or structures within 8m of any tidal or fluvial defence; any proposed works or structures in/under/over/within 8m of the top of the bank of a main river
	Water Abstraction licence	Abstractions of more than 20 cubic metres / day from main and ordinary watercourses, and groundwater
	Environmental Permit for water discharge or waste operations / registration of exempt waste operations and water discharges (as necessary or registered exemption from such)	Discharge to surface water (main river or ordinary watercourse) or groundwater of anything other than clean, uncontaminated surface water run-off
Lead Local Flood Authority (Norfolk County Council) or Norfolk Rivers Internal Drainage Board	Consent for works affecting ordinary watercourses (Ordinary Watercourse Consent – also known as Land Drainage Consent)	Works in/over/under/near an ordinary watercourse

12 MONITORING AND SITE INSPECTIONS

~~120.~~137. The mitigation measures described above will be monitored by the Contractor's environmental management representative and the ECoW throughout the construction phase. If non-conformity with any of the mitigation measures is identified, it will be recorded during a site audit and appropriate remedial actions will be implemented.

~~121.~~138. A monitoring programme will be established for environmental aspects associated with the project site, which will be documented in the final CoCP. The Norfolk Vanguard Limited EMS and associated audit programme includes a requirement for Norfolk Vanguard Limited or an experienced nominated delegate to audit Norfolk Vanguard Limited construction sites on a periodic basis; included in the audit scope will be the appointed Contractor's monitoring and inspection regime.

13 ENVIRONMENTAL INCIDENT RESPONSE AND CONTINGENCY

~~122.~~139. As part of the CoCP, a project specific environmental emergency / incident response plan will be prepared. The plan will include a response flow chart and detail how to report and deal with an environmental incident, including the measures available to contain/clean up an incident (e.g. spill kits, waste reception facilities). A contact list for notifying relevant stakeholders will be appended to the plan.

~~123.~~140. Personnel working on site, including any subcontractors will be trained in the project environmental emergency response procedures, so that they are prepared and able to respond to an incident promptly and effectively. Where appropriate, Norfolk Vanguard Limited encourages environmental emergency response plans to be tested on-site in consultation with Norfolk Vanguard Limited.

~~124.~~141. During construction, all site staff would be made aware of sections of the route that are located within a Flood Zone, and aware of the evacuation process in the event of a flood and any Flood Warning Systems would be subscribed to.

~~125.~~142. If, during construction, remains are found unexpectedly on a site not known to be a burial ground, they will not be removed (DCO Part 4, requirement 17). In such circumstances, the local environmental health officer and the project archaeologist will be consulted to assess the remains. If it is concluded that they are modern, the police will be consulted. If the police have no interest and it is necessary to exhume the remains, then an application for a licence will be made to the Ministry of Justice immediately.

14 REFERENCES

Bat Conservation Trust (2012). Professional Training Standards for Ecological Consultants.

Construction Industry Research and Information Association (CIRIA) (2001). Control of water pollution from construction sites – A guide to good practice.

Norfolk Biodiversity Partnership (2009) Norfolk Biodiversity Action Plan: Hedgerows. Ref 1/H5, November 2009 (Version 3).

Norfolk Vanguard Limited (2017) Norfolk Vanguard Offshore Wind Farm: Preliminary Environmental Information Report.

APPENDIX A – Scope of Soil Management Plan

Pre-construction soil survey

Pre-construction detailed soil survey work will be undertaken by a competent person (e.g. a soil scientist) in order to produce specific soil resource topsoil and subsoil unit plans and restoration specifications for areas of agricultural land within individual land holdings that will be occupied by Norfolk Vanguard. These surveys will form the basis of the pre-construction condition assessments of the land prior to soil stripping operations and will be used to monitor the progress of soil handling and restoration operations. The surveys will provide a baseline schedule of soil condition against which the restoration of the soil post-construction will be assessed.

The survey work will include the identification of the physical characteristics of profiles at a standard density of 100 m intervals (with additional profiles examined where the 100 m grid sampling does not enable a suitable density of sampling in an agricultural enclosure that will otherwise be missed). Soil pits will also be examined at appropriate locations to provide additional detail on soil structure and stoniness. The survey will provide information on the following soil physical characteristics:

- Soil horizon depths for topsoil and subsoil horizons;
- Soil textures of all horizons;
- Soil colour;
- Stone contents, estimated from augering, confirmed by soil pit excavation/and or sample analysis;
- Presence and characteristics of mottling, a soil wetness indicator;
- Presence of manganese concretions, a soil wetness indicator;
- Identification of gleyed horizons;
- Identification of slowly permeable layers; and
- Identification of impenetrable rock layers.

Soil Scientist

The Applicant will appoint a soil scientist for conducting the pre-construction surveys and production of the Soil Management Plan (SMP). The SMP will set out the approaches for soil handling and storage and define the conditions when it is not suitable for works to take place (specifically in relation to rainfall). The ALO and the Applicant will be responsible for undertaking the works in accordance with the approved SMP.

Construction Method

The Applicant's construction method for duct installation is proposed to be conducted in a sectionalised approach in order to minimise impacts as detailed in Section 2.5.1. This method minimises the volume and time in which soils are stored.

Soil Handling, Management and Reinstatement Principles

The following principles are applicable to the handling, management and reinstatement of topsoil and subsoils during construction:

- Topsoil will be stripped and stored in a bund.
- Subsoil which is excavated for trenching will be stored in a separate bund to topsoil.
- Ducts, stabilised backfill and marker tiles will be installed within the trench and subsoil replaced.
- Topsoil will be replaced so far as possible across the working width (typically excluding the running track and associated temporary drainage) within 3 months of stripping where the following conditions are met:
  - The subsoil is dry and in a suitable condition to take topsoil reinstatement.
  - The landowner does not reasonably object to reinstatement.

Following partial restoration of the working width, the Applicant will not:

- Be obliged to install the post scheme drainage works until such time as programmed on the wider scheme.
- Be obliged to hand back possession of the working area if they do not reasonably consider it appropriate to do so.
- Be obliged to pay crop loss or any other loss arising from the farmer choosing to commercially crop the partially restored working area.
- The restoration of the topsoil will not be full restoration and the conditions associated with full restoration do not have to be met until the appropriate time as agreed.

In the event that the topsoil will be stored in excess of 3 months, the following conditions are to apply:

- Topsoil and subsoil are kept in separate bunds.
- Entrenched vertical entrapment fences (e.g. Silt Fences) are to be installed around the bund as per EA/SEPA Pollution Prevention Guidelines.
- Hydroseeding of bunds with an agreed/appropriate grass mix at soonest opportunity recommended by specialist contractors.
- Installation of biodegradable erosion control (e.g. Geo-Jute Erosion Control Blanket) to stabilise the surface and give a 'key' for the Hydroseeding growing medium.
- Assessment to be carried out where water may pond on subsoil in the stripped working area and, where appropriate, means to drain this water away installed through the bund if necessary.
- Dewatering pits to be located on the running track side of the working area.

The restored working width will be seeded with a cover crop of an agreed species mix for the soil type, land use and time of year.

The Applicant is not obliged to restore the working area within an area at an agreed distance either side of the running track, a mobilisation area, a trenchless crossing area or any other area where for good technical and engineering reasons it is not appropriate to do so.

The ALO will work alongside the soil specialist and drainage consultant as necessary during the works to have an input into the preparation, construction and reinstatement of the working area with a brief as follows:

- To agree when conditions in the working area are suitable for construction of the works specifically required at the time of assessment.
- To assess when work can recommence in the following situation:
  - There has been more than 12mm of rain falling on the working area in any preceding 24 hour period.
  - There has been more than 20mm of rain falling on the working area in any preceding 96 hour period.
  - Where the thresholds specified above have not been met but long term adverse weather conditions have led to cumulative wetting of the working area.
  - Where the landowner considers the conditions to be unsuitable for working without unavoidable long term soil damage.

APPENDIX B – Role of Agricultural Liaison Officer

The Agricultural Liaison Officer (ALO) will be appointed by the Applicant prior to the commencement of pre-construction activities and will be the prime contact for ongoing engagement about practical matters with landowners, occupiers and their agents before and during the construction process. There may be more than one ALO if required.

The ALO will have relevant experience of working with landowners and agricultural businesses and will have knowledge of the compulsory acquisition process (if required) and working on a linear infrastructure project.

The ALO (or their company) will be contactable from 7am to 7pm during the construction phase to landowners, agents and occupiers and will provide 24-hour team or company contact details for use in the event of emergency.

Post-construction the ALO will remain in place for up to one year in order to manage remediation issues.

After that year the Applicant will ensure that ongoing contact details are provided in order for landowners and occupiers to seek consent, if required, in respect of restrictive covenants for the lifetime of the project or to highlight any defects. Information in relation to the process of management of restrictive covenants will be issued to landowners and occupiers upon any change in the person/s responsible for the process on behalf of the Applicant or the OFTO.

The ALO will have responsibility for liaising with landowners, agents and occupiers in respect of the following:

- Coordinating drainage surveys and sharing pre and post-construction drainage schemes with landowners or occupiers in advance for their consideration;
- Discussing the location, grouping and marking of link boxes, including why they are subject to overriding constraints (such as cable lengths and environmental constraints), with the landowner/occupier;
- Coordinating the provision of a detailed pre-construction condition survey to include a soil survey as detailed in Appendix A, as well as a record of condition of the following elements:
  - existing crop regimes;
  - the position and condition of field boundaries;
  - the condition of existing access arrangements;
  - the location of private water supplies (as far as reasonable investigations allow);
  - the type of agricultural use taking place;

  - the yield of crops;
  - the quality of grazing land; and
  - the existing weed burden.

- Advising on risks relating to the translocation of soil diseases and ensuring appropriate protective provisions are implemented;
- Ensuring that landowners and occupiers are consulted in respect of requirements relating to field entrances and accesses across the construction strip and land-locked or severed land parcels;
- Arrange quarterly meetings with agent representatives of landowners;
- Undertake pre-construction and day-to-day discussions with affected parties to minimise disruption, where possible, to existing farming regimes and timings of activities;
- Undertake site inspections during construction to monitor working practices and ensure landowners' and occupiers' reasonable requirements are fulfilled; and
- Discussing and agreeing reinstatement measures following completion of the works.

APPENDIX C – Field Drainage

Irrigation

Details of the irrigation system on each land holding will be gathered during the detailed design stage and irrigation plans will be developed to inform the management of agricultural land drainage during construction. The ALO will be responsible for consulting with each individual landowner to obtain the relevant information and to be a point of contact to report concerns regarding irrigation systems during construction. The plans will include the following information:

- Location of boreholes and water supplies used by each farmer;
- Irrigation or impoundment licence granted by the EA; and
- System of irrigation applied and the location of irrigation network for each field.

Agricultural Land Drainage

Particular care will be taken to ensure that the existing land drainage system is not compromised as a result of construction. Land drainage systems will be maintained during construction and reinstated on completion.

The ALO will coordinate drainage surveys to establish the existing drainage position including any related farm drainage that may be affected by the scheme. The services of a suitably qualified drainage consultant will be employed by the Applicant to act as a drainage expert during the detailed design process and liaise with landowners or occupiers (through the ALO) to consult on the pre and post drainage schemes required. This will include the design of any land drainage works required during construction, and on the design and timing of any land drainage works required for the subsequent restoration of the land. This process will take due regard of any local and site-specific knowledge.

Subject to the consultation, existing agricultural land drains, where encountered during the construction, will be appropriately marked. The location of drains cut or disturbed by the construction works will be photographed, given a unique number and logged using GPS coordinates. The actual condition and characteristics (e.g. depth of installation, pipe type and diameter) of the existing drain will also be recorded upon excavation.

During the construction works, temporary drainage will be installed either side of the cable trenches, within the onshore cable route working width, to intercept existing field drains and ditches in order to maintain the integrity of the existing field-drainage system during construction and ensure existing flow is not channelled by the onshore cable route. Such measures will also assist in reducing the potential for wet areas to form during the works, thereby reducing the impact on soil structure and fertility.

Drainage systems however will not be installed into areas where they are not currently present, e.g. environmental wetlands.

Any field drainage intercepted during the cable installation will either be reinstated following the installation of the ducts or diverted to a secondary channel. Landowners and occupiers will be informed of the design of drainage works required during construction and following installation of the ducts and associated works, including: pipe layout, falls, dimensions and outfalls (if required). The drainage would be reinstated in a condition that is at least as effective as the previous condition and will follow best practice for field drainage installations taking into account site specific conditions.

Where it is reasonable for the reinstatement of drainage to involve works outside of the Oerder limits it will be done subject to the agreement of the landowner.

Landowners and occupiers will be provided with the opportunity to inspect land drainage works as they progress, subject to health and safety considerations. Furthermore, records of existing and remedial drainage will be maintained by the Applicant with copies provided to the Landowner (and the Occupier, if applicable) following the completion of construction works.

A dispute resolution process will be established including the appointment of a jointly agreed Independent Expert for drainage design and implementation, where required. Where agreement cannot be reached on the appointment of the expert the matter will be referred to the President of the Institution of Civil Engineers.

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