Environmental Report to Support Joint Non-Material Change Application:
Dogger Bank Teesside A and Sofia Offshore Wind Farms

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Recommended (Organisation unit/ Name):	Date/Signature:
Dogger Bank Wind Farm Projco 3 / Jonathan Wilson Sofia Offshore Wind Farm Limited / Kim Gauld-Clark	12/05/2020 JW/KGC
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Dogger Bank Wind Farm Projco 3 / Jonathan Wilson Sofia Offshore Wind Farm Limited / Kim Gauld-Clark	12/05/2020 JW/KGC

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1 Introduction

The Dogger Bank Teesside A and B Offshore Wind Farm Development Consent Order 2015 (the DCO) was granted in August 2015. Dogger Bank Wind Farm Projco 3 is a joint venture between SSE and Equinor established to develop Dogger Bank Teesside A Offshore Wind Farm. Sofia Offshore Wind Farm Limited (SOWFL), a subsidiary company of Innogy, is developing Dogger Bank Teesside B (now known as the Sofia Offshore Wind Farm (Sofia)). Teesside A and Sofia are herein referred to as the Projects. This Environmental Report supports a joint non-material change (NMC) application to the DCO (as amended) for both Projects.

The DCO requires the authorised development to have commenced on or before 25th August 2022. Dogger Bank Wind Farm Projco 3 and SOWFL (herein referred to as the 'Project Teams') are now progressing with the Projects to meet this commencement date, with the expectation that onshore works will start in Q1 2021.

The onshore elements of the Projects are located entirely within the Redcar and Cleveland Borough Council administrative area and comprise cable landfall between Redcar and Marske-by-the-Sea, underground high voltage direct current (HVDC) cables, two onshore converter stations (OCS) (one per Project) and National Grid connection works at the existing National Grid Electricity Transmission (NGET) substation at Lackenby. The OCS and NGET substation will be connected by underground high voltage alternating current (HVAC) cables.

The onshore elements of the Projects are split in the DCO into 'stages', which group various onshore works according to location and which project they apply to. There are also shared works. This approach was adopted to allow for the discharge of the requirements in the DCO to be done by stage so all details would not have to be approved before works can start and to simplify and streamline the discharge of requirements where possible. The stages as set out in Part 3 of Schedule 1 of the DCO as made are presented in **Table 1**.

Table 1 Stages as set out in the DCO as made

DCO Stage	Works Number
Stage 1	3A, 4A and 5A
Stage 2	3B, 4B and 5B
Stage 3	6A, 8A, 10A, 10B, 10C, 10D, 10E, 10F, 10G, 10H, 10I and 10K;
Stage 4	6B, 8B, 10A, 10B, 10C, 10D, 10E, 10F, 10G, 10H, 10I and 10K;
Stage 5	7, 7L, 10H and 10I
Stage 6	8S, 8A, 10H, 10I, 10J and 10K
Stage 7	8S, 8B, 10H, 10I, 10J and 10K
Stage 8	9, 10H, 10I, 10J and 10K

Some development permitted by the DCO is defined as "shared works" which could be carried out by either Project company. These are defined by reference to the works areas shown on the Works Plans that accompany the DCO (**Appendix 1**). Shared works in the DCO as made are:

- Work No. 7;
- Work No. 7L;
- Work No. 8S;
- Work No. 9; and
- Work Nos 10A – 10J (inclusive).

1.1 Purpose of this document

The Project Teams are seeking an NMC to the DCO to enable the Projects to be constructed in the most efficient and cost-effective manner and to further streamline the discharge of the requirements. For the avoidance of doubt, the NMC relates to and will apply to both Projects.

The purpose of this Environmental Report is to provide:

- A description of the predicted effects (if any) of the changes sought alongside the outcome of the original assessment provided within the Environmental Statement (ES) (Forewind, 2014) (the 2014 ES); and
- Confirmation that no new, or materially different, likely significant effects will arise as a result of the amendments, during construction or operation.

1.2 Non-material change guidance

Department for Communities and Local Government (DCLG) 'Guidance on Changes to Development Consent Orders' (DCLG, 2015) provides details of certain characteristics that may indicate whether a change to a development consent order is more likely to be considered material, as outlined in **Table 2**. This report considers each of these characteristics or tests, to confirm that the changes proposed can be considered non-material.

Table 2 Characteristics to consider when preparing an application for a change to a DCO

Characteristics	Consideration	Outcome
Environmental Statement (ES)	Does the change require an update to the ES at the time the DCO was made required?	No, see **Section** Error! Reference source not found. for further information.
Habitats and protected species	Does the change invoke the need for a Habitats Regulations Assessment (HRA)? Are additional licences in respect of European Protected Species (EPS) required?	No, as there are no terrestrial SACs or SPAs / Ramsar sites that would be affected by proposed works within the export cable route at the landfall or the proposed substation location. The 2014 HRA Screening Report concluded that LSE with respect to designated terrestrial habitats and species would not arise as a result of onshore development of the Projects.
Compulsory acquisition	Does the change authorise the compulsory acquisition of any land or an interest in or rights over land that was not authorised in the DCO?	No, the changes do not amend the compulsory acquisition powers or rights in the DCO.
Business and residents	Does the change have the potential to impact on local people, for example impacts on the natural environment, traffic or visual amenity?	No, see **Section** Error! Reference source not found. for further information.

2 Proposed amendments

The following sections describe the amendments sought by the Project Teams. **Sections 2.1-2.3** describe amendments that are within the specified parameters of the 2014 ES and controlled by the DCO, and are therefore not considered further. **Section 2.4** describes an amendment at the Network Rail crossing that is within the parameters controlled by the DCO but further details are provided to demonstrate there is no potential for new, or materially different, likely significant effects to arise. These further details are provided in **Section 3**.

2.1 DCO Stages

Since the DCO was granted in 2015, it has been determined that the Projects will be developed by different project companies in separate ownership.

In order to achieve optimum separation between the Projects and ensure flexibility and efficiencies during construction, changes are being sought to the currently defined stages in Requirement 1 of the DCO as set out in **Table 1**. Further definitions have also been included to separate out different parts of identified works to enable elements of a work to be carried out by the other Project, for example the Project A and Project B converter station enabling works and the cable enabling works. Further detail on these definitions is set out in the Explanatory Memorandum to the revised DCO that forms part of this application. The changes to the stages and definitions are entirely within the envelope of the environmental assessments undertaken at the point of consent and as presented in the 2014 ES that supported the DCO application.

The proposed amendments to the DCO stages are presented in **Table 3**. These are proposed by the Project Teams to ensure the necessary separation of the Projects and to ensure flexibility and efficiencies during the discharge of requirements process and the subsequent construction phase, including allowing for joint working to be undertaken during the construction phase to minimise environmental effects. There is some duplication for works within the various proposed stages to allow for some flexibility as to whether they are carried out by the Project Teams separately, or jointly to facilitate efficient working and minimise environmental effects. Requirement 20 of the DCO provides that the local planning authority must approve the various stages before works commence.

Table 3 Dogger Bank Teesside A and Sofia proposed DCO stages

DCO Stage	Works
Stage 1 (Project A)	Works nos. 3A, 4A and 5A
Stage 2 (Project B)	Works nos. 3B, 4B and 5B
Stage 3 (Project A)	Works nos. 6A, 8A
Stage 4 (Project B)	Works nos. 6B, 8B
Stage 5 (shared works)	Cable preparation works
Stage 6 (shared works)	Works nos. 10A, 10B, 10C, 10D, 10E, 10F, 10G, 10H, 10I, 10J and 10K
Stage 7 (shared works)	Work No 7 enabling works (where the Project A converter station enabling works and Project B converter station enabling works are undertaken as a shared work), Work Nos. 8S (where 8S is undertaken as a shared work), Work Nos. 7L, and 10I
Stage 8 (Project A)	Project A converter station enabling works (where the Project A converter station enabling works are not undertaken as a shared work);
Stage 9 (Project A)	Project A converter station works
Stage 10 (Project B)	Project B converter station enabling works (where the Project B converter station enabling works are not undertaken as a shared work)
Stage 11 (Project B)	Project B converter station works

DCO Stage	Works
Stage 12 (Project A)	Project A HVAC cable works (where the Project A HVAC cable works are not undertaken as a shared work) and Work No. 8A
Stage 13 (Project B)	Project B HVAC cable works (where the Project B HVAC cable works are not undertaken as a shared work) and Work No. 8B
Stage 14 (shared works)	Work Nos. 9 (where Work No. 9 is undertaken as a shared work), 10J and 10K
Stage 15 (Project A)	Project A National Grid substation connection works (where the Project A National Grid substation connection works are not undertaken as a shared work)
Stage 16 (Project B)	Project B National Grid substation connection works (where the Project B National Grid substation connection works are not undertaken as a shared work)

For further context, Chapter 5 Project Description of the 2014 ES provides flexibility in the construction programme in order to accommodate the range of uncertainties that existed at the time in relation to how the Projects would be developed. This included for example, overall construction programme, construction techniques and methodologies, technology and phasing (i.e. single project, parallel, sequential and enabling). As such, the assessments within the 2014 ES considered the full range of different construction scenarios. The worst case selected for the assessments was identified on a topic by topic basis. These construction scenarios are not linked to how the stages of works are defined in the DCO.

As such, there is no change to the construction programme scenarios assessed in the 2014 ES as a result of the proposed changes to the DCO stages and additional definitions. The parameters controlled by the DCO and as considered in the 2014 ES remain unchanged including the overall construction period and the time limits for commencement. Therefore, these amendments do not affect the assessment presented in the 2014 ES and are not considered further within this Environmental Report.

2.2 Onshore HVDC cables

To ensure maximum flexibility and efficiency during construction, the Project Teams are seeking the flexibility within certain identified sections of the onshore HVDC cables within the defined Order limits to install cables on either side of the DCO corridor.

The DCO currently states that Project A (Teesside A) installs onshore HVDC cables in Work No. 3A, 4A, 5A and 6A and Project B (Sofia) installs onshore HVDC cables in Work No. 3B, 4B, 5B and 6B (proposed Stages 1-4). There are three locations where the Project Teams seek the flexibility for either or both Projects to use either corridor to install onshore HVDC cables. The locations where this flexibility is sought are shown in **Appendix 1** Onshore Works Plan and are summarised as:

- Location 1: Work Nos 3A and 3B, and 4A and 4B;
- Location 2: Specified coordinates within Work Nos. 6A and 6B in the vicinity of the Tees Valley rail crossing point; and
- Location 3: Specified coordinates within Work Nos. 6A and 6B within the Wilton Complex.

All works will remain within the consented DCO order limits as a result of this amendment and there will be no change to the separation distances associated with the cables[1], the total number of export cables installed, the construction programme, methodology or any other consented parameter. The proposed amendment to this methodology does not involve any works outwith the DCO order limits and is within the envelope of the 2014 ES. The amendment in relation to the installation of the onshore HVDC cables does not affect the assessment presented in the 2014 ES and is therefore not considered further within this Environmental Report.

2.3 Onshore HVAC cables

The Project Teams seek to amend the definition of 'cable' in the DCO to explicitly include the laying of cable in a trefoil formation, for the onshore HVAC cables only. The changes to the cables are for permanent underground infrastructure (i.e. buried cables) only. The onshore HVAC cables run from the OCS along 2 km to the existing NGET substation at Lackenby (as shown on the Onshore Works Plans in **Appendix 1**).

Chapter 5 Project Description of the 2014 ES describes the onshore HVAC cable parameters. These are shown in **Table 4** alongside the proposed changes. The quantities described are for both Projects.

Table 4 Consented and proposed HVAC cable parameters

Parameter	Quantity (2014 ES)	Proposed HVAC changes
Total number of trenches	2	2 – no change
Voltage	400 kV	400 kV – no change
Length (km)	2	2 – no change
Number of circuits	2	4
Formation of cables	Flat	Trefoil
Number of trefoil cables	Not described	4
Onshore cable definition (in the DCO)	"a direct-lay cable and a cable laid in a cable duct"	"a direct-lay cable, and a cable laid in a cable duct and, in respect of a HVAC onshore cable only, cables laid in a trefoil"

For further context, Chapter 5 Project Description, paragraph 4.2.3 of the 2014 ES states that "the size of the onshore underground cables used for Dogger Bank Teesside A & B will be subject to detailed electrical and thermal design analysis. This will be carried out as part of the detailed design in consultation with specialist cable manufacturers." Cable parameters provided in ES Chapter 5 (Table 4.1 and Table 4.2) (Forewind, 2014) are also stated to be indicative only. The HVAC circuits are described as comprising "three cables laid in flat formation" (per project), however, no changes are being sought for the parameters which were considered in the 2014 ES in relation to the installation of the HVAC cables (e.g. dimensions of the cable trenches, volume of excavated material or number of vehicle movements) and which are subject to further approval through the discharge of the requirements of the DCO.

The amendment in relation to the installation of the onshore HVAC cables does not affect the assessment presented in the 2014 ES and is therefore not considered further within this Environmental Report.

[1] Appendix 5C Health Impact Review in the 2014 ES states the Projects will be compliant with ICNIRP guidelines (2009) on magnetic and electric fields associated with buried cables.

2.4 Network Rail crossing

Due to engineering considerations, an amendment is being sought in relation to the proposed HVDC crossing methodology of the Tees Valley railway line where it intersects Green Lane and Redcar Road.

Appendix 1 Sheet 02 shows the location of the Network Rail crossing. The 2014 ES Chapter 5 Project Description describes the crossing as using a Horizontal Directional Drill (HDD) trenchless crossing method. Multiple HDDs would have been required for the crossing, with pipe or bore diameters of up to 1,000 mm. Alongside other technical solutions, the Project Teams are considering the use of a single cable chamber (through the use of microtunnelling or segmental tunnelling installation techniques) as an alternative option of crossing using trenchless techniques to further avoid the bridge structure and any potential for disruption or disturbance to the railway during construction and maintenance of the onshore HVDC cables. The use of a single cable chamber in place of multiple HDDs is considered to fall within the scope of the trenchless cable lay techniques authorised by the DCO and is further clarified by the definition of "cable preparation works" that is proposed to be inserted into the DCO, which comprises "all or any part of the trenched or trenchless installation works to install cable ducting or otherwise facilitate the laying of cables" along the cable route.

Table 5 provides a comparison of the HDD parameters assessed in the 2014 ES with the proposed HVDC cable chamber parameters. **Section 3** then demonstrates that the worst-case parameters associated with the cable chamber remain either within those assessed under the HDD methodology or will not lead to any new, or materially different, likely significant effects, allowing this option to be sought as a non-material change.

Table 5 HDD parameters compared with proposed cable chamber parameters at the Network Rail crossing

HDD parameter	As assessed in the 2014 ES	Reference chapter (Forewind, 2014)	Proposed HVDC cable chamber parameters
Size of compound (minor HDD)	1,200 m^2 Per project	Chapter 5 Table 4.13	As previous
Intermediate construction compound area	784 m^2 Per project	Chapter 5 Table 4.13	As previous
No. of HDD compounds	26 no. (building both projects concurrently)	Chapter 24 Table 5.1	As previous
Quantity of excavated material (offsite disposal)	840 m^3 (HDD slurry waste) 99,580 m^3 (total) (building both projects concurrently)	Chapter 24 Table 5.1	3,320 m^3 excavated material
HDD depth	Approximately 10 m	Chapter 24 paragraph 6.2.2	16 m (to cable chamber invert) 19.05 m depth of shaft

HDD parameter	As assessed in the 2014 ES	Reference chapter (Forewind, 2014)	Proposed HVDC cable chamber parameters
Cable route width at HDD locations (for below-ground drilled sections)	40 m for minor HDD Per project	Chapter 5 Table 4.3	As previous
Length of construction	Overall onshore HVDC cable construction is up to 24 months, however specific HDD duration was not specified within the ES. Within the Transport Assessment (Appendix 28A, 2014 ES), a duration of 2 months was used for the traffic assessment only as in that case a shorter duration is considered to represent the worst-case.	Appendix L in Ch 28 App A TA	23 weeks (worst case)

3 Network Rail Crossing

In order to demonstrate that there is no potential for new, or materially different, likely significant effects to arise as a result of the proposed trenchless techniques for the Network Rail crossing outlined in **Section 2.4**, a two stage process has been undertaken. Firstly**,** a screening exercise for relevant onshore topics considered in the 2014 ES identifies which topics may require further consideration (screened in) based on the parameters assessed in the ES. Secondly, those topics that are screened in are given further consideration to identify whether there is the potential for new, or materially different, likely significant effects. **Table 6** shows the results of the screening exercise, with those topics screened in considered further in **Section 3.1-3.4**.

Table 6 Screening

Onshore environmental topic assessed in the 2014 ES	Potential for any changes to assessed impacts as presented in the 2014 ES	Screened In / Out
Landscape and visual	The proposed Network Rail crossing works will not involve any additional above ground permanent infrastructure, and therefore will not lead to any new, or materially different, likely significant effects for the landscape and visual assessment. The worst-case duration for the construction of the cable chamber crossing of 23 weeks remains short-term as per the methodology (Section 3 in Chapter 21 Landscape and Visual in the 2014 ES) and the overall duration of construction is not increased. There is a housing development approximately 130 m from the crossing, which was not present at the time of drafting the 2014 ES. However, there is existing screening between the housing development and the Network Rail crossing consisting of a 45 m wide belt of trees and several farm buildings. The presence of the housing development reduces the sensitivity of the arable fields between the railways line and the A174, as the landscape is less vulnerable to a change or loss of features as a result of the increased development. Therefore, it is not considered that the amendment would lead to any new, or materially different, likely significant effects for the landscape and visual assessment. There will be no change to the parameters assessed with regard to landscape and visual, therefore, the proposed amendment does not change the assessment as presented in the 2014 ES.	**Out**
Socio-economics	The proposed Network Rail crossing works will lead to an increase in employees during construction of the Projects; however, this only represents a 1.4 % increase in direct employment during construction which is not considered to change the outcome of the 2014 ES. Therefore, it is not considered that the amendment would lead to any new, or materially different, likely significant effects for the socio-economics assessment.	**Out**

Onshore environmental topic assessed in the 2014 ES	Potential for any changes to assessed impacts as presented in the 2014 ES	Screened In / Out
	There will be no change to the parameters assessed with regard to socio-economics, therefore, the proposed amendment does not change the assessment as presented in the 2014 ES.	
Tourism and recreation	The proposed Network Rail crossing works will not lead to an increase in land take. There are no Public Rights of Way that will be affected as a result of the Network Rail crossing amendment. The overall duration of construction remains the same. As such it will not lead to any new, or materially different, likely significant effects and does not change the tourism and recreation assessment as presented in the 2014 ES.	**Out**
Geology, water resources and land quality	The proposed Network Rail crossing works will lead to an increase in the volume of excavated material and the depth of the crossing. The increased depth could have the potential to affect groundwater resources and subsequent contamination of surface waters. As such, potential impacts on geology, water resources and land quality are considered further to determine whether the impacts will be greater than those assessed in the ES.	**IN**
Terrestrial ecology	The proposed Network Rail crossing works will not require additional land take and there will be no change to the parameters assessed with regard to terrestrial ecology. The overall duration of construction remains the same. As such it will not lead to any new, or materially different, likely significant effects and does not change the assessment as presented in the 2014 ES.	**Out**
Land use and agriculture	The proposed Network Rail crossing works will not require additional land take and there will be no change to the parameters assessed with regard to land use and agriculture. The overall duration of construction remains the same. As such it will not lead to any new, or materially different, likely significant effects and does not change the assessment as presented in the 2014 ES.	**Out**

Onshore environmental topic assessed in the 2014 ES	Potential for any changes to assessed impacts as presented in the 2014 ES	Screened In / Out
Terrestrial archaeology	The proposed Network Rail crossing works have the potential to uncover additional unknown buried heritage assets, as there will be an increase in underground excavation for the cable chamber construction. As such, potential impacts on buried heritage assets are considered further to determine whether the impacts will be greater than those assessed in the 2014 ES.	**IN**
Traffic and access	The proposed Network Rail crossing works will lead to an increase in excavated material, and therefore associated vehicle movements. As such, potential impacts on traffic and access are considered further to determine whether the impacts will be greater than those assessed in the 2014 ES.	**IN**
Noise and vibration	The proposed Network Rail crossing works will lead to an increase in excavated material, and therefore associated vehicle movements and noise. The additional housing development to the west of the crossing is an additional potential receptor. As such, potential impacts on noise and vibration are considered further to determine whether the impacts will be greater than those assessed in the 2014 ES.	**IN**
Air quality	The proposed Network Rail crossing works will lead to an increase in excavated material and therefore vehicle movements. The overall duration of construction remains the same. However, the 2014 ES concluded that there would be a negligible impact on air quality as a result of the Projects (in total). The overall duration of construction is not increased and there will be no additional impact on air quality as a result of the Network Rail crossing amendment. As such it will not lead to any new, or materially different, likely significant effects and does not change the assessment as presented in the 2014 ES.	**Out**

The topics screened in (**Table 6**) for further consideration are:

- Geology, water resources and land quality;
- Terrestrial archaeology;
- Traffic and access; and
- Noise and vibration.

The following sections consider each of these topics, and whether the proposed Network Rail crossing works has the potential to lead to new, or materially different, likely significant effects.

3.1 Geology, water resources and land quality

The 2014 ES documents (Chapter 24 Geology, Water Resources and Land Quality and Appendix A Land Quality Phase 1 Desk Study) show that the superficial geology in the area of the Network Rail crossing generally comprises glacial till of approximately 10 m in thickness, composed predominantly of clay. The superficial geology is underlain by the Redcar Mudstone Formation. This has been confirmed by ground investigations undertaken to inform the crossing appraisal, which suggested an absence of groundwater (COWI, 2020). There are no Source Protection Zones (SPZs) within 1 km of the crossing and no other major groundwater or surface water receptors were identified in this area. Due to the presence of till, predominantly of a clay composition with considerable thickness it is not expected that groundwater would be encountered during excavations in large quantities. The groundwater quality in this area is unknown although the likelihood of contamination is considered to be low.

The proposed cable chamber at the Network Rail crossing will lead to an increase in the volume of soil excavated in order to construct the cable chamber. The 2014 ES estimated that construction of both Projects will result in 99,580 m^3 of excavated soils and the proposed cable chamber construction will result in 3,300 m^3 of additional material. The 3% increase of excavated material is not considered significant especially considering the 2014 ES already proposed to mitigate impacts associated with soil excavations. These existing mitigation measures include designing and positioning stockpiles in a manner to minimise erosion, pollution of watercourses or increased flooding as well as measures to manage offsite soils disposal if needed.

The proposed cable chamber at the Network Rail crossing will use a microtunnel or segmental tunnel technique rather than HDD and although this is different to the indicative proposed design presented in the ES, no likely significant effects are expected to occur as a result of this change. The 2014 ES recognised the need for excavation dewatering and considered the impacts on groundwater to surface water. The proposed mitigation included pumping out and passing through a settlement tank or lagoon to allow suspended solids to settle out before being discharged to an appropriate location. In addition to that, the 2014 ES specified that any groundwater control, if required, should be subject to a formal dewatering design by specialist consultants/ contractors. It also advised that assessments of anticipated ground movement and damage assessments should be carried out. The mitigation commitments are not changed by the proposed Network Rail crossing works.

As a result, the cable chamber will not lead to any new, or materially different, likely significant effects for the geology, water resources and land quality assessment. **The proposed Network Rail crossing works are therefore not anticipated to give rise to any new, or materially different, likely significant effects upon geology, water resources and land quality than those presented in the 2014 ES**.

3.2 Terrestrial archaeology

Chapter 27 Terrestrial Archaeology of the 2014 ES did not identify any designated assets of high importance at the Network Rail crossing. There are two Grade II listed buildings adjacent to the crossing, (Figure 4.1 in Chapter 27 of the 2014 ES), however they are located outside of the Zone of Theoretical Visibility (ZTV) (Figure 3.4 in Chapter 21 Landscape and Visual of the 2014 ES) and will have no visual relationship with the Projects due to distances involved and intervening settlement, landform and vegetation. No further assessment was required, and no impact concluded in the 2014 ES, which remains valid in relation to the proposed Network Rail crossing works.

A World War II pillbox is located at the railway line (Figure 3.4 in Chapter 27 Terrestrial Archaeology of the 2014 ES), which is a locally listed structure. As the HVDC cable route at this point was to be installed by trenchless technique (HDD), construction of the project would not lead to any physical change to the asset and would not change its setting. Construction of the cable chamber (also a trenchless technique) would not lead to any physical change to the asset or its setting, therefore the outcome of the impact assessment for this asset (neutral impact) remains valid with no mitigation required.

There are no known non-designated heritage assets at this location although the potential for as yet unknown heritage assets in the form of buried archaeology to survive cannot be ruled out. These potential impacts will be mitigated against, as outlined in **Table 7**. This mitigation was proposed in the 2014 ES and is secured through the DCO under Requirement 26.

Table 7 Mitigation measures for previously unrecorded assets

Mitigation measures
• An archaeological mitigation strategy will be produced which will set out the methodology for conserving the archaeological resource and will entail a systematic programme of archaeological investigation comprising one or all of the following stages of work: o Trial trench evaluation; o Detailed excavation, post-excavation assessment and analysis; o Watching brief during specific construction activities, recording and reporting; and o Deposition of archive with RCBC and Tees Archaeology. • The mitigation strategy will be discussed and agreed with RCBC. • All stages of field work and reporting will be in accordance with The Chartered Institute for Archaeologists (CIfA) guidance and a Written Scheme of Investigation (WSI).

Chapter 24 Geology, Water Resources Land Quality of the 2014 ES identified the geology across the study area from available boreholes as glacial till with localised alluvium deposits, approximately 10 m thick, underneath which lies the bedrock of the Redcar Mudstone Formation. The proposed depth of the cable chamber is estimated to be between 13-16 m which is well below the layer of till. There is therefore a very low potential for impacting on buried archaeological and/or geoarchaeological remains at these depths.

As a result, the cable chamber will not lead to any new, or materially different, likely significant effects for the archaeology assessment. **The proposed Network Rail crossing works are therefore not anticipated to give rise to any new, or materially different, likely significant effects upon terrestrial archaeology than those presented in the 2014 ES**.

3.3 Traffic and access

Traffic movements (for both employees and HGVs) in the 2014 ES (Chapter 28 Traffic and Access and Appendix 28A Transport Assessment) were derived from an understanding of the required materials and resources aligned to a construction programme, to determine peak traffic demand. An assessment of these peak vehicle movements was then undertaken in accordance with the Guidelines for the Environmental Assessment of Road Traffic (GEART) upon the following effects:

- Severance;
- Pedestrian amenity;
- Highway safety; and
- Driver delay.

The 2014 ES traffic assessment was based upon daily peak impacts. This review follows the same approach, therefore the length of construction as presented in **Table 5** does not have any bearing on this assessment.

With the introduction of a package of mitigation measures, developed and agreed with relevant stakeholders, the residual impacts in the 2014 ES were assessed as negligible to minor adverse.

3.3.1 Proposed changes and scope of review

The 2014 ES proposed construction vehicle access to the HDD activities under Redcar Road and the Tees Valley railway line from a new access (access 2) with Green Lane (via Redcar Road) to the north and from a new access with A174 to the south (access 3). The location of these accesses was depicted within Figure 1 of the 2014 TA, provided in this report in **Appendix 2**.

The proposed works would result in a change in methodology from the use of HDD to the use of microtunnelling or segmental tunnelling as an alternative trenchless crossing technique. To reduce the potential impacts of construction traffic travelling via Redcar Road (which was assessed as of high sensitivity within the 2014 ES) it is proposed that the drive pit (where the majority of deliveries and employees would need to access) would be accessed from A174 (assessed as of low sensitivity).

The proposed change from the use of HDD to either a microtunnelling or segmental tunnelling technique would not be considered to materially change the operational maintenance requirements assessed as 'negligible' in the 2014 ES. Therefore, the following review considers the construction phase only.

3.3.2 Trip generation and assignment

The 2014 ES considered a worst case of six employees per day for HDD activities. By comparison, the proposed change to either a microtunnelling or segmental tunnelling technique would require up to 37 employees, leading to a net increase of up to 31 employees per day. When applying the car-share ratio of 2.5 employees per vehicle (as adopted within the 2014 ES) it can be concluded that there could be up to 13 additional employee vehicle movements per day associated with a change from HDD to a microtunnelling or segmental tunnelling technique (13 in at the start of the day and 13 out at the end of the day).

Using either a microtunnelling or segmental tunnelling technique will require a peak of up to 74[2] two-way daily HGV movements. Of these 74 two-way daily HGV movements, 28 movements would travel to the reception pit location (access 2 off Redcar Road) and 46 would travel to the drive pit location (access 3 off the A174). The 2014 ES did

[2] *A two-way movement represent the inbound and outbound trip, i.e. 74 two-way movements equates to 37 arrivals and 37 departures.*

not include for a specific breakdown of HGV deliveries for HDD activities but outlined a requirement for up to 58 two-way HGV movements per day for deliveries associated with installing the haul road, cables and HDD works. As it is not possible to disaggregate the 2014 ES HDD traffic to enable a direct comparison of this activity, a worst-case of an additional 74 two-way HGV movements per day is considered here.

In order to understand if the net increase in employee and HGV vehicle movements would result in a material change to the 2014 assessed impacts, it is necessary to assign the vehicle movements to the study area. The study area for the 2014 ES was split into 14 separate sections known as links. A copy of Figure 3.2 from the 2014 ES showing each of these 14 links and their degree of sensitivity to change is provided in **Appendix 2** of this report.

The net increase in vehicle movements has been assigned to each of the links within the study area adopting the same distribution as used within the 2014 ES. **Appendix 3 Table 9** highlights the assignment of employee vehicle trips to the study area and **Appendix 3 Table 10** details the assignment of HGV trips to the study area.

3.3.3 Consideration of effects

Appendix 3 Table 11 presents a summary of the peak change in total daily movements in comparison to the 2015 background traffic flows used within the 2014 ES. For the purpose of allowing comparison with the 2014 ES, background traffic flows have not been increased to account for background traffic growth.

3.3.3.1 Route Screening

In accordance with GEART, a screening process adopting the following rules has been undertaken to identify routes that are likely to have sufficient changes in traffic flows and therefore require further consideration.

- Rule 1: Include highway links where traffic flows (or number of HGVs) are predicted to increase by more than 30%; and
- Rule 2: Include any other specifically sensitive areas where traffic flows (or number of HGVs) are predicted to increase by 10% or more.

It can be observed from **Appendix 3 Table 11** that link FF (the A174 south of Wilton) would continue to be above screening thresholds, whilst link KK (Redcar Road) would now experience an increase in traffic above GEART screening thresholds. The impacts on all other links are therefore considered to be no greater than previously assessed within the 2014 ES.

The significance of impacts upon links FF and KK are considered further for the effects of severance, amenity, road safety and driver delay.

3.3.3.1 Severance

The peak change in total traffic flow for link FF and KK remains significantly below 30% whereby GEART suggests adverse impacts may be experienced. The impact significance of an increase in traffic (associated with a change in approach to the trenchless crossing) upon severance would therefore be no greater than assessed in the 2014 ES (minor adverse).

3.3.3.2 Amenity

The peak change in total traffic and HGV flow for link FF and KK remains significantly less than a doubling of HGV component flows whereby GEART suggests adverse impacts may be experienced. The impact of an increase in traffic (associated with a change in approach to the trenchless crossing) upon amenity would therefore be no greater than assessed in the 2014 ES (minor adverse).

3.3.3.3 Highway safety

The 2014 ES considered the impact of an increase in traffic upon collision clusters[3] within the study area. Two collision clusters were identified along link FF and KK. A collision cluster was located along link FF (at the roundabout junction of the A174, A1053 and B1380) and a further cluster identified along link KK (at the roundabout junction of the B1269, Redcar Road and Plantation Road).

The 2014 ES identified that the junction of the B1269, Redcar Road and Plantation Road had experienced eight collisions within five years all of which resulted in slight injury and therefore the junction was identified as being of high sensitivity. The level of forecast daily traffic generated by the Project was however, not considered to significantly influence the accident frequency.

A review of the latest collision records[4] (collated between 2015 to 2019) identifies that the number of collisions at this junction has reduced from eight to one. The junction therefore no longer forms a collision cluster and consequently the sensitivity of the junction can be reduced to low. The impact of an increase in traffic (associated with a change in approach to the trenchless crossing) upon highway safety would therefore be no greater than previously assessed.

The 2014 ES identified that the junction of the A174, A1053 and B1380 had experienced 22 collisions within five years, one of which resulted in a fatal injury and the remainder in slight injuries. The junction was therefore identified as being of high sensitivity. During the development of the 2014 ES, discussions with Highways England (then known as the Highways Agency) identified that the junction was improved as part of the works for the Teesport Northern Gateway development and therefore benefited from enhanced road safety measures. It was therefore agreed the road safety measures were appropriate to mitigate the identified collisions and improve road safety at the junction.

A review of the latest collision records (collated between 2015 to 2019) identifies that the number of collisions has significantly reduced from 22 to six. Recognising the significant improvement in baseline road safety and that the total change in daily traffic would be less than 0.2% (a change from 1.8% in the 2014 ES to 2.0% with the change in approach to the trenchless crossing) it is considered that the impact upon highway safety would be no greater than previously assessed.

A review of the latest collision records (collated between 2015 to 2019) along links FF and KK has also identified that there are no new collision clusters from those identified within the 2014 ES.

3.3.3.4 Driver delay

With regard to driver delay, the 2014 ES noted that whilst it is recognised that percentage impacts are not always a suitable measure of network performance, that peak increases in background traffic flows of up to 2.6% would be

[3] *Defined as roundabouts with four or more collisions and priority/signal-controlled junctions with three or more collisions within a five-year period.*

[4] www.crashmap.co.uk

indiscernible within daily and seasonal fluctuations in traffic and therefore unlikely to result in an adverse impact upon network operation.

With the proposed changes the increase in network traffic flows within the study area is forecast to increase to 2.8%. It is considered that a change of traffic flows of up to 2.8% would continue to be indiscernible within daily and seasonal fluctuations in traffic and therefore unlikely to result in an adverse impact upon network operation.

3.3.4 Traffic and Access Summary

It has been demonstrated that a change in methodology from HDD to the use of microtunnelling or segmental tunnelling techniques would not lead to any new, or materially different, likely significant effects for the traffic and access assessment. **The Network Rail crossing works are therefore not anticipated to give rise to any new, or materially different, likely significant effects upon traffic and access than those presented in the 2014 ES**.

3.4 Noise and vibration

The construction of the cable chamber has the potential to cause impacts related to noise and vibration. The 2014 ES (Figure 6.1 in Chapter 29 Noise and Vibration) identified noise sensitive receptors adjacent to the Network Rail crossing (R3 Ryehills Farm and R4 Bridge Farm). The existing environment was characterised as having dominant road traffic noise and noise audible from the sewage treatment works (M3, Table 4.4 in Chapter 29). The additional housing development could potentially experience noise impacts, however noise sensitive receptor R4 Bridge Farm is considered to be representative of this housing development, as it is in closer proximity to the crossing.

The assessment in the 2014 ES was based on the worst-case scenario of noise levels from cable installation and the HDD works occurring at the same time, with all noise-producing plant located as close as possible to nearby receptors.

A medium magnitude was identified at Bridge Farm and low at Ryehills Farm. The indicative locations of the construction compounds associated with the Network Rail crossing amendment are not in the immediate vicinity of any residential properties. As such, with a range of good practice mitigation measures identified in **Table 8**, minor residual impacts were predicted for Ryehills Farm and Bridge Farm in the 2014 ES. This mitigation was proposed in the 2014 ES and is secured through the DCO under Requirement 27 the production of a Code of Construction Practice (COCP), which includes a requirement for construction noise and vibration management.

Table 8 Potential mitigation measures in relation to construction noise

Mitigation measures
To reduce potential construction noise impacts at receptors where the magnitude of impact is predicted to be greater than low, a solid site boundary hoarding fence, approximately 2.4 m in height, could be erected prior to commencement of cable installation and remain in place until the works are complete in the relevant section of the cable route. Any fence would be located as close to the receptor as possible but still remaining within the easement.
A set of generic Best Practice working practices referred to as Best Practicable Means (BPM) are advised to be employed during the construction phase. Examples of typical BPM include: • Locating static noisy plant in use as far away from noise sensitive receptors as is feasible for the particular activity; • Ensuring that plant and equipment covers and hatches are properly secured and there are no loose fixings causing rattling; • Using the most modern equipment available and ensuring such equipment is properly maintained and operated by trained staff;

Mitigation measures
• Using silenced equipment where possible, in particular silenced power generators if night-time power generation is required for site security or lighting; • Ensuring that vehicles and mobile plant are well maintained such that loose body fittings or exhausts do not rattle or vibrate; • Ensuring plant machinery is turned off when not in use; • Imposition of vehicle speed limits for heavy goods vehicle traffic travelling on access roads close to receptors and ensuring that vehicles do not park or queue for long periods outside residential properties with engines running unnecessarily; • Ensuring, where practicable, that site access routes are in good condition with no potholes or other significant surface irregularities; • Maintaining good public relations with local residents that may be affected by noise from the construction works. Effective communication should be established prior to construction works, 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. Leaflet drops, posters and public meetings or exhibitions are an effective method of keeping local residents informed; • Provision of contact details for a site representative in the event that disturbance due to noise or vibration from the construction works occurs; ensuring that any complaints are dealt with promptly and that subsequent resolutions are communicated to the complainant; and • If night-time works are envisaged, then a Section 61 Prior Consent Notice should be sought from RCBC. • This is a formal agreement that construction noise will be managed in accordance with 'best practicable means' (as outlined above). • BS 5228 states that where a barrier completely screens line-of-sight of a noise source, a reduction of around 10dB can be expected. Any barrier should be of a substantial construction, with no holes or gaps and be approximately 10kg/m^2 in density.

For the construction of the cable chamber, it is anticipated that due to the depth of excavation (around 16 m), ground level noise from the use of microtunnelling or segmental tunnelling techniques will be negligible. In terms of above ground plant such as generators and de-sanding equipment, the noise levels are expected to be comparable to that produced during standard HDD operations. The Projects have also committed to no HGV movements at night associated with soil removal. Appropriate noise mitigation therefore remains as per **Table 8** with residual minor impacts associated with the two nearest receptors. It is not deemed that other site or off-site mitigation is required.

As a result, the cable chamber will not lead to any new, or materially different, likely significant effects for the noise and vibration assessment. **The Network Rail crossing works are therefore not anticipated to give rise to any new, or materially different, likely significant effects from noise and vibration than those presented in the 2014 ES**.

4 Conclusion

This Environmental Report has considered proposed amendments to the Projects in relation to the DCO stages, onshore HVDC and HVAC cables, and the proposed Network Rail crossing works for the purposes of an NMC application.

With respect to the DCO stages and onshore HVDC and HVAC cable amendments, the parameters controlled by the DCO and as considered in the 2014 ES remain unchanged, including the overall construction period and the time

limits for commencement. The amendments to the DCO stages and onshore HVDC and HVAC cables, therefore, do not affect the assessments presented in the 2014 ES.

With respect to the Network Rail crossing works, this report provides information to:

1. Describe the justification for, and nature and location of, the Network Rail crossing works;
2. Consider further potential effects of the amendments alongside the outcome of the original assessment presented within the 2014 ES; and
3. Provide confirmation that no new, or materially different, likely significant effects will arise as a result of the amendments during construction or operation.

A screening exercise was undertaken to compare the proposed amendments against the topics considered in the 2014 ES. Topics screened in for further consideration in relation to the Network Rail crossing were:

- Geology, water resources and land quality;
- Terrestrial archaeology;
- Traffic and access; and
- Noise and vibration.

This report considers the characteristics in **Section 1.2** against the proposed amendments and demonstrates that there are no new, or materially different, likely significant effects, no additional compulsory acquisition of land required, no requirement for an HRA and no additional impacts on businesses and residents as a result of the proposed amendments. As a result, it is appropriate for the application to be approved as an NMC to the DCO.

5 References

COWI (2020) Sofia/ TSA Onshore Cable Corridors – Railway Crossing Options – Constructability And Risks.

Department for Communities and Local Government (2015) Guidance on Changes to Development Consent Orders. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/485064/Making_changes_guidance_to_Development_Consent_Orders.pdf

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ICNIRP (2009) Statement on the “Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz). Health Physics 97 (3): 257-259, 2009.

6 Appendix 1: Figures

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7 Appendix 2: Traffic Figures

29.11.16

8 Appendix 3: Additional traffic information

Table 9 Distribution of employee vehicle movements to the study area

Trip destination	Trip origin	Trip origin % distribution	No. of net employee vehicle movements	Net, daily two-way employee vehicle movements per link													
				AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN
Access 3 - A174 (link NN)	Via A66	26%	26		7	7			7		7						7
	Via A174 (west)	30%						8	8		8						8
	Via A1042	17%								5	5						5
	Via A1085	13%				3			3		3						3
	Via A174 (east)	14%														3	3
Total two-way daily employee vehicle movements per link					**7**	**10**		**8**	**18**	**5**	**23**					**3**	**26**

Table 10 Assignment of HGV movements to the study area

Trip destination	Trip origin	Trip origin % distribution	No. of net employee vehicle movements	Net, daily two-way HGV movements per link													
				AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN
Access 3 - A174 (link NN)	Via A66	56%	46		26	26			26		26						26
	Via A174 (west)	44%						20	20		20						20
Access 2 - Redcar Road (link KK)	Via A66	56%	28		16	16			16		16			16			
	Via A174 (west)	44%						12	12		12			12			
Total two-way daily HGV movements per link					**42**	**32**		**32**	**74**		**74**			**28**			**46**

Table 11 Existing, consented and proposed daily traffic flows

Link	Description	Link Sensitivity	Background 2015 flows		2014 ES consented peak daily construction flows		Revised peak daily construction flows		2014 ES percentage increase		Revised percentage increase	
			All vehicles	HGVs	Total vehicles	HGVs	Total Vehicles	HGVs	Total Vehicles	HGVs	Total Vehicles	HGVs
AA	A1085 (Trunk Road)	Low	No change									
BB	A1053 (Tees Dock Rd)	Low	23,267	1,862	415	291	464	333	1.8%	15.6%	2.0%	17.9%
CC	A1053 (Greystone Rd)	Low	16,055	1,302	415	291	457	323	2.6%	22.4%	2.8%	24.8%
DD	B1380 (High St)	High	No change									
EE	A174	Low	26,245	1,479	372	229	412	261	1.4%	15.5%	1.6%	17.6%
FF	A174 (south of Wilton)	Low	40,540	1,400	739	482	831	556	1.8%	34.4%	2.0%	39.7%
GG	A1042 (Kirkleatham Ln)	High	15,315	352	81	0	86	0	0.5%	0.0%	0.6%	0.0%
HH	A174 (south of Redcar)	Low	28,173	1,541	253	87	350	161	0.9%	5.6%	1.2%	10.4%
II	B1269 (Fishponds Rd)	Medium	No change									
JJ	Grewgrass Ln	Medium	No change									
KK	Redcar Rd	High	8,874	141	11	7	39	35	0.1%	5.0%	0.4%	24.8%
LL	A1085 (Coast Rd)	High	No change									
MM	A174 (south of Marske)	Low	No change									
NN	A174 (Redcar – Marske)	Low	28,173	1,541	173	32	245	78	0.6%	2.1%	0.9%	5.1%