5 Human Environment

5.1 Commercial Fisheries

5.1.1 Baseline Information

Introduction

5.1.1.1 This chapter of this Environmental Statement (ES) summarises the assessment of the potential impacts on commercial fishing from the construction, operation and decommissioning of the modified transmission infrastructure (modified TI). This includes up to two Alternating Current (AC) Offshore Substation Platforms (OSPs), inter-platform cabling and up to four export cables which will connect the OSPs to the grid connection point at New Deer. The two OSPs and associated cabling will be located within the boundary of the three consented wind farms. The modified offshore transmission infrastructure (modified OfTI) includes export cable(s) will run from the OSPs to the modified export cable route landfall site at Inverboyndie. Due to the changes in the route and the differences in the commercial fishery receptors associated with the modified route, this Environmental Impact Assessment (EIA) provides a full assessment of the modified OfTI.

5.1.1.2 The following technical reports and ES Chapters support this chapter:

- Technical Appendix 5.1 A (Commercial Fisheries) of the MORL ES (MORL, 2012);
- Technical Appendix 5.1 A (Commercial Fisheries);
- ES Chapter 8.1 (Commercial Fisheries) (MORL, 2012);
- ES Chapter 5.2 (Shipping and Navigation); and
- ES Chapter 4.2 (Fish and Shellfish Ecology).

5.1.1.3 Sections 5.1.1.9-5.1.1.14 below summarises the baseline which is described in full detail in Technical Appendix 5.1 A (Commercial Fisheries). This section includes a summary of the key fisheries identified as operating in the vicinity of the modified OfTI.

5.1.1.4 Potential effects on the salmon and sea trout fishery as a result of the modified OfTI are assessed within ES Chapter 4.2 (Fish and Shellfish Ecology). Due to the migratory behaviour of these species, it is considered appropriate to make an assessment of the fisheries in Chapter 4.2 as potential effects on the fishery will be as a result of potential effects on the species.

Consultations

5.1.1.5 EIA scoping reports for the three consented wind farms and associated OfTI were circulated to statutory and non-statutory consultees by MORL (2010, 2011). A further scoping report was issued for the modified OfTI in 2014. A number of issues and particular concerns to address in the EIA were raised in the scoping responses (Marine Scotland, 2010, 2011 and 2014). Those received from the 2014 scoping report, that are of direct relevance to the assessment of commercial fisheries are presented in Table 5.1-1. For further detail on other consultation done in relation to commercial fisheries and the modified OfTI, see section 4 of Technical Appendix 5.1 A (Commercial Fisheries).

5.1.1.6 Consultation has been undertaken with the organisations and individuals listed in Table 5.1-1. Where organisations have responded to the scoping opinion, this is highlighted. Full details of all scoping responses are provided in Chapter 1, section 1.4 of this ES.

Table 5.1-1 Responses to the 2014 Scoping Report

Organisation	Consultation response	MORL approach
Scottish Fishermen's Federation	Would expect cables to be buried as far as possible at a depth to ensure minimum risk from snagging or changes in seabed as a result of tidal movement. Where this is not possible, consultation and mitigation on alternative measures must be decided and agreed through the Moray Firth Commercial Fisheries Working Group. The SFF expect to see the cumulative and in combination impacts clearly illustrated along with any necessary mitigation. Provided information for inclusion in the baseline.	The potential effects of the cable to commercial fishing activity along with the appropriate mitigation methods (including cable burial and discussion through the Moray Firth Commercial Fisheries Working Group) are described in section 5.1.2. The cumulative and in combination effect to commercial fishing activity are described in section 5.1.3. The commercial fisheries baseline is provided in section 5.1.1 of this chapter and Technical Appendix 5.1: Commercial Fisheries.
Marine Scotland Science	ScotMap data should be used as a primary source of information. It would be worth ensuring good contact is made and consultation maintained with fisheries representatives in the area. VMS vessel fishery data indicates the key target species as nephrops, scallops and some demersal whitefish species. Squid is becoming increasingly important for vessels as there are fewer restrictions on vessels targeting this species. The fisheries baseline assessment was based on relatively old data (2000-2009), however MSS commercial fishing landings distribution maps relate to data from 2007-2011. MS could provide more up to date datasets in greater scale for a more informed baseline assessment. Baseline assessments of vessels under-15 m is very limited, thus overlapping the development with ScotMap layers is advised.	ScotMap data was included in Technical Appendix 5.1 A (Commercial Fisheries) to aid in establishing a coherent baseline upon which a robust assessment of potential effects can be made. Contact has been made and is ongoing with all relevant fisheries stakeholders. The commercial fisheries for *Nephrops,* scallops, demersal whitefish and squid have all been assessed separately for relevant effects. Maps provided by MSS have been used to prepare the commercial fisheries baseline and are presented in Technical Appendix 5.1 A: Commercial Fisheries. As above, ScotMap data has been included in preparing the baseline assessments.

5.1.1.7 Additionally, information provided through previous consultation for the three consented wind farms has been included in this assessment. This includes information provided by the following organisations:

- Caithness Static Gear Fishermen's Association;
- Fishermen's Association Limited;
- North East Inshore Fisheries Group;
- Scrabster Fishery Office;

- Buckie Fishery Office; and
- Aberdeen Fishery Office.

5.1.1.8 Further detail on the responses received from the 2010 and 2011 scoping documents are presented in the MORL ES (2012, Appendix 5.1 A: Commercial Fisheries Technical Report).

Baseline Characteristics

5.1.1.9 The commercial fisheries baseline is described in full in Technical Appendix 5.1 A (Commercial Fisheries). The principal commercial species targeted by gear type in the area of the modified OfTI are: *Nephrops* by demersal trawlers, king scallops by boat dredgers, squid by demersal trawlers, whitefish by demersal trawlers and crab and lobster by creelers. There is also some mackerel hand-lining activity in the area.

5.1.1.10 In the Moray Firth, *Nephrops* are targeted along the southern Moray Firth coast; under-15 m vessels predominantly fish in the inner Firth whereas over-15 m vessels target grounds further offshore. The modified export cable route corridor passes through areas of high intensity *Nephrops* grounds fished by the over-15 m fleet and under-15 m fleet when the weather is favourable. *Nephrops* are targeted throughout the year with a peak in activity in June and July. Activity in the vicinity of the three consented wind farms is negligible.

5.1.1.11 The majority of scallop dredging activity is recorded in central areas of the Moray Firth with discrete grounds located in the vicinity of the modified export cable route corridor and three consented wind farms. Scallops are targeted by vessels over-15 m deploying boat dredges. The majority of vessels fishing for scallops in the Moray Firth belong to the nomadic fleet and will target grounds around the UK, in addition to those in the Moray Firth. Scallops are targeted all year with the majority of activity recorded between June and September.

5.1.1.12 Squid are fished throughout the Moray Firth, however they are a sporadic species and landings have fluctuated considerably over the past ten years. As a result, it is considered that squid fishing grounds can occur anywhere within the Moray Firth. A high proportion of vessels targeting *Nephrops* will seasonally switch their gear to target squid when *Nephrops* stocks are low or quota is restricted. In addition to these vessels, there are also visiting vessels based at home ports outside the Moray Firth which will seasonally target squid in the area when they are present. The majority of squid landings are recorded between July and November.

5.1.1.13 There are a limited number of vessels which trawl for whitefish species such as cod and haddock. This activity occurs to the north of the three consented wind farms and in the eastern Moray Firth, off the coast at Fraserburgh and Peterhead. Activity within the immediate area of the modified OfTI is limited.

5.1.1.14 Creelers target crab and lobster in the coastal areas of the Moray Firth. The majority of vessels are under-10 m in length. Crab and lobster are caught throughout the year with the majority of landings occurring between June and November. Within the area of the modified export cable landfall site at Inverboyndie, six full time creelers have been identified as operating. There are also a number of part time vessels who will set a small number of creels in inshore areas during the summer months. In addition to creeling, some vessels will seasonally hand-line for mackerel in the same area.

Desktop Studies

5.1.1.15 In addition to the consultation with commercial fishermen and their representatives (see Table 5.1) to inform the baseline outlined above, a desktop review was undertaken of available data and information from the following key sources:

- Marine Scotland Science (MSS);
- International Council for the Exploration of the Seas (ICES);
- Marine Management Organisation (MMO);
- European Commission – Fisheries (Europa);
- Scientific research and other relevant publications; and
- Brown and May Marine in-house databases.

5.1.1.16 As there is currently no single data source or recognised model to establish a commercial fisheries baseline, the approach has incorporated a wide range of relevant data and information sources. Technical Appendix 5.1 A (Commercial Fisheries) outlines the relevant information and data and provides information on the varying limitations, sensitivities and uncertainties.

Legislative and Planning Framework

5.1.1.17 The assessment of potential effects from the modified OfTI on commercial fishing activities takes into account the following guidance:

- British Wind Energy Association (BWEA) (2004) Recommendations for fisheries liaison;
- Centre for Environment, Fisheries and Aquaculture Science (Cefas) (2012) Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects. Contract report;
- Cefas, Marine Consents and Environment Unit (MCEU), Department for Environment, Food and Rural Affairs (DEFRA) and Department of Trade and Industry (DTI) (2004) Offshore Wind Farms - Guidance note for Environmental Impact Assessment In respect of FEPA and CPA requirements, Version 2;
- Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) (2014) Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison;
- Renewable UK (2013) Cumulative impact assessment guidelines; Guiding principles for cumulative impacts assessments in offshore wind farms;
- Sea Fish Industry Authority and UK Fisheries Economic Network (UKFEN) (2012) Best practise guidance for fishing industry financial and economic impact assessments;
- Blyth-Skyrme (2010) Options and opportunities for marine fisheries mitigation associated with wind farms. Final report for Collaborative Offshore Wind Research into the Environment;
- International Cable Protection Committee (ICPC) (2009) Fishing and Submarine Cables - Working Together;
- Marine Scotland, Strategic Environmental Assessment (SEA) of Draft Plan for Offshore Wind Energy in Scottish Territorial Waters (STW): Volume 1: Environmental Report (Marine Scotland, 2010);
- The Department for Energy and Climate Change (DECC), UK Offshore Energy SEA (DECC, 2009);

- UK Oil & Gas, Fisheries Liaison Guidelines (UK Oil & Gas, 2008); and
- Section 95 of the Energy Act 2004, The Electricity (Offshore Generating Stations) (Safety Zones) (Application Procedures and Control of Access) Regulations 2007 and DECC Guidance on 'Applying for safety zones around offshore renewable energy installations'.

5.1.2 Impact Assessment

Summary of Effects and Mitigation

5.1.2.1 This section presents an assessment of the likely significant effects of the construction, operation and decommissioning of the modified OfTI on commercial fisheries.

5.1.2.2 Potential impacts are as provided in the Cefas and MCEU guidelines which specify requirements for the assessment of impacts on commercial fisheries are listed below.

- Implications for fisheries during the construction phase:
  - Adverse effects on commercially exploited fish and shellfish populations;
  - Adverse effects on recreational fish populations;
  - Temporary loss or restricted access to traditional fishing grounds;
  - Safety issue for shipping, including fishing vessels;
  - Increased steaming times to fishing grounds; and
  - Interference with fisheries activities.
- Implications for fisheries during the operation phase:
  - Adverse effects on commercially exploited fish and shellfish populations;
  - Adverse effects on recreational fish populations;
  - Complete loss or restricted access to traditional fishing grounds;
  - Obstacles on the sea bed post-construction;
  - Safety issue for shipping, including fishing vessels;
  - Increased steaming times to fishing grounds; and
  - Interference with fisheries activities.

5.1.2.3 In addition to the potential effects above, the following effect has been identified through stakeholder consultation and is considered for both the construction and operational phases:

- Displacement of fishing activity into other areas.

5.1.2.4 As mentioned previously, adverse effects on recreational fish populations, such as salmon and sea trout, are assessed in ES Chapter 4.2 (Fish and Shellfish Ecology).

Embedded Mitigation

5.1.2.5 In line with standard industry practice, dialogue will be ongoing with fishermen prior to and during the construction and operational phases to ensure that project information is effectively disseminated to fishermen, as well as allowing for issues to be raised by the fishing community. This will be assisted by Fishing Industry Representatives (FIRs) and a Fisheries Liaison Officer (FLO). Additionally, all information regarding activities at sea will be disseminated through Notice to Mariners (NtMs) published in Kingfisher and distributed to the wider fishing community.

5.1.2.6 Cables will be buried to a target depth of 1 m, where it is technically practicable to do so, which will reduce the risk to fishing vessels from snagging. In instances where adequate burial cannot be achieved an appropriate cable protection will be used. Over-trawlability surveys will be undertaken as necessary along areas of the cable route where potential snagging risks (such as clay berms) could be located, to reduce risks to the vessels operating trawled gear. Fishing vessels have previously been used to undertake surveys in the area and it is feasible that this will continue throughout all phases of development.

5.1.2.7 Engagement with the creel fishery for offshore surveys has already been undertaken and gear removal successfully negotiated to reduce interference to those fishing activities. This engagement will continue into the construction, operation and decommissioning phases.

Summary of Effects

5.1.2.8 The main fisheries present within the area of the modified OfTI are trawling for *Nephrops*, squid and whitefish, dredging for scallops, creeling for crab and lobster and hand-lining for mackerel.

5.1.2.9 Fishing activity is expected to be restricted in discrete areas of the modified OfTI corridor during construction. It is considered however, that during operation, vessels will be able to regain access to fishing grounds located within the modified OfTI corridor.

5.1.2.10 During the construction phase, a significant moderate effect is predicted on the crab and lobster fishery due to potential temporary loss of fishing area, displacement into other grounds and interference with fishing vessels. Effects on the *Nephrops*, scallop, squid, whitefish and mackerel fisheries, during construction are considered, at worst, minor, which is not significant in Environmental Impact Assessment (EIA) terms.

5.1.2.11 Safety issues for fishing vessels will be reduced to within acceptable levels by the application of safety zones where construction activity takes place.

5.1.2.12 Cables will be buried or protected by other means where target burial depth is not possible and, although OSPs will be present, the area occupied by these will be discrete. It is considered that fishing activities would be able to resume their normal fishing patterns and practices once the modified OfTI is operational and therefore no significant effects have been identified.

5.1.2.13 During the decommissioning phase, likely significant effects are considered to be, at worst, no greater than those identified for the construction phase.

Summary of Proposed Mitigation Measures and Residual Effects

5.1.2.14 The Moray Firth Commercial Fisheries Working Group (MFCFWG) has been established and will continue to facilitate future engagement with the fishing industry. Working practices will also be agreed to achieve any possible reduction in interference. A construction management plan will be defined in consultation with fishing interests which clearly establishes protocol for engagement between Moray Offshore Renewables Limited (MORL) and fishermen throughout the construction period. Where necessary, a mitigation strategy will be devised through the means of the Moray Firth Commercial Fisheries Working Group (MFCFWG). MORL has committed to a draft Commercial Fisheries mitigation strategy as part of the applications for the Project (i.e. the three consented wind farms and export cable route to Fraserburgh). This strategy is referred to in the conditions in the Section 36

consents for the three wind farms and addresses both wind farm and transmission infrastructure.

5.1.2.15 MORL is committed to continuing the exploration and development of mitigation options in consultation with the fishing industry. At the current time, MORL is proposing to undertake fishing trials using modified scallop dredge gear with a view to identifying enhancements to traditional scallop fishing practices that may be of benefit to both the developer and the scallop fleet. At present Bangor University is preparing a feasibility report for these trials which will be consulted on with the scallop industry during the summer of 2014.

5.1.2.16 MORL will continue to facilitate ongoing dialogue throughout the pre-construction, construction and operational phases of the development, which will continue to discuss the mitigation options under investigation, as well as defining the protocol for engagement during the construction and operation phases.

5.1.2.17 A summary of the effects, receptors and the level of impact significance pre- and post-mitigation is provided in Table 5.1-2.

Table 5.1-2 Impact Assessment Summary

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Construction & Decommissioning				
Adverse effects on commercially exploited fish and shellfish populations	Underwater disturbance to the seabed – all target species except squid	Minor significance	None	Minor significance
	Underwater disturbance to the seabed – squid	Minor significance		Minor significance
	Noise – whitefish	Minor significance	Soft start piling	Minor significance
	Noise – herring	Minor significance		Minor significance
	Noise – shellfish	Minor significance		Minor significance
Adverse effects on recreational fish populations	Underwater disturbance to the seabed – salmon and sea trout	Minor significance	None	Minor significance
	Noise – salmon and sea trout	Minor significance	Soft start piling	Minor significance
Temporary loss or restricted access to fishing grounds	Over-15 m *Nephrops* trawling	Minor significance	Ongoing discussions through the MFCFWG to include development of mitigation strategies and construction schedules	Minor significance
	Under-15 m *Nephrops* trawling	Minor significance		Minor significance
	Scallop dredging	Minor significance		Minor significance

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
	Squid trawling	Minor significance	Cable burial and protection Over-trawlability surveys Ongoing fisheries liaison	Minor significance
	Whitefish trawling	Minor significance		Minor significance
	Creeling	Moderate significance		Minor significance
	Hand-lining for mackerel	Minor significance		Minor significance
Safety issues for fishing vessels	All vessels	Within acceptable limits	Updates on the construction programme will be provided to the fishing industry through the forum of the MFCFWG, FIRs, FLO and NtMs Safety zones and adherence to standard maritime practices	Within acceptable limits
Increased steaming times to fishing grounds	Over-15 m *Nephrops* trawling	Minor significance	Ongoing discussions through the MFCFWG to include development of mitigation strategies and construction schedules Ongoing fisheries liaison	Minor significance
	Under-15 m *Nephrops* trawling	Minor significance		Minor significance
	Scallop dredging	Minor significance		Minor significance
	Squid trawling	Minor significance		Minor significance
	Whitefish trawling	Minor significance		Minor significance
	Creeling	Minor significance		Minor significance
	Hand-lining for mackerel	Minor significance		Minor significance
Displacement of fishing activity	Over-15 m *Nephrops* trawling	Minor significance	Ongoing discussions through the MFCFWG to include development of mitigation strategies and construction schedules Cable burial and protection Over-trawlability surveys Ongoing fisheries liaison	Minor significance
	Under-15 m *Nephrops* trawling	Minor significance		Minor significance
	Scallop dredging	Minor significance		Minor significance
	Squid trawling	Minor significance		Minor significance
	Whitefish trawling	Minor significance		Minor significance
	Creeling	Moderate significance		Minor significance
	Hand-lining for mackerel	Minor significance		Minor significance
Interference with	Towed gear vessels	Minor significance	Ongoing discussions	Minor significance

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
fishing vessels	Static gear vessels	Moderate significance	through the MFCFWG to include development of construction schedules Ongoing fisheries liaison Information distributed through FIRs, FLO and NtMs	Minor significance
Operation				
Adverse effects on commercially exploited fish and shellfish populations	EMFs – Shellfish	Minor significance	Cable burial/protection	Minor significance
	EMFs – Other commercial fish species	Minor significance		Minor significance
Adverse effects on recreational fish populations	EMFs – salmon and sea trout	Minor significance	Cable burial/protection	Minor significance
Complete loss or restricted access to fishing grounds	Over-15 m *Nephrops* trawling	Minor significance	Ongoing discussions through the MFCFWG Cable burial and protection Ongoing fisheries liaison	Minor significance
	Scallop dredging	Minor significance		Minor significance
	Squid trawling	Minor significance		Minor significance
	Whitefish trawling	Minor significance		Minor significance
Safety issues for fishing vessels	All vessels	Within acceptable limits	Ongoing fisheries liaison Information distributed through FIRs, FLO and NtMs	Within acceptable limits
Increased steaming times to fishing grounds	Over-15 m *Nephrops* trawling	Minor significance	Ongoing discussions through the MFCFWG Cable burial and protection Ongoing fisheries liaison	Minor significance
	Scallop dredging	Minor significance		Minor significance
	Squid trawling	Minor significance		Minor significance
	Whitefish trawling	Minor significance		Minor significance
Obstacles on the seabed post-construction	All vessels	Within acceptable limits	Seabed rectification procedures Over-trawlability surveys Compliance to obligatory standards by contractors	Within acceptable limits
Displacement of fishing activity	Over-15 m *Nephrops* trawling	Minor significance	Ongoing discussions through the	Minor significance

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
	Scallop dredging	Minor significance	MFCFWG Cable burial and protection Ongoing fisheries liaison	Minor significance
	Squid trawling	Minor significance		Minor significance
	Whitefish trawling	Minor significance		Minor significance
Interference with fishing vessels	Static gear vessels	Minor significance	Ongoing fisheries liaison Information distributed through FIRs, FLO and NtMs	Minor significance
	Towed gear vessels	Minor significance		Minor significance

Introduction to Impact Assessment

5.1.2.18 Establishing a commercial fisheries baseline upon which a robust assessment of effects can be made requires utilising a number of data and information sources. It should be noted that different data and information sources are subject to varying sensitivities and limitations which have been taken into account in the following assessment. The aim has been to provide a detailed account of commercial fishing activities using all sources currently available.

5.1.2.19 Responses arising from the scoping exercise, as well as any issues and concerns identified during the course of consultation have informed the following assessments.

Rochdale Envelope Parameters Considered in the Assessment

5.1.2.20 A worst case scenario for the effect of the installation / decommissioning and operation of the modified OfTI upon commercial fishing activities has identified the design parameters which will realistically have the greatest effect upon the fishing activities described in the baseline.

5.1.2.21 The principal factor in determining the design parameters that will constitute a worst case is the consideration of how the fishing activities described in the baseline will be most affected. This could occur in two ways: the first is the potential for the modified OfTI to cause adverse effects to fish and shellfish populations of commercial importance and hence result in reduced fishing productivity. Whilst this type of effect is briefly discussed within this section, it is more fully assessed in ES Chapter 4.2 (Fish and Shellfish Ecology). Second, there is the potential for the modified OfTI to constitute a physical obstacle or risk to the continuation of normal fishing activities as described in the baseline. Accepting that the Fish and Shellfish Ecology assessment will identify the worst case parameters for the first issue, it is the second which determines the parameters of a worst case for commercial fishing activities and which may result in the identifying of design parameters different to those identified as the worst case for incurring effects to species.

5.1.2.22 below summarises the design parameters considered to constitute a realistic worst case scenario for the continuation of normal fishing activities as described in the baseline.

Table 5.1-3 Design Envelope Parameters relevant to the Commercial Fisheries Impact Assessment

Potential Effect	Design Envelope Scenario Assessed
Construction & Decommissioning	
Adverse effects on commercially exploited fish and shellfish populations	• See ES Chapter 4.2: Fish and Shellfish Ecology
Temporary loss or restricted access to fishing grounds	• Maximum loss of fishing grounds resulting from maximum number of safety zones around construction works. The maximum number of infrastructure to be constructed will result in the highest number of safety zones: o Maximum number of OSPs in the area of the three consented wind farms with jacket substructures – two 100 x 100 m o Inter-platform cable route length plus to export cable to wind farm boundary – approximately 70 km o Offshore export cable route length from the southern boundary of the MacColl wind farm – approximately 52 km o Maximum number of export cables – 4 o Maximum width of export cable trenches – 4 x 6 m o Maximum construction period – 18 months
Safety issues for fishing vessels	• See Chapter 5.2: Shipping and Navigation o In addition, the worst case scenario should also recognise the safety risks posed from the construction of the infrastructure detailed above
Increased steaming times	• Maximum number of safety zones in the area resulting in increased steaming times
Displacement of fishing activity	• Maximum number of safety zones in the area resulting in fishing activity being displaced into other grounds and impacting fishermen in that area. An indirect effect could result in conflict between static and mobile vessels and/or increased competition for a limited resource
Interference with fishing activities	• Location of port (not currently known) for construction and maximum number of construction works vessels – 6 vessels working 255 days/year for 18 months in two phases (installation of 1 OSP and 2 cables in 2017 and potentially a further 1 OSP and 2 cables in 2020)
Operation	
Adverse effects on commercially exploited fish and shellfish populations	• See ES Chapter 4.2: Fish and Shellfish Ecology
Loss or restricted access to fishing grounds	• Maximum number of OSPs in the area of the three consented wind farms with jacket substructures – two 100 x 100 m
Safety issues for fishing vessels	• See Chapter 5.2: Shipping and Navigation o Maximum number of OSPs in the area of the three consented wind farms with jacket substructures – two 100 x 100 m
Increased steaming times	• None foreseen
Obstacles on the seabed post-construction	• Any construction related obstacles and changes to seabed conditions including cable burial and protection
Displacement of fishing activity	• Maximum number of OSPs in the area of the three consented wind farms with jacket substructures – two 100 x 100 m
Interference with fishing activities	• None foreseen in addition to potential operational effects above

5.1.2.23 The offshore export cable(s) will be buried to a target depth of 1 m based on site specific seabed conditions. Where adequate burial cannot be achieved alternative protection such as mattress or rock placement will be used. The appropriate post-construction surveys and, if necessary, seabed rectification procedures will be undertaken to ensure that fishing vessels are able to safely resume activities in the modified OfTI once operational.

EIA Methodology

5.1.2.24 The following section describes the impact assessment methodology, which has been applied to the commercial fisheries baseline. In the absence of published guidelines by Marine Scotland regarding the assessment of effects of wind farm developments (including export cables) upon commercial fishing activities, the aspects requiring assessment for the proposed development are as specified in the Cefas/MCEU *et al*. (2004) Guidelines, as follows.

- Implications for fisheries during the construction phase:
  - Adverse effects on commercially exploited fish and shellfish populations;
  - Adverse effects on recreational fish populations;
  - Temporary loss or restricted access to traditional fishing grounds;
  - Safety issue for shipping, including fishing vessels;
  - Increased steaming times to fishing grounds; and
  - Interference with fisheries activities.
- Implications for fisheries during the operation phase:
  - Adverse effects on commercially exploited fish and shellfish populations;
  - Adverse effects on recreational fish populations;
  - Complete loss or restricted access to traditional fishing grounds ;
  - Obstacles on the sea bed post-construction;
  - Safety issue for shipping, including fishing vessels;
  - Increased steaming times to fishing grounds; and
  - Interference with fisheries activities.

5.1.2.25 In addition to the potential effects above, the following effect has been identified through stakeholder consultation and is considered for both the construction and operational phases:

- Displacement of fishing activity into other areas.

5.1.2.26 Effects shall be assessed separately for the construction, operation and decommissioning phases for each identified receptor group. For the purposes of this assessment and in the absence of detailed information on decommissioning schedules and methodologies, it is assumed that any effects derived from the decommissioning phase will, at worst, be of no greater significance than those derived from the construction phase and are likely to be significantly less (e.g. there will be no piling works during decommissioning).

5.1.2.27 Displacement effects will be considered to occur if a significant loss of fishing area is identified.

5.1.2.28 Safety issues for commercial fishing and increased steaming times to fishing grounds will be assessed in full as part of Chapter 5.2: Shipping and Navigation and summarised within this chapter where relevant.

5.1.2.29 Impacts upon fish and shellfish stocks, including commercially exploited species will be assessed in full in Chapter 4.2: Fish and Shellfish Ecology assessment and summarised in the commercial fisheries chapter where relevant.

Assessment Limitations

5.1.2.30 The principal limitation of an assessment of effects upon commercial fishing activities is the potential of the established baseline to change over time. This may be for a number of reasons; fluctuations in landings, changes in legislation and management policies and economic constraints such as fuel costs and crew availability. As a result the scope of the impact assessment undertaken is limited by the baseline identified.

5.1.2.31 As discussed in Technical Appendix 5.1 A (Commercial Fisheries), the king scallop fishery is largely nomadic, with the exception of several smaller and predominantly inshore vessels, variously targeting grounds around the UK. Although it is noted that individual vessels may spend more time in certain regional areas such as the Moray Firth, it is not possible within the scope of this assessment to consider the extent of an impact on a vessel by vessel basis. Instead, scallop grounds affected by the modified OfTI have been considered within the context of their relative importance to the Moray Firth, as well as to available scallop grounds around the UK.

5.1.2.32 Changes to the behaviour of species of commercial importance in the offshore marine environment, arising from the construction/decommissioning and operation of the modified OfTI, may indirectly affect commercial fishing activities. An assessment of the potential effects upon fish and shellfish species is provided in Chapter 4.2: Fish and Shellfish Ecology and the findings summarised in the relevant sections below. It should be noted that the methodology used to assess impacts on fish and shellfish species (including significance criteria) differs from the one used to assess commercial fisheries, as the former is based on the Institute of Ecology and Environmental Management (IEEM, 2010) guidelines for ecological impact assessment (see Chapter 4.2: Fish and Shellfish Ecology).

Significance Criteria

5.1.2.33 The magnitude of an effect is considered for each type of effect on a fishery by fishery basis. In each instance, the following characteristics are taken into account.

- The extent of effects: (for development specific assessments) referring to the full area over which the effect occurs. With the exception of effects on commercially exploited species, the extent of the effect will be the extent of the area(s) from which a category of fishing is excluded during the construction/decommissioning and operational phases.
- Duration: the duration over which the effect is expected to last. With the exception of effects on commercially exploited species, the effects will either be temporary related to the duration of the construction phase or permanent relating to the operational phase.
- Reversibility: Irreversible effects are those from which recovery is not possible within a reasonable timescales. Reversible (temporary) are effects from which full spontaneous recovery is possible or for which effective mitigation is both possible and will be implemented.

5.1.2.34 The magnitude of an effect has been assessed as negligible, low, medium or high, using the following criteria.

- Negligible: there is no discernible effect upon current fishing practices.
- Low: there is no noticeable effect upon current fishing practices.
- Medium: a discernible effect upon current fishing practices.
- High: fishing activities are noticeably and permanently affected.

5.1.2.35 The definition of the magnitude of effects takes account of the principal concern expressed by fishermen during the various consultation meetings. Primarily this relates to effects associated with exclusion and/or restriction from traditional fishing grounds and displacement impacts in a wider Moray Firth context. It also recognises that the magnitude of effects will differ between receptor groups as a consequence of the proportional extent of fishing areas affected.

5.1.2.36 Due to the high seasonality of certain fisheries, it is not possible to standardise the definition of duration of effects. For example, whilst an effect may be of short duration, if it coincides with the entire period of a valuable seasonal fishery, the consequences will differ from when an effect occurs during a year round fishery.

5.1.2.37 The sensitivity of a receptor will be assigned taking account of its degree for adaptability, tolerance and recoverability to the potential effect. In addition, the following parameters will be considered.

- Value: referring to the proportional value of the fishery affected by the modified OfTI.
- Tolerance: the ability of the fishery (i.e. vessels) to withstand temporary or permanent effects.
- Recoverability: referring to the degree to which a receptor group can resume baseline fishing activities.
- Adaptability: referring to the degree to which a receptor group can adapt to alternative similarly productive fishing methods, operating patterns or areas.

5.1.2.38 The sensitivity of each fishery has been assessed as low, medium or high using the following criteria.

- Low sensitivity: no significant change to current fishing practices.
- Medium sensitivity: discernible changes to current fishing practices.
- High sensitivity: fishing activities are significantly and permanently affected.

5.1.2.39 It is not within the scope of the assessment to consider the extent of an effect on a vessel by vessel basis but rather receptors have been identified based on fishing method and geographical extent of fishing grounds.

5.1.2.40 The significance criteria as defined in Table 5.1-4 have been used for this assessment. It should however be noted that the impacts of the construction/decommissioning and operation of the modified OfTI upon commercial fishing activities cannot be easily categorised and the application of the significance criteria to an assessment of effects is, as a result, subjective.

5.1.2.41 In the instances whereby the potential effect of the modified OfTI pose a risk to the health and safety of a fishing vessel and crew, the significance criteria used for this assessment cannot be applied. Instead, the risk is assessed to be within or outside acceptable limits (a risk is considered outside of acceptable limits if they are greater than those incurred during the course of normal fishing operations). For further details see Chapter 5.2: Shipping and Navigation.

5.1.2.42 It should further be noted that in instances where findings from the Fish and Shellfish Ecology Chapter have been summarised, the significance criteria used in that Chapter apply. For the purposes of this assessment any effect with a significance of moderate or above is significant for the purposes of EIA.

Table 5.1-4 Significance Criteria

		Sensitivity of Receptor		
		Low	**Moderate**	**High**
Magnitude	**Negligible**	Not significant	Minor significance	Minor significance
	Low	Minor significance	Minor significance	Moderate significance
	Moderate	Minor significance	Moderate significance	Major significance
	High	Moderate significance	Major significance	Major significance

Impact Assessment
Construction

5.1.2.43 The effects of the construction phase have been assessed on commercial fisheries occurring within the vicinity of the modified OfTI. A description of the potential changes on commercial fisheries receptors caused by each identified effect is given below. In general terms however, the potential effects arising from the construction of the modified OfTI are temporary, as they only occur during the construction phase (which is estimated to occur over an 18 month period).

Adverse Effects on Commercially Exploited Fish and Shellfish Populations

5.1.2.44 The principal commercial species targeted within the vicinity of the modified OfTI are *Nephrops*, scallops, squid, whitefish (including cod and haddock), crab species, lobster and mackerel. As previously stated, there is the potential for the construction of the modified OfTI to cause adverse effects to fish and shellfish populations of commercial importance and hence result in changes to behaviour or a decline in species abundance, which may indirectly affect the productivity of the fishery. This is an indirect effect and whilst the potential effect is briefly discussed within this section, it is fully assessed in Chapter 4.2: Fish and Shellfish Ecology.

5.1.2.45 The effects of the construction phase on these species are summarised in Table 5.1-5.

Table 5.1-5 Summary of Impact Assessment on Principal Commercial Species

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation effect
Underwater disturbance to the seabed	All target species except squid	Minor significance	None	Minor significance
	Squid	Minor significance	None	Minor significance
Noise	Whitefish	Minor significance	Soft start piling	Minor significance
	Herring	Minor significance		Minor significance
	Shellfish	Minor significance		Minor significance

5.1.2.46 Taking into account the findings of Chapter 4.2: Fish and Shellfish Ecology and accepting that there may be short-term species displacement effects which may have a limited indirect effect upon catch rates, it is reasonable to assume that the indirect effects to commercial fishing will not be greater than those identified in the table above.

5.1.2.47 The sensitivity of squid to underwater disturbance to the seabed is considered to be medium and the magnitude of effect is considered to be small. This results in a significance of effect of **minor**, which is not significant in EIA terms.

5.1.2.48 The sensitivity of all target species with the exception of squid to underwater disturbance to the seabed is considered to be low and the magnitude of effect is considered to be small. This results in a significance of effect of **minor**, which is not significant in EIA terms.

5.1.2.49 The sensitivity of whitefish and herring to noise is considered to be medium and the magnitude of effect is considered to be small. This results in a significance of effect of **minor**, which is not significant in EIA terms.

5.1.2.50 The sensitivity of shellfish to noise is considered to be low and the magnitude of effect is considered to be negligible. This results in a significance of effect of **minor**, which is not significant in EIA terms.

Adverse Effects on Recreational Fish Populations

5.1.2.51 The principal recreational species targeted within the vicinity of the modified OfTI are salmon and sea trout. There is the potential for the construction of the modified OfTI to cause adverse effects to fish populations and hence result in changes to behaviour or a decline in species abundance. This is an indirect effect and whilst the potential effect is briefly discussed within this section, it is fully assessed in Chapter 4.2: Fish and Shellfish Ecology.

5.1.2.52 The effects of the construction phase on these species are summarised in Table 5.1-6.

Table 5.1-6 Summary of Impact Assessment on Principal Recreational Species

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation effect
Underwater disturbance to the seabed	Salmon and sea trout	Minor significance	None	Minor significance
Noise	Salmon and sea trout	Minor significance	Soft start piling	Minor significance

5.1.2.53 Taking into account the findings of Chapter 4.2: Fish and Shellfish Ecology, it is reasonable to assume that the indirect impacts will not be greater than those identified in the table above.

5.1.2.54 The sensitivity of salmon and sea trout to underwater disturbance to the seabed is considered to be medium and the magnitude of effect is considered to be small. This results in a significance of effect of **minor**, which is not significant in EIA terms.

5.1.2.55 The sensitivity of salmon and sea trout to noise is considered to be medium and the magnitude of effect is considered to be negligible. This results in a significance of effect of **minor**, which is not significant in EIA terms.

Temporary Loss or Restricted Access to Fishing Grounds

5.1.2.56 The principal effects of construction considered to incur temporary loss or restricted access to these fishing grounds during the construction phase are:

- Safety zones around construction activities;
- Safety zones around installed or partial installed infrastructure; and
- Advisory safety zones along exposed sections of cable.

5.1.2.57 Temporary safety zones of 500 m are expected to be imposed around construction works, from which all non-construction associated vessels would be excluded. Safety zones around partially installed infrastructure and advisory safety zones around exposed sections of cable will further restrict access to, and result in temporary loss of, fishing area. The fishing industry will be notified of the location of all safety zones through NtMs and other communications. All vessels will be requested to respect the advisory safety zones which, as well as reducing the risk of collision damage, will provide protection to the works vessels, the export cables and other infrastructure.

5.1.2.58 It therefore follows that fishing opportunities could be progressively reduced as construction advances. As mentioned previously, it is not within the scope of this assessment to assess effects on a vessel by vessel basis. It is however recognised that

skippers may elect to avoid the area of the modified OfTI during the entire construction phase and therefore the assessed effect will be slightly higher for these vessels. The seasonality of fishing activity will also render these safety zones more sensitive depending upon the time of year, with the summer months recording the highest levels of activity overall.

5.1.2.59 During installation of the cables, simultaneous lay and burial techniques would require rolling short term safety zones around installation activities. Where separate burial methods are to be deployed or where additional protective measures are necessary, there may be longer periods when fishing vessels deploying gears will be required to avoid exposed cable sections. As has been previously stated, the export cable(s) will be buried where possible (target depth of 1 m) and where adequate burial cannot be achieved alternative protection will be used.

5.1.2.60 There is the potential for cable installation works (including export cables and inter-platform cabling) to preclude fishing activities safely resuming as a result of the associated risks with snagging fishing gear, particularly in the case of towed gear fishing activities such as bottom otter trawling for *Nephrops* and boat dredging for scallops. It is considered that normal fishing practices cannot safely resume in the immediate vicinity of the cable(s) until all the necessary cable protection measures, including rock placement and/or mattressing, have been completed and the area is considered at an acceptable standard for all fishing activities to safely resume. It is considered that access to fishing grounds will not resume until these measures are satisfactorily complete and their 'over-trawlable' status confirmed by post-installation surveys.

5.1.2.61 The construction of the OSPs will progressively result in permanent loss of fishing grounds within the footprint of those areas, which will potentially be up to 0.02 km^2. In addition, vessels will not be able to resume fishing activities in the immediate vicinity of the export cables during installation and until the appropriate post-installation surveys confirm the 'over-trawlable' status of the seabed.

5.1.2.62 Given the availability of fishing grounds within the Moray Firth and the ability of large, over-15 m vessels to exploit these grounds, the sensitivity of the over-15 m vessels targeting the *Nephrops*, squid, scallops and whitefish fisheries is considered to be low.

5.1.2.63 Smaller vessels targeting inshore fisheries including the under-15 m *Nephrops* fleet, creel vessels and vessels hand-lining for mackerel are limited by their operational ranges. Additionally, these fisheries are often seasonal, with the majority of activity occurring over a limited period of time. The sensitivity of these fisheries is therefore considered to be medium.

5.1.2.64 As shown in Figures 5.21, 5.27 and 5.32 of Technical Appendix 5.1 A (Commercial Fisheries), activity by the under-15 m *Nephrops* fleet, vessels hand-lining for mackerel and vessels trawling for whitefish generally occurs in areas outwith of the modified OfTI. As a result, the magnitude of effect for these vessels is considered to be low. It is noted, however, that under-15 m *Nephrops* vessels will occasionally target the same grounds as the over-15 m fleet in the vicinity of the modified export cable route during favourable weather.

5.1.2.65 Figures 5.13, 5.14, 5.31 and 5.33 of Technical Appendix 5.1 A (Commercial Fisheries) show fishing activity for the over-15 m *Nephrops* fleet, scallop dredgers, squid trawlers and creelers, respectively. High levels of activity for each fishery are located in the vicinity of the modified OfTI and grounds are considered to be of high value to each fishery. As the cable route and footprint of the OSPs constitute a relatively very

small proportion of total grounds available and the effect will be temporary, the magnitude of effect is considered to be medium.

5.1.2.66 The significance of effect for all fisheries is considered to be, at worst, **minor adverse**, with the exception of the creel fishery which has a significance of effect of **moderate adverse**. All effects are direct and of a temporary nature.

5.1.2.67 Mitigation will be implemented which will reduce impacts on the commercial fishing industry. The Section 36 consent conditions for the three consented wind farms refer to the draft Commercial Fisheries Mitigation Strategy proposed by MORL in respect of the three consented wind farms and the then proposed OfTI. The commitments given there are also given by MORL in respect of the modified OfTI. Ongoing discussions through the MFCFWG will include the development of mitigation strategies and construction schedules. Cables will be buried or protected by other means where target burial depth is not possible and over-trawlability surveys will be undertaken as necessary. Liaison with the fishing industry will be ongoing via FIRs and the FLO, this will include gear removal negotiations where required. This mitigation would result in a **minor adverse** residual effect on the creel fishery.

5.1.2.68 The under-15 m *Nephrops* fishery and the mackerel hand-lining fishery are considered to be of medium sensitivity, low magnitude and the significance of effect is therefore considered to be **minor**, which is not significant in EIA terms.

5.1.2.69 The over-15 m *Nephrops* fishery, squid fishery and scallops fishery are considered to be of low sensitivity and medium magnitude, resulting in a significance of effect of **minor**, which is not significant in EIA terms.

5.1.2.70 The whitefish fishery is considered to be of low sensitivity and magnitude, resulting in a **minor** effect, which is not significant in EIA terms.

5.1.2.71 The creel fishery is considered to be of medium sensitivity and magnitude and the significance of effect is therefore considered to be **moderate**, which is significant in EIA terms. It is considered however, that the mitigation suggested above will result in a residual effect of **minor**, which is not significant in EIA terms.

Safety Issues for Fishing Vessels

5.1.2.72 In line with standard practices, safety zones of 500 m may be in place around all offshore construction works from which all vessels, including fishing vessels, will be excluded. Risk to fishing vessels would only occur if infringement of these safety zones occurred. It should also be recognised that in line with standard maritime practices the ultimate responsibility with regards to safety lies with the master of a vessel. These issues are considered further in Chapter 5.2: Shipping and Navigation.

5.1.2.73 In addition, there is the potential for infrastructure outside of the designated safety zones to pose a risk to fishing vessels as a result of potentially hazardous interaction with fishing gear. This includes export cable(s), OSPs and inter-platform cabling. Infrastructure that is not fully installed will be appropriately marked and lit and safety zones will be in force. Areas of exposed offshore export cable that constitute a potential snagging risk will be marked by the presence of guard vessels. There will also be advisory safety zones communicated for exposed cables. Furthermore, updates on the construction programme will be provided to the fishing industry through the forum of the MFCFWG, FIRs, FLO and NtMs.

5.1.2.74 Compliance with the safety zones during the construction phase and adherence to standard maritime practices would put safety risks **within acceptable limits**, which is not significant in EIA terms.

Increased Steaming Times

5.1.2.75 The implementation of safety zones during the construction phase could result in some increases in steaming distances and times and therefore higher operational costs for fishing vessels. Safety zones will however be very discrete (500 m around construction vessels) and relatively short term. The sensitivity of vessels is as defined above in "Temporary loss or restricted access to fishing grounds" and the magnitude of effect is considered to be low. The significance of the effect is therefore, at worst, **minor adverse** for all vessels. All effects are direct and of a temporary nature.

5.1.2.76 The MFCFWG will include the development of construction schedules which will potentially reduce impacts of construction on the commercial fishing industry. In addition, ongoing fisheries liaison, including the dissemination of information through Fishery Industry Representatives (FIRs), Fisheries Liaison Officer (FLO) and Notice to Mariners (NtMs), will ensure that all potentially impacted stakeholders will be aware of ongoing construction works.

5.1.2.77 Vessels participating in the under-15 m *Nephrops* fishery, the creel fishery and the mackerel hand-lining fishery are considered to be of medium sensitivity, low magnitude and therefore the effect will be of **minor** significance, which is not significant in EIA terms.

5.1.2.78 Vessels scallop dredging, trawling for squid, trawling for whitefish and the over-15 m vessels trawling for *Nephrops* are considered to be of low sensitivity, low magnitude and therefore the effect will be of **minor** significance, which is not significant in EIA terms.

Displacement of Fishing Activity

5.1.2.79 Concerns were raised during consultation with fishermen that wind farm related activities, including the installation of export offshore cable(s) and OSPs which may limit access to fishing grounds, could displace vessels into grounds outside the area, potentially resulting in increased competition for grounds elsewhere. This may result in either conflict between vessels competing for the same resource or between different fishing methods (i.e. between static and towed gear).

5.1.2.80 Displacement of fishing vessels into other areas will be a function of the loss or restricted access to traditional fishing grounds as fishing areas are restricted by substrate type, operational ranges of vessels targeting the fishery and, in some cases, seasonality. As discussed previously, the creel fleet has been assessed as potentially being significantly affected by the construction of the modified OfTI. It is therefore possible that creel vessels will be displaced and impact upon other creelers targeting grounds outside of the modified OfTI. The significance of effect is as assessed for the loss or restricted access to traditional fishing grounds and is therefore considered to be **moderate adverse** for creel vessels and, at worst, **minor adverse** for all other fishing types. All effects are direct and of a temporary nature.

5.1.2.81 As mentioned above (Sections 5.1.2.5-5.1.2.7), embedded mitigation will be implemented which will reduce impacts on the commercial fishing industry. Ongoing discussions through the MFCFWG will include the development of mitigation strategies and construction schedules. Cables will be buried or protected by other means where target burial depth is not possible and over-trawlability surveys will be undertaken as necessary. Liaison with the fishing industry will be ongoing via FIRs and the FLO, this will include gear removal negotiations where required. This mitigation would result in a minor adverse residual impact on the creel fishery.

5.1.2.82 The under-15 m *Nephrops* fishery and the mackerel hand-lining fishery are considered to be of medium sensitivity, low magnitude and the significance of effect is therefore considered to be **minor**, which is not significant in EIA terms.

5.1.2.83 The over-15 m *Nephrops* fishery, squid fishery and scallops fishery are considered to be of low sensitivity and medium magnitude, resulting in a significance of effect of **minor**, which is not significant in EIA terms.

5.1.2.84 The whitefish fishery is considered to be of low sensitivity and magnitude, resulting in a **minor** effect, which is not significant in EIA terms.

5.1.2.85 The creel fishery is considered to be of medium sensitivity and magnitude and the significance of effect is therefore considered to be **moderate**, which is significant in EIA terms. It is considered however, that the mitigation suggested above will result in a residual effect of **minor**, which is not significant in EIA terms.

Interference with Fishing Vessels

5.1.2.86 All of the potential effects included in this assessment could cause interference to fishing activities. An additional effect to be considered is the potential for navigational conflict arising between fishing vessels and construction vessels transiting to and from the modified OfTI. This could include the fouling of static gear marker buoys and dhans, or towed gear vessels being required to alter towing direction.

5.1.2.87 The potential for interference will be, in part, determined by the seasonality of construction works and the location of the construction port. At this current time, the construction port is unknown, however a conservative assumption has been made that transit routes will be in the vicinity of static and towed gear grounds. The limited duration of the construction schedule and the relatively low level of works vessel transits for the modified OfTI construction activities are recognised.

5.1.2.88 Transiting works vessels will fully comply with the international regulations for preventing collisions at sea (COLREGS) to negate the requirements for fishing vessels engaged in fishing to alter course. Transit routes will also be established prior to construction commencing to aid with maritime safety. Due to the high mobility of towed gear vessels, the sensitivity is considered to be low. As works vessels will comply with COLREGs to minimise interference with towed gear vessels, the magnitude is considered to be low. The significance of effect is therefore considered to be **minor adverse**, which will be a direct effect of a temporary nature.

5.1.2.89 It should also be recognised that in order to minimise gear loss, static gear fishermen avoid deploying their gear in shipping routes and areas of high shipping activity. Works vessels will also comply with COLREGS which reduces risk to fishing gears being towed. Static gear vessels are considered to be of medium sensitivity as these vessels are restricted in the mobility and operational range. The magnitude of effect is considered to be medium as the potential for static gear to be towed away or fouled by works vessels is considered to be greater than works vessels colliding with mobile vessels towing gear. Due to the nature of the static gear fishery, gear is left unattended for extended periods of time and, although gear is marked and works vessels will comply with COLREGS, there is still a risk of static fishing gear being damaged or lost. As a result, the significance of effect is therefore considered to be **moderate adverse**. It should be noted however that ongoing discussions through the MFCFWG will include the development of construction schedules. Additionally, information regarding construction activity will be distributed to the fishing industry through the means of the FIRs, FLO and through NtMs published in Kingfisher.

Consultation with the fishing industry will be ongoing to minimise potential impacts on fishing activities. This will result in a residual effect of **minor adverse**.

5.1.2.90 The sensitivity of towed gear vessels is considered to be low and the magnitude of effect is also low. The significance of effect is therefore considered to be **minor,** which is not significant in EIA terms.

5.1.2.91 The static gear fleet is considered to be of medium sensitivity and there is expected to be a medium magnitude of effect. The significance of effect is therefore considered to be **moderate**, which is significant in EIA terms. It is considered however, that the mitigation suggested above will result in a residual effect of **minor**, which is not significant in EIA terms.

Operation

5.1.2.92 The assessment below is based on the current baseline and the potential of this to change should be recognised. It should be noted that once operational it is assumed that the export cable(s) will no longer have the potential to adversely affect commercial fishing activities as cables will be buried or protected where burial is not possible.

Adverse Effects on Commercially Exploited Fish and Shellfish Populations

5.1.2.93 The principal commercial species targeted within the vicinity of the modified OfTI are *Nephrops*, scallops, squid, whitefish (including cod and haddock), crab species, lobster and mackerel. There is the potential for the operational modified OfTI to cause adverse effects to fish and shellfish populations of commercial importance, and hence result in changes to behaviour or a decline in species abundance, which may indirectly affect the productivity of the fishery. This is an indirect effect and whilst the potential effect is briefly discussed within this section, it is fully assessed in Chapter 4.2: Fish and Shellfish Ecology, and summarised below.

5.1.2.94 The impacts of the operational phase on these species are summarised in Table 5.1-7.

Table 5.1-7 Summary of Impact Assessment on Principal Commercial Species

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation effect
EMFs	Shellfish	Minor Significance	Cable burial/protection	Minor Significance
	Other commercial fish species	Minor Significance		Minor Significance

5.1.2.95 Taking into account the findings of Chapter 4.2: Fish and Shellfish Ecology, and accepting that there may be short-term species displacement effects which may have a limited indirect effect upon catch rates, it is assumed that the indirect effects upon commercial fishing will not be greater than those identified in the table above.

5.1.2.96 The sensitivity of shellfish and other commercial fish species to EMFs is considered to be low and the magnitude of effect is considered to be small. This results in a significance of effect of **minor**, which is not significant in EIA terms.

Adverse Effects on Recreational Fish Populations

5.1.2.97 The principal recreational species targeted within the vicinity of the modified OfTI are salmon and sea trout. There is the potential for the operational modified OfTI to cause adverse effects to fish populations and hence result in changes to behaviour or a decline in species abundance. This is an indirect effect and whilst the potential effect is briefly discussed within this section, it is fully assessed in Chapter 4.2: Fish and Shellfish Ecology, and summarised below.

5.1.2.98 The impacts of the operational phase on these species are summarised in Table 5.1-8.

Table 5.1-8 Summary of Impact Assessment on Principal Recreational Species

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation effect
EMFs	Salmon and sea trout	Minor Significance	Cable burial/protection	Minor Significance

5.1.2.99 Taking into account the findings of Chapter 4.2: Fish and Shellfish Ecology, it is assumed that the indirect impacts upon recreational fishing will not be greater than those identified in the table above.

5.1.2.100 The sensitivity of salmon and sea trout to EMFs is considered to be medium and the magnitude of effect is considered to be small. This results in a significance of effect of **minor**, which is not significant in EIA terms.

Complete Loss or Restricted Access to Fishing Grounds

5.1.2.101 Subject to successful burial of the cable(s) or if necessary, protection, and the appropriate post-construction surveys being undertaken, it is considered that fishing will be able to recommence in the modified OfTI. It is therefore considered that no impacts on the commercial fishing activities identified previously will occur as a result of the operational cable(s). Furthermore, it is considered that impacts of temporary loss or restricted access to fishing grounds during the operational phase will only arise as a result of the presence of the OSPs. It should be noted that the OSPs will be located further offshore than grounds targeted by the inshore fleet and therefore only the over-15 m *Nephrops*, scallop, squid and whitefish fisheries have been assessed.

5.1.2.102 Once operational, the two OSPs will result in a total loss of seabed of 0.02 km^2 within the modified OfTI. This is considered to be a very discrete area when compared to fishing grounds and therefore the magnitude of effect is considered to be low. The sensitivity of each receptor is as assessed previously in "Temporary loss or restricted access to fishing grounds during construction" and therefore the significance of effect for each receptor will be, at worst, **minor adverse**. All effects are direct and permanent.

5.1.2.103 The appropriate liaison and information distribution will be undertaken to make fishermen fully aware of the locations and designs of all infrastructure in the modified OfTI.

5.1.2.104 The under-15 m *Nephrops* fishery, creel fishery and the mackerel hand-lining fishery are considered to be of medium sensitivity, low magnitude and the significance of effect is therefore considered to be **minor**, which is not significant in EIA terms.

5.1.2.105 The over-15 m *Nephrops* fishery, squid fishery, scallops fishery and whitefish fishery are considered to be of low sensitivity and low magnitude, resulting in a significance of effect of **minor**, which is not significant in EIA terms.

Safety Issues for Fishing Vessels

5.1.2.106 Safety issues for fishing vessels during the operational phase of the modified OfTI are discussed in Chapter 5.2: Shipping and Navigation and are summarised below.

5.1.2.107 Provided cable protection measures (for both export cables and inter-platform cables) and over-trawl surveys are satisfactorily completed and, if necessary, seabed rectification procedures are undertaken, it is considered that fishing vessels will be able to continue with normal fishing practices once the cable(s) are operational. It is therefore considered that safety risks to fishing vessels as a result of the operational cable(s) will be within acceptable limits.

5.1.2.108 There is the potential for fishing gears to fasten on the foundations of the OSPs. In order to minimise this risk the appropriate liaison and information distribution will be undertaken to make fishermen fully aware of the locations and designs of all underwater infrastructure which might represent a fastening risk to fishing gears. Furthermore, in line with standard offshore practices, fishermen will be made fully aware of the procedures to be adopted in the event of a fastening incident. Compliance with the implemented safety measures and policies means that the safety risks to fishing vessels and their gears should be **within acceptable limits,** which is not significant in EIA terms.

Increased Steaming Times

5.1.2.109 As mentioned previously, it is considered that the cable(s) will not affect fishing activities once operational and therefore there will be no increase in steaming times for fishing vessels. As before, only the fisheries potentially impacted by the presence of the OSPs will therefore be assessed.

5.1.2.110 Chapter 5.2: Shipping and Navigation considers that there is good prospect for fishing vessels to navigate within the three consented operational wind farm sites where the OSPs will be located. The magnitude of effect associated with increases in steaming times as a result of the operational OSPs is considered to be low. The sensitivities of the receptors are as defined previously and therefore the significance of effect is considered to be, at worst, **minor adverse**. All effects are direct and permanent.

5.1.2.111 The appropriate liaison and information distribution will be undertaken to make fishermen fully aware of the locations and designs of all infrastructure in the modified OfTI.

5.1.2.112 Vessels participating in the under-15 m *Nephrops* fishery, the creel fishery and the mackerel hand-lining fishery are considered to be of medium sensitivity, low magnitude and therefore **minor** significance, which is not significant in EIA terms.

5.1.2.113 Vessels scallop dredging, trawling for squid, trawling for whitefish and the over-15 m vessels trawling for *Nephrops* are considered to be of low sensitivity, low magnitude and therefore **minor** significance, which is not significant in EIA terms.

Obstacles on the Seabed Post-construction

5.1.2.114 There is the potential for obstacles to be left on the seabed during the construction or decommissioning phases of the modified OfTI which could result in damage to or loss of fishing gears, as well as representing a safety hazard. Additionally, offshore works such as cable trenching can produce seabed obstructions that can cause fastenings for fishing nets and damage to fishing gears.

5.1.2.115 Contractors (those engaged to undertake development works offshore) will be obliged and monitored to ensure compliance with standard offshore policies prohibiting the discarding of objects or waste at sea (International Maritime Organisation (IMO), 1996). The reporting and recovery of any accidentally dropped objects is also required.

5.1.2.116 Any seabed obstructions and spoil identified during post-installation surveying and which might represent a hazard to fishing, such as trenching berms, will be rectified.

5.1.2.117 Provided there is compliance to obligatory standards by contractors and, if necessary, the implementation of seabed rectification measures, the effect is considered to be **within acceptable limits**, which is not significant in EIA terms.

Displacement of Fishing Activity

5.1.2.118 As discussed previously, displacement of fishing activity is a function of the complete loss or restricted access to traditional fishing grounds. It is therefore considered that the significance of effect on fishing vessels will be, at worst, **minor adverse**. All effects are direct and permanent.

5.1.2.119 The under-15 m *Nephrops* fishery, creel fishery and the mackerel hand-lining fishery are considered to be of medium sensitivity, low magnitude and the significance of effect is therefore considered to be **minor**, which is not significant in EIA terms.

5.1.2.120 The over-15 m *Nephrops* fishery, squid fishery, scallops fishery and whitefish fishery are considered to be of low sensitivity and low magnitude, resulting in a significance of effect of **minor**, which is not significant in EIA terms.

Interference with Fishing Vessels

5.1.2.121 All of the impacts included in this assessment have the potential to cause interference to fishing activities. An additional effect to be considered is the potential for navigational conflicts arising between fishing vessels and operations and maintenance vessels transiting to and from site. This could include the fouling of static gear marker buoys and dhans, or towed gear vessels being required to alter towing direction.

5.1.2.122 This interference has the potential to impact more fishing vessels than those operating in the immediate vicinity of the modified OfTI, depending upon the location of the operations and maintenance port. At the current time, the operations and maintenance port is unknown, however a conservative assumption has been made that operation and maintenance transit routes will be in the vicinity of static and towed gear grounds.

5.1.2.123 Activity by operations and maintenance vessels will be less frequent than that occurring during the construction phase and furthermore it is considered that codes of conduct between works vessels and fishing vessels will be well established by the completion of construction activities, irrespective of port used. Transit routes will also be well established prior to operation.

5.1.2.124 Transiting works vessels will fully comply with COLREGS to negate the requirements for fishing vessels engaged in fishing to alter course. It therefore follows that the significance of impact on these vessels will be of low sensitivity and low magnitude, which results in a **minor adverse** effect, which will be a direct, permanent impact.

5.1.2.125 Works vessels will also comply with COLREGS which reduces risk to fishing gears being towed. Static gear vessels are considered to be of medium sensitivity and the magnitude of effect will be low, which results in a **minor adverse** effect on these vessels, which will be a direct, permanent effect.

5.1.2.126 The sensitivity of towed gear vessels is considered to be low and the magnitude of effect is also low. The significance of effect is therefore considered to be **minor,** which is not significant in EIA terms.

5.1.2.127 The static gear fleet is considered to be of medium sensitivity and there is expected to be a low magnitude of effect. The significance of effect is therefore considered to be **minor**, which is not significant in EIA terms.

Decommissioning

5.1.2.128 As mentioned previously, for the purposes of this assessment and in the absence of detailed information on decommissioning schedules and methodologies, it is assumed that any effects derived from the decommissioning phase will, at worst, be of no greater significance than those derived from the construction phase and are likely to be significantly less (e.g. there will be no piling works during decommissioning).

5.1.3 Cumulative Impact Assessment

Summary

5.1.3.1 This section presents the results of the assessment of the potential cumulative effects upon commercial fisheries arising from the modified OfTI in conjunction with reasonably foreseeable marine coastal developments and activities. MORL's approach to the assessment of cumulative effects is described in Chapter 1.3: Environmental Impact Assessment.

5.1.3.2 A whole project assessment has been undertaken for the likely significant cumulative effects of the modified OfTI in conjunction with the three consented wind farms.

5.1.3.3 An assessment then follows of the likely significant cumulative effects of the whole project with the Beatrice Offshore Windfarm Limited (BOWL) (including the offshore generation station and associated TI) and the Western Development Area (WDA).

5.1.3.4 An assessment of the likely significant effects of the whole project in conjunction with the following unconsented but reasonably foreseeable projects has also been undertaken:

- Firth of Forth Phase 1 (including the associated TI);
- Inch Cape Offshore Wind Farm (including the associated TI); and
- Neart Na Gaoithe Offshore Wind Farm (including the associated TI).

5.1.3.5 Due to lack of detail about schedules and design parameters, it has not been possible to carry out an assessment of the likely cumulative effects of some anticipated future developments located in the Moray Firth and elsewhere. Instead a general commentary on the following developments has been provided, however these have not been assessed:

- Other renewable energy developments;
- The Scottish Hydro Electric Transmission Limited (SHE-T) cable;
- Shipping and navigation;
- Relevant oil and gas activities; and
- Marine Protected Areas (MPAs) and other closed or restricted areas.

5.1.3.6 The following likely significant effects are considered.

- Implications for fisheries during the construction phase:
  - Adverse effects on commercially exploited fish and shellfish populations;
  - Adverse effects on recreational fish populations;
  - Temporary loss or restricted access to traditional fishing grounds;
  - Safety issue for shipping, including fishing vessels;
  - Increased steaming times to fishing grounds;
  - Interference with fisheries activities; and
  - Displacement of fishing activity into other areas.
- Implications for fisheries during the operation phase:
  - Adverse effects on commercially exploited fish and shellfish populations;
  - Adverse effects on recreational fish populations;
  - Complete loss or restricted access to traditional fishing grounds;
  - Obstacles on the sea bed post-construction;
  - Safety issue for shipping, including fishing vessels;
  - Increased steaming times to fishing grounds;
  - Interference with fisheries activities; and
  - Displacement of fishing activity into other areas.

5.1.3.7 The MORL ES (MORL, 2012) provided a detailed assessment of potential effects from all relevant developments, both individually and cumulatively. The preceding impact assessment demonstrates that the nature, magnitude, extent, duration and significance of the potential effects from the modified OfTI are the same or less than previously assessed in the MORL ES (MORL, 2012). Comparable aspects of the other, now consented, developments considered for cumulative effects have either stayed the same, or have been refined (reduced) since the previous assessments were made. Therefore, the nature, magnitude, extent, duration and significance of cumulative effects also remain the same or are reduced.

5.1.3.8 A summary of cumulative effects is listed in Table 5.1-9 below.

Table 5.1-9 Cumulative Impact Summary

Effect/Receptor	Residual significance level for modified TI	Whole project assessment: Modified TI + Stevenson, Telford and MacColl	Whole project with consented projects + WDA	Whole project with unconsented but reasonably foreseeable projects	Mitigation Method
Construction					
Adverse effects on commercially exploited fish and shellfish populations	Underwater disturbance to the seabed – general: Minor significance Noise – general: Minor significance	Underwater disturbance to the seabed – general: Minor significance Noise – general: Minor significance	Underwater disturbance to the seabed – general: Minor significance Noise – general: Minor significance	Underwater disturbance to the seabed – general: Minor significance Noise – general: Minor significance	Soft-start piling
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	Underwater disturbance to the seabed: Cumulative effects associated with increased suspended sediment concentrations and sediment re-deposition are expected to be of minor significance. Noise: Cumulative effects associated with underwater noise are expected to be minor following mitigation (see Chapter 2.1: Fish and Shellfish Ecology, section 2.1.3 for further details).				
Adverse effects on recreational fish populations	Underwater disturbance to the seabed – salmon and sea trout: Minor significance Noise – salmon and sea trout: Minor significance	Underwater disturbance to the seabed – salmon and sea trout: Minor significance Noise – salmon and sea trout: Minor significance	Underwater disturbance to the seabed – salmon and sea trout: Negligible - Minor significance Noise – salmon and sea trout: Minor significance	Underwater disturbance to the seabed – salmon and sea trout: Negligible - Minor significance Noise – salmon and sea trout: Minor significance	Soft-start piling
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	Underwater disturbance to the seabed: Cumulative effects associated with increased suspended sediment concentrations and sediment re-deposition are expected to be of minor significance. Noise: Cumulative effects associated with underwater noise are expected to be minor following mitigation (see Chapter 2.1: Fish and Shellfish Ecology, section 2.1.3 for further details).				

Effect/Receptor	Residual significance level for modified TI	Whole project assessment: Modified TI + Stevenson, Telford and MacColl	Whole project with consented projects + WDA	Whole project with unconsented but reasonably foreseeable projects	Mitigation Method
Temporary loss or restricted access to fishing grounds	All vessels: Minor significance	All vessels: Minor significance	All vessels: Minor significance	Scallop dredge vessels: Moderate significance All other vessels: Minor significance	Ongoing discussions through the MFCFWG to include development of mitigation strategies and construction schedules Cable burial and protection Over-trawlability surveys Ongoing fisheries liaison Scallop gear trials
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	Scallop dredge vessels: Moderate significance All other vessels: Minor significance				
Safety issues for fishing vessels	All vessels: Within acceptable limits	All vessels: Within acceptable limits	All vessels: Within acceptable limits	All vessels: Within acceptable limits	Updates on the construction programme will be provided to the fishing industry through the forum of the MFCFWG, FIRs, FLO and NtMs Safety zones and adherence to standard maritime practices
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	All vessels: Within acceptable limits				

Effect/Receptor	**Residual significance level for modified TI**	**Whole project assessment:** **Modified TI + Stevenson, Telford and MacColl**	**Whole project with consented projects + WDA**	**Whole project with unconsented but reasonably foreseeable projects**	**Mitigation Method**
Increased steaming times to fishing grounds	All vessels: Minor significance	All vessels: Minor significance	All vessels: Minor significance	All vessels: Minor significance	Ongoing discussions through the MFCFWG to include development of mitigation strategies and construction schedules Ongoing fisheries liaison
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	All vessels: Minor significance				
Displacement of fishing activity	All vessels: Minor significance	All vessels: Minor significance	All vessels: Minor significance	Scallop dredge vessels: Moderate significance All other vessels: Minor significance	Ongoing discussions through the MFCFWG to include development of mitigation strategies and construction schedules Cable burial and protection Over-trawlability surveys Ongoing fisheries liaison Scallop gear trials
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	Scallop dredge vessels: Moderate significance All other vessels: Minor significance				

Effect/Receptor	Residual significance level for modified TI	Whole project assessment: Modified TI + Stevenson, Telford and MacColl	Whole project with consented projects + WDA	Whole project with unconsented but reasonably foreseeable projects	Mitigation Method
Interference with fishing vessels	All vessels: Minor significance	All vessels: Minor significance	All vessels: Minor significance	All vessels: Minor significance	Ongoing discussions through the MFCFWG to include development of construction schedules Ongoing fisheries liaison Information distributed through FIRs, FLO and NtMs
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	All vessels: Minor significance				
Operation					
Adverse effects on commercially exploited fish and shellfish populations	EMFs – general: Minor significance	EMFs – general: Minor significance	EMFs – general: Minor significance	EMFs – general: Minor significance	Cable burial / protection
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	EMFs: As it is expected that the cables within the modified OfTI will be buried to a sufficient depth that EMFs will be minor (EN-3), the contribution of the modified OfTI to the cumulative impact of EMFs will be of minor significance.				
Adverse effects on recreational fish populations	EMFs – salmon and sea trout: Minor significance	EMFs – salmon and sea trout: Minor significance	EMFs – salmon and sea trout: Minor significance	EMFs – salmon and sea trout: Minor significance	Cable burial / protection
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	EMFs: As it is expected that the cables within the modified OfTI will be buried to a sufficient depth that EMFs will be minor (EN-3), the contribution of the modified OfTI to the cumulative effect of EMFs will be of minor significance.				

Effect/Receptor	Residual significance level for modified TI	Whole project assessment: Modified TI + Stevenson, Telford and MacColl	Whole project with consented projects + WDA	Whole project with unconsented but reasonably foreseeable projects	Mitigation Method
Complete loss or restricted access to fishing grounds	All vessels: Minor significance	All vessels: Minor significance	All vessels: Minor significance	Scallop dredge vessels: Moderate significance All other vessels: Minor significance	Ongoing discussions through the MFCFWG Cable burial and protection Ongoing fisheries liaison Scallop gear trials
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	Scallop dredge vessels: Moderate significance All other vessels: Minor significance				
Safety issues for fishing vessels	All vessels: Within acceptable limits	All vessels: Within acceptable limits	All vessels: Within acceptable limits	All vessels: Within acceptable limits	Ongoing fisheries liaison Information distributed through FIRs, FLO and NtMs
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4t	All vessels: Within acceptable limits				
Increased steaming times to fishing grounds	All vessels: Minor significance	All vessels: Minor significance	All vessels: Minor significance	All vessels: Minor significance	Ongoing discussions through the MFCFWG Cable burial and protection Ongoing fisheries liaison
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	All vessels: Minor significance				

Effect/Receptor	Residual significance level for modified TI	Whole project assessment: Modified TI + Stevenson, Telford and MacColl	Whole project with consented projects + WDA	Whole project with unconsented but reasonably foreseeable projects	Mitigation Method
Obstacles on the seabed post-construction	Within acceptable limits	Within acceptable limits	Within acceptable limits	Within acceptable limits	Seabed rectification procedures Over-trawlability surveys Compliance to obligatory standards by contractors
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	Within acceptable limits				
Displacement of fishing activity	All vessels: Minor significance	All vessels: Minor significance	All vessels: Minor significance	Scallop dredge vessels: Moderate significance All other vessels: Minor significance	Ongoing discussions through the MFCFWG Cable burial and protection Ongoing fisheries liaison Scallop gear trials
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	Scallop dredge vessels: Moderate significance All other vessels: Minor significance				
Interference with fishing vessels	All vessels: Minor significance	All vessels: Minor significance	All vessels: Minor significance	All vessels: Minor significance	Ongoing fisheries liaison Information distributed through FIRs, FLO and NtMs
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	All vessels: Minor significance				

Assessment of Cumulative Effects

5.1.3.9 The developments and activities considered in detail within this assessment are listed below and are shown in Figure 5.1-1.

- MORL three consented wind farms (Telford, Stevenson and MacColl);
- MORL WDA;
- BOWL site and export cable route;
- Firth of Forth Phase 1 and export cable route;
- Inch Cape Offshore Wind Farm and export cable route; and
- Neart Na Gaoithe Offshore Wind Farm and export cable route.

5.1.3.10 The connection between the WDA and the three consented wind farms necessitates a slightly different approach to assessment, as the effects arising from the "worst case" for the three consented sites cannot simply be added to the "worst case" scenario for the WDA. The potential capacity of the WDA (500 MW) when added to the consented capacity of the EDA (1,166 MW) exceeds the overall target capacity of the MORL zone (1,500 MW). It is not proposed that the target capacity for the MORL zone will be exceeded. 500 MW represents the maximum development on the WDA, but in the event that MORL successfully constructs in excess of 1,000 MW in the three consented wind farm sites then the development in the WDA will be restricted accordingly to ensure the MORL zone capacity is not exceeded.

5.1.3.11 This restriction of the total capacity of the MORL zone means that the effects from development in the EDA and WDA combined will be restricted also. In the MORL ES, effects were assessed on the basis of a potential capacity of 1,500 MW (3x500 MW) from the EDA alone. So the predicted effects of a 1,500 MW offshore wind farm within the MORL zone have been assessed and reported in the MORL ES. Where it is considered relevant and can be justified on the basis that conditions across the zone are consistent, the conclusions from that assessment have been assumed in this ES to be representative of the effects of the three consented wind farms and the WDA combined.

5.1.3.12 As mentioned previously, a general commentary on the following developments has been provided, however no significance ratings have been assessed:

- Other renewable energy developments;
- The SHE-T cable;
- Shipping and navigation;
- Relevant oil and gas activities; and
- MPAs and other closed or restricted areas.

5.1.3.13 Although sufficient information has been provided on the MeyGen tidal project in the Pentland Firth to assess potential cumulative effects, it is considered that the fishing activity that occurs in the Moray Firth will not be synonymous with that occurring in the area of the tidal project. As such, a full cumulative assessment has been scoped out and a brief commentary on tidal projects in the Pentland Firth, including the MeyGen project, has been provided.

5.1.3.14 There is currently one MPA which is proposed for the Moray Firth area (Southern Trench). As no information on the management procedures for the area is available (i.e. whether or not fishing will be able to resume within the operational MPA) it is not possible to full assess potential cumulative effects arising from this proposal. As such,

a brief commentary on MPAs and their potential to contribute towards a cumulative effect has been provided.

5.1.3.15 Although there will be some development at the ports of Invergordon, Nigg and Ardeseir, these development works are not expected to have any impact on fisheries.

5.1.3.16 Currently, there are no licensed aggregate dredging areas in the Moray Firth, the closest being located in the Firth of Forth. Although it is recognised that loss of fishing area as a result of aggregate dredging may apply to certain vessels, it is not considered within the scope of this assessment to identify impacts on a vessel by vessel basis.

5.1.3.17 The study area of the assessment is the same as that described in Technical Appendix 5.1 A (Commercial Fisheries) and focuses principally on cumulative effects in the Moray Firth.

5.1.3.18 Cumulative effects on commercially exploited fish and shellfish populations are addressed in full in Chapter 4.2: Fish and Shellfish Ecology and summarised below.

5.1.3.19 It is recognised that fishing vessels may not spend all, or indeed a significant proportion, of their time in the Moray Firth and hence certain other offshore renewable developments may also affect them. This is most obviously the case for the scallop fishery, which is targeted by vessels that are largely nomadic, variously targeting grounds around the UK. As stated previously, although individual vessels may spend more time in certain regional areas such as the Moray Firth, it is not possible within the scope of this assessment to consider the extent of an effect on a vessel by vessel basis. Instead, scallop grounds affected by the proposed projects in the Moray Firth have been considered within the context of available scallop grounds around the UK relevant to other offshore renewable developments.

Methodology

5.1.3.20 The assessment methodology has followed that outlined in the Moray Firth Offshore Wind Developers Group Discussion Document (MORL, 2012, Technical Appendix 1.3 D: MFOWDG Cumulative Assessment Document).

Worst Case Scenarios

5.1.3.21 The detailed assessment of the likely significant cumulative effects focuses on the modified OfTI in conjunction with the three consented wind farms, WDA, the BOWL site and export cable route, the Firth of Forth Phase 1 and export cable route, Inch Cape Offshore Wind Farm and export cable route and Neart na Gaoithe Offshore Wind Farm and export cable route, as a result of their proximity and the level of project information that has been made available.

Telford, Stevenson and MacColl

5.1.3.22 The worst case scenario for the three consented wind farms is summarised in Table 5.110 below. It should be noted that this varies from the original worst case scenario for the three consented wind farms as provided in ES Chapter 11.1 (Commercial Fisheries) (MORL, 2012).

Table 5.1-10 Summary of the MORL Three consented wind farms Worst Case Parameters

Worst case parameters	**Scenario assessed**
Wind farm site	186 x 6 MW turbines
Turbine Layout	
Minimum spacing (crosswind)	1,080 m
Minimum spacing (downwind)	1,350 m
Foundations and Substructure	
Foundation type	Gravity Base
Footprint of individual turbine	65m diameter
Met Mast	
Maximum number of met masts	2
Inter Array Cables	
Estimated total length	572 km

Western Development Area

5.1.3.23 The worst case parameters of wind farm design for the WDA in terms of commercial fisheries are provided in Table 5.1-11.

Table 5.1-11 Summary of the MORL WDA Worst Case Parameters

Worst case parameters	**Scenario assessed**
Wind farm site	100 x 5 MW turbines
Turbine Layout	
Minimum spacing (crosswind)	1,080 m
Minimum spacing (downwind)	1,350 m
Foundations and Substructure	
Foundation type	Gravity Base
Footprint of individual turbine	3,318 m^2
Met Mast	
Maximum number of met masts	1 x 4.5 m diameter

BOWL Site and Export Cable Route

5.1.3.24 The worst case parameters of wind farm design for the BOWL site and export cable route in terms of commercial fisheries are provided in Table 5.1-12.

Table 5.1-12 Summary of the BOWL Worst Case Parameters as consented and restricted by condition

Worst case parameters	**Scenario assessed**
Wind farm site	125 turbines but with the potential to install140 turbines if consent conditions are met.
Turbine Layout	
Minimum spacing (crosswind)	924 m
Minimum spacing (downwind)	924 m
Foundations and Substructure	
Foundation type	Tubular Jacket and Gravity Base
Footprint of individual turbine	1,963m^2
Met Mast	
Maximum number of met masts	3
Inter Array Cables	
Estimated total length	325 km
Additional Offshore Infrastructure	
Maximum number of OSPs	3
Export Cable	
Maximum length of offshore export cable corridor	65 km
Maximum number of cables	4
Export cable route	South of the development to landfall in the Spey Bay area

Other Developments

5.1.3.25 Developments that are at an earlier stage and for which there are limited development details at this stage, are also considered. The worst case scenarios for these projects are limited in detail and are as follows:

- Firth of Forth Phase 1 – 2 x 75 turbine wind farms;
- Inch Cape Offshore Wind Farm – 213 turbines, three met masts, five offshore substations and 6 offshore export cables; and
- Neart na Gaoithe Offshore Wind Farm – 125 turbines and 2 offshore substations.

Cumulative Assessment

5.1.3.26 The types of effects considered in this assessment are listed below.

- Implications for fisheries during the construction phase:
  - Adverse effects on commercially exploited fish and shellfish populations;
  - Adverse effects on recreational fish populations;
  - Temporary loss or restricted access to traditional fishing grounds;
  - Safety issue for shipping, including fishing vessels;
  - Increased steaming times to fishing grounds;
  - Interference with fisheries activities; and
  - Displacement of fishing activity into other areas.
- Implications for fisheries during the operation phase:
  - Adverse effects on commercially exploited fish and shellfish populations;
  - Adverse effects on recreational fish populations;
  - Complete loss or restricted access to traditional fishing grounds;
  - Obstacles on the sea bed post-construction;
  - Safety issue for shipping, including fishing vessels;
  - Increased steaming times to fishing grounds;
  - Interference with fisheries activities; and
  - Displacement of fishing activity into other areas.

5.1.3.27 The receptors identified for consideration in this assessment are:

- Demersal trawling for *Nephrops* (over and under-15 m vessels);
- Dredging for scallops;
- Demersal trawling for squid;
- Demersal trawling for whitefish;
- Creeling for crab and lobster; and
- Hand-lining for mackerel.

5.1.3.28 A summary of the overall significance for each effect described below is given in Table 5.1-9 above.

Adverse Effects on Commercially Exploited Fish and Shellfish Populations

5.1.3.29 The principal commercial species targeted within the vicinity of the modified OfTI are *Nephrops*, scallops, squid, whitefish (including cod and haddock), crab species, lobster and mackerel.

5.1.3.30 Predicted cumulative adverse effects on commercially exploited fish and shellfish populations arising from the construction and operation of the proposed developments are described in Chapter 4.2: Fish and Shellfish Ecology and summarised in Table 5.1-13 below.

Table 5.1-13 Summary of Impact Assessment on Principal Commercial Species

Effect/Receptor	Residual significance level for modified OfTI	Whole project assessment: Modified OfTI + Stevenson, Telford and MacColl	Whole project with consented projects + WDA	Whole project with unconsented but reasonably foreseeable projects	Mitigation Method
Adverse effects on commercially exploited fish and shellfish populations	Underwater disturbance to the seabed – general: Minor significance Noise – general: Minor significance EMFs – general: Minor significance	Underwater disturbance to the seabed – general: Minor significance Noise – general: Minor significance EMFs – general: Minor significance	Underwater disturbance to the seabed – general: Minor significance Noise – general: Minor significance EMFs – general: Minor significance	Underwater disturbance to the seabed – general: Minor significance Noise – general: Minor significance EMFs – general: Minor significance	Soft-start piling Cable burial / protection
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	Underwater disturbance to the seabed: Cumulative effects associated with increased suspended sediment concentrations and sediment re-deposition are expected to be of minor significance. Noise: Cumulative effects associated with underwater noise are expected to be minor following mitigation (see Chapter 2.1: Fish and Shellfish Ecology, section 2.1.3 for further details). EMFs: It is expected that the cables within the modified OfTI will be buried to a sufficient depth that EMFs will be significantly attenuated (EN-3). Furthermore, as EMFs diminish rapidly both horizontally and vertically from source, the overall footprint over which EMFs could be detected by sensitive species will be small. Therefore, the contribution of the modified OfTI to the overall cumulative impact of EMFs will be of minor significance.				

Adverse Effects on Recreational Fish Populations

5.1.3.31 The principal recreational species targeted within the vicinity of the modified OfTI are salmon and sea trout.

5.1.3.32 Predicted cumulative adverse effects on recreational fish populations arising from the construction and operation of the proposed developments are described in Chapter 4.2: Fish and Shellfish Ecology and summarised in Table 5.1-14 below.

Table 5.1-14 Summary of Impact Assessment on Principal Recreational Species

Effect/Receptor	Residual significance level for modified OfTI	Whole project assessment: Modified OfTI + Stevenson, Telford and MacColl	Whole project with consented projects + WDA	Whole project with unconsented but reasonably foreseeable projects	Mitigation Method
Adverse effects on recreational fish populations	Underwater disturbance to the seabed – salmon and sea trout: Minor significance Noise – salmon and sea trout: Minor significance EMFs – salmon and sea trout: Minor significance	Underwater disturbance to the seabed – salmon and sea trout: Minor significance Noise – salmon and sea trout: Minor significance EMFs – salmon and sea trout: Minor significance	Underwater disturbance to the seabed – salmon and sea trout: Negligible - Minor significance Noise – salmon and sea trout: Minor significance EMFs – salmon and sea trout: Minor significance	Underwater disturbance to the seabed – salmon and sea trout: Negligible - Minor significance Noise – salmon and sea trout: Minor significance EMFs – salmon and sea trout: Minor significance	Soft-start piling Cable burial / protection
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.1.3.3 and 5.1.3.4)	Underwater disturbance to the seabed: Cumulative effects associated with increased suspended sediment concentrations and sediment re-deposition are expected to be of minor significance. Noise: Cumulative effects associated with underwater noise are expected to be minor following mitigation (see Chapter 2.1: Fish and Shellfish Ecology, section 2.1.3 for further details). EMFs: As it is expected that the cables within the modified OfTI will be buried to a sufficient depth that EMFs will be minor (EN-3), the contribution of the modified OfTI to the cumulative effect of EMFs will be of minor significance.				

Temporary and Complete Loss or Restricted Access to Fishing Grounds

5.1.3.33 It should be noted that the worst case scenario for the three consented wind farms differs from that previously identified in ES Chapter11.1 (Commercial Fisheries) (MORL, 2012). Additionally, the availability of different data sets has resulted in changes to the assessment. It therefore follows that the potential effects arising from the three consented wind farms in MORL ES (2012) Chapter 11.1 may vary to those identified below.

5.1.3.34 The *Nephrops* fishery is the most important fishery in the Moray Firth and is targeted by a range of vessels, both over and under-15 m. Fishing grounds for the over-15 m fleet are principally concentrated in the southern half of the Moray Firth (Figure 5.1-2), whereas fishing grounds for the under-15 m fleet are located in the inner Firth (Figure 5.1-3). It should be noted however, that these vessels will occasionally target the same grounds as the over-15 m fleet in favourable weather. All *Nephrops* fishing grounds are located out with the consented wind farm sites but in the vicinity of the modified export cable route. Activity is generally constant on an annual basis. Larger category vessels have the operational range to target grounds in the wider North Sea, however smaller category vessels are limited in their operational range and tend to spend the majority of their time fishing grounds in the Moray Firth.

5.1.3.35 Analysis of statistical datasets and information gathered through consultation with fishermen demonstrates that dredging for scallops occurs in areas throughout the Moray Firth and in the vicinity of the MORL Zone, BOWL site and associated export cable routes (Figure 5.1-4). The majority of vessels are nomadic and will potentially target grounds around the UK. The amount of time spent in the Moray Firth varies annually and depends upon the productivity and availability of grounds here and elsewhere.

5.1.3.36 The squid fishery in the Moray Firth is important on a national scale. There is also a squid fishery in the Firth of Forth, although this is less productive and landings vary significantly on an annual basis. In light of this, the cumulative effect upon the fishery will therefore predominantly arise from the BOWL site in conjunction with the MORL Zone and associated export cables (Figure 5.1-5).

5.1.3.37 Although some whitefish activity (principally for haddock) is recorded in the in the north of the BOWL site, the majority of grounds are located away from the developments and associated export cable routes (Figure 5.1-6) and as a result there is not considered to be a significant cumulative effect upon the fishery.

5.1.3.38 Although crab and lobster activity is located throughout coastal areas of the Moray Firth, it is considered that the fishery under consideration for the cumulative effects arising as a result of the modified OfTI and other developments in the Moray Firth is only comprised of those vessels fishing the immediate area of the modified OfTI. This is due to the small operational ranges of vessels within the creel fishery which limits the vessels to discrete areas. The vessels targeting the crab and lobster fishery in the vicinity of the modified OfTI landfall at Inverboyndie will only be affected by the installation of the export cables (Figure 5.1-7). As a result, it is not considered that there will be a cumulative effect upon the fishery from infrastructure in addition to this.

5.1.3.39 As with the creel fishery, the mackerel hand-lining fishery is targeted by small, local vessels which will have limited operational ranges (Figure 5.1-8). It is therefore considered that there will be no cumulative effect on the fishery from infrastructure in addition to the modified OfTI.

Modified OfTI and Three Consented Wind Farms

5.1.3.40 There is the potential for all fishing activity to be temporarily displaced from localised areas in the MORL three consented wind farm sites during construction as a result of the temporary 500 m safety zones around all major construction activities. Cumulatively, there will be six major construction events in the MORL three consented wind farm sites in addition to 500 m safety zones during the construction of the MORL modified OfTI.

5.1.3.41 Additionally, during the construction phase, the safety risks associated with the installation of inter array cables and export cables for the MORL consented wind farms would result in the progressive loss of access to these areas as the construction schedule advances. Access to these areas will not resume until the appropriate over-trawl surveys and if necessary seabed rectification measures have been completed, confirming that normal fishing activities can safely resume.

5.1.3.42 The sensitivities of the fisheries are as defined for the site specific impact assessment previously (i.e. over-15 m *Nephrops* fleet is low, under-15 m *Nephrops* fleet is medium, scallop fleet is low and the squid fleet is low).

5.1.3.43 As shown in Figure 5.1-3, activity by the under-15 m *Nephrops* fleet generally occurs in areas to the south-west of the developments, with discrete areas transected by the MORL modified OfTI. As a result, the magnitude of effect for these vessels is considered to be low. The cumulative significance of effect of the MORL modified OfTI and three consented wind farms for these vessels is considered to be **minor adverse**.

5.1.3.44 Figure 5.1-2 shows the fishing activity by the over-15 m *Nephrops* fleet. All activity occurs outside of the three consented wind farm sites, to the south in the areas of the modified OfTI. It is therefore considered that there is no additional cumulative effect arising from the MORL modified OfTI in conjunction with the three consented wind farms and the effect is as assessed previously (i.e. **minor adverse**).

5.1.3.45 Figure 5.1-4 shows scallop dredging activity in the Moray Firth (see inset). Moderate to high levels of activity are located throughout the Moray Firth, including in the vicinity of the MORL three consented wind farms and modified OfTI. The magnitude of effect is considered to be high. The cumulative significance of effect of the MORL modified OfTI and three consented wind farms for scallop dredging vessels is considered to be **moderate adverse**.

5.1.3.46 It can be seen from Figure 5.1-5, that squid trawling occurs throughout the Moray Firth. As mentioned previously, the fishery varies year on year and it is not possible to predict future fishing grounds. As such, the assumption has been made that squid trawling can occur throughout the Moray Firth, including within the vicinity of the MORL three consented wind farms and the modified OfTI. Due to the availability of grounds, the magnitude of effect is therefore considered to be medium. The cumulative significance of effect of the MORL modified OfTI and three consented wind farms for vessels trawling for squid is considered to be **minor adverse**.

5.1.3.47 Subsequent to any necessary seabed rectification measures being satisfactorily completed, it is considered that fishing vessels will regain some degree of access to fishing grounds within the operational wind farm sites, although it is recognised that individual skippers, particularly those operating bottom towed gear, may consider it unsafe to continue fishing. It is also considered that vessels fishing grounds over the export cables will regain full access to their traditional fishing grounds during operation. It is therefore considered that the magnitude of effect will remain as identified for the construction phase. The significance of the cumulative effect of complete loss of fishing grounds during the operational phase is therefore expected to be **moderate adverse** for scallop and **minor adverse** for *Nephrops* (both over and under-15 m) and squid.

5.1.3.48 As mentioned above (Sections 5.1.2.5-5.1.2.7), embedded mitigation will be implemented which will reduce impacts on the commercial fishing industry. Ongoing discussions through the MFCFWG will include the development of mitigation strategies and construction schedules. Cables will be buried or protected by other

means where target burial depth is not possible and over-trawlability surveys will be undertaken as necessary. Liaison with the fishing industry will be ongoing via FIRs and the FLO. In addition, scallop gear trails will be undertaken. This mitigation would result in a **minor adverse** residual cumulative effect on the scallop fishery during both construction and operation.

5.1.3.49 The under-15 m *Nephrops* fishery is considered to be of medium sensitivity, low magnitude and the cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms is considered to be **minor**, which is not significant in EIA terms.

5.1.3.50 The over-15 m *Nephrops* fishery and squid fishery are considered to be of low sensitivity and medium magnitude, resulting in a cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms of **minor**, which is not significant in EIA terms.

5.1.3.51 The scallop dredge fishery is considered to be of low sensitivity and high magnitude, resulting in a cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms of **moderate**, which is significant in EIA terms. It is considered however, that the mitigation suggested above will result in a residual effect of **minor**, which is not significant in EIA terms.

5.1.3.52 No cumulative effects arising from the construction and operation of the modified OfTI in conjunction with the three consented wind farms on the whitefish, creel and mackerel hand-lining fisheries have been identified.

Modified OfTI, Three Consented Wind Farms, WDA and BOWL

5.1.3.53 In addition to the MORL three consented wind farms and modified OfTI, there is the potential for fishing activity to be temporarily displaced from localised areas in the BOWL site and export cable route and the WDA.

5.1.3.54 The sensitivities of the fisheries are as defined for the site specific impact assessment previously (i.e. over-15 m *Nephrops* fleet is low, under-15 m *Nephrops* fleet is medium, scallop fleet is low and the squid fleet is low).

5.1.3.55 As mentioned previously, the under-15 m *Nephrops* fleet targets grounds in the inner Firth with low levels of activity located in the south of the Moray Firth. This includes grounds transected by the modified OfTI and BOWL export cable route. Low monetary value grounds are also located in the WDA. It is considered however, due to the very low levels of activity recorded in these areas, the magnitude of effect is low. The cumulative significance of effect of the MORL modified OfTI, three consented wind farms, BOWL project and WDA for these vessels is considered to be **minor adverse**.

5.1.3.56 The over-15 m *Nephrops* fleet targets grounds in the south of the Moray Firth, including grounds through which the modified OfTI and BOWL export cable route pass. Due to the temporary nature of the construction events for the offshore export cable installation and the discrete areas covered by the cable routes, the magnitude of effect is considered to be no greater than that assessed for the modified OfTI (i.e. low), resulting in a significance of effect of **minor adverse**.

5.1.3.57 Scallop grounds are located throughout the Moray Firth, including in the areas of the MORL three consented wind farms, WDA, BOWL site and associated export cable routes. The magnitude of effect is considered to be high. The cumulative

significance of effect of the MORL modified OfTI, three consented wind farms, WDA and BOWL project for scallop dredging vessels is considered to be **moderate adverse**.

5.1.3.58 Squid grounds are located throughout the Moray Firth, however, as mentioned previously, fishing activity can vary year on year. Due to the availability of grounds, the magnitude of effect is therefore considered to be medium. The cumulative significance of effect of the MORL modified OfTI , three consented wind farms, WDA and BOWL project for vessels trawling for squid is considered to be **minor adverse**.

5.1.3.59 As mentioned above, during operation vessels will be able to regain access to the BOWL site, WDA and three consented wind farms. Vessels towing trawl gear may decide it is unsafe to continue working within the operational wind farm site and as such the magnitude of effect is considered the same as for construction. The significance of the cumulative effect of complete loss of fishing grounds during the operational phase of the MORL three consented wind farms, WDA, modified OfTI and BOWL project is therefore expected to be **moderate adverse** for scallop and **minor adverse** for *Nephrops* (both over and under-15 m) and squid.

5.1.3.60 As mentioned previously, mitigation has been suggested which will reduce the effect on scallop dredging activity to **minor adverse**. Potential mitigation for the BOWL project is unknown, however it is considered that as the majority of scallop dredging activity is located in the three consented wind farms and as BOWL are included in the MFCFWG, the mitigation suggested above would still reduce the effect to **minor adverse** for both the construction and operational phases.

5.1.3.61 The under-15 m *Nephrops* fishery is considered to be of medium sensitivity, low magnitude and the cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA is considered to be **minor**, which is not significant in EIA terms.

5.1.3.62 The over-15 m *Nephrops* fishery and squid fishery are considered to be of low sensitivity and medium magnitude, resulting in a cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA of **minor**, which is not significant in EIA terms.

5.1.3.63 The scallop dredge fishery is considered to be of low sensitivity and high magnitude, resulting in a cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA of **moderate**, which is significant in EIA terms. It is considered however, that the mitigation suggested above will result in a residual effect of **minor**, which is not significant in EIA terms.

5.1.3.64 No cumulative effects arising from the construction and operation of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA on the whitefish, creel and mackerel hand-lining fisheries have been identified.

Modified OfTI, Three Consented Wind Farms and Unconsented but Reasonably Foreseeable Projects

5.1.3.65 In addition to the MORL three consented wind farms and modified OfTI, there is the potential for fishing activity to be temporarily displaced from localised areas in other unconsented but reasonably foreseeable projects. Principally, these include the three developments in the Forth and Tay area:

- Firth of Forth Phase 1 and export cable route;
- Inch Cape Offshore Wind Farm and export cable route; and
- Neart Na Gaoithe Offshore Wind Farm and export cable route.

5.1.3.66 The sensitivities of the fisheries are as defined for the site specific impact assessment previously (i.e. over-15 m *Nephrops* fleet is low, under-15 m *Nephrops* fleet is medium, scallop fleet is low and the squid fleet is low).

5.1.3.67 Under-15 m vessels targeting *Nephrops* in the Moray Firth will target fish grounds outside of the areas identified in Figure 5.1-3. It is therefore considered that the Forth and Tay projects will not add to any cumulative effect on these vessels.

5.1.3.68 Over-15 m *Nephrops* trawlers have the potential to target grounds in the Forth and Tay. Only export cable routes are located over high activity areas in the Forth and Tay area (Figure 5.1-2) and therefore, due to the temporary nature of construction works and the discrete areas covered by cables, the magnitude of effect is considered to be no greater than that identified previously (i.e. low). The cumulative significance of effect of the MORL modified OfTI, three consented wind farms, and other unconsented projects for these vessels is therefore considered to be **minor adverse**.

5.1.3.69 High levels of scallop dredging activity are located in the Forth and Tay area, including grounds on which offshore developments are being considered. As a result, the magnitude of effect is considered to be high. The cumulative significance of effect of the MORL modified OfTI, three consented wind farms and other unconsented projects for scallop dredging vessels is considered to be **moderate adverse**.

5.1.3.70 Although squid activity has been recorded in the Forth and Tay area, activity is limited and vessels will often choose to fish more productive grounds in the Moray Firth. It is therefore considered that the Forth and Tay projects will not add to any cumulative effect on these vessels.

5.1.3.71 During operation, the magnitude of effect for all vessels towing gear is considered the same as for construction. The significance of the cumulative complete loss of fishing grounds during the operational phase of the MORL three consented wind farms, modified OfTI and other unconsented projects is therefore expected to be **moderate adverse** for scallop and **minor adverse** for over-15 m *Nephrops* vessels.

5.1.3.72 Although mitigation has been suggested by MORL which reduce the residual effects of the three consented wind farms and modified OfTI to minor, mitigation has not yet been suggested for the unconsented wind farms in the Forth and Tay area. Due to the high levels of scallop dredging activity occurring in the area, it is considered that the cumulative residual effect will not be lowered by MORLs mitigation alone and as such the residual effect is considered to be **moderate adverse**.

5.1.3.73 The over-15 m *Nephrops* fishery are considered to be of low sensitivity and medium magnitude, resulting in a cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms and other unconsented projects of **minor**, which is not significant in EIA terms.

5.1.3.74 The scallop dredge fishery is considered to be of low sensitivity and high magnitude, resulting in a cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms and other unconsented projects of **moderate**, which is significant in EIA terms.

5.1.3.75 No cumulative effects arising from the construction and operation of the modified OfTI in conjunction with the three consented wind farms and other unconsented projects on the under-15 m *Nephrops* fleet, squid trawlers, whitefish trawlers, creelers and mackerel hand-lining fishery have been identified.

Total Cumulative Effect

5.1.3.76 The total cumulative effect of all developments which have the potential to result in loss or restricted access for commercial fishing activities during the construction and operational phases is considered to be of **moderate** significance for scallop dredge vessels, which is significant in EIA terms. The total cumulative effect on all other vessels is considered to be of **minor** significance, which is not significant in EIA terms.

Safety Issues to Fishing Vessels
Modified OfTI and Three Consented Wind Farms

5.1.3.77 Vessels travelling greater distances to fishing grounds may be affected by multiple developments. The proximity of the MORL three consented wind farms and modified OfTI pose a cumulative risk to the safety of fishing vessels in the area.

5.1.3.78 There will be overlap in the construction schedules of the MORL three consented wind farms and the modified OfTI. In line with standard practice, construction safety zones of 500 m will be in place around all offshore construction activities and partially construction infrastructure, from which all vessels, including fishing vessels, will be excluded. There will also be communications of advisory safety zones around areas of exposed cables.

5.1.3.79 Risks to fishing vessels would only occur if there were infringements of these safety zones. It should also be recognised that, in line with standard maritime practice, the ultimate responsibility with regards to safety lies with the master of a vessel. Compliance with the safety zones would put the safety risk within acceptable limits. These issues are considered further in Chapter 5.2: Shipping and Navigation.

5.1.3.80 There is the potential for infrastructure outside of the designated safety zones to pose an additional risk to fishing vessels as a result of potentially hazardous interactions with fishing gear. These include turbines, inter array cables, OSPs and offshore export cables.

5.1.3.81 Infrastructure that is not fully installed will be appropriately marked and lit and safety zones put in place. Areas of exposed cable that constitute a potential snagging risk will be marked by the presence of guard vessels and advisory safety zones communicated. Furthermore, updates on the construction programme and vessel management plan will be provided to the fishing industry through the forum of the MFCFWG, FIRs, FLO and NtMs.

5.1.3.82 It is expected that, subsequent to the appropriate overtrawl surveys and installation burial and protection measures being completed, normal fishing activities will be able to safely resume in the immediate vicinity of Moray Firth developments during the operational phases. The safety risks would therefore be **within acceptable limits** for all commercial fisheries operating in the area, which is not significant in EIA terms.

Modified OfTI, Three Consented Wind Farms, WDA and BOWL

5.1.3.83 Vessels travelling greater distances to fishing grounds may be affected by multiple developments. The proximity of the MORL three consented wind farms and modified OfTI to the WDA and BOWL project poses the greatest cumulative risk to the safety of fishing vessels in the area.

5.1.3.84 As per consent conditions for the wind farm, BOWL is expected to follow the same standard guidelines as outlined above and as such the safety risks would be **within acceptable limits** for all commercial fisheries operating in the area, which is not significant in EIA terms.

Modified OfTI, Three Consented Wind Farms and Unconsented but Reasonably Foreseeable Projects

5.1.3.85 There is the potential for some vessels travelling to other areas, such as the Forth and Tay, to be affected by other, unconsented developments.

5.1.3.86 It is assumed, because of ES commitments and conditions on currently consented wind farms, that the unconsented developments will follow the same standard guidelines as outlined above and as such the safety risks would be **within acceptable limits** for all commercial fisheries operating in the area, which is not significant in EIA terms.

Total Cumulative Effect

5.1.3.87 The total cumulative effect of all developments which have the potential to result in safety issues for fishing vessels during the construction and operational phases is considered to be of **within acceptable limits**, which is not significant in EIA terms.

Increased Steaming Time to Fishing Grounds
Modified OfTI and Three Consented Wind Farms

5.1.3.88 The sensitivities of the fisheries are as defined for the site specific impact assessment previously (i.e. over-15 m *Nephrops* fleet is low, under-15 m *Nephrops* fleet is medium, scallop fleet is low and the squid fleet is low).

5.1.3.89 Cumulatively, there will be six major construction events in the MORL three consented wind farm sites in addition to 500 m safety zones during the construction of the MORL consented wind farms and modified OfTI. Due to the discrete nature of these safety zones however, the magnitude of effect is considered to be low. The significance of the effect is therefore **minor adverse** for all vessels.

5.1.3.90 The Shipping and Navigation assessment (Chapter 5.2 of this ES) considers that there is a good prospect for fishing vessels to navigate within the consented operational wind farm sites and modified OfTI. The magnitude of effect is considered to be low during the operational phase. The significance of the effect is therefore, at worst, **minor adverse** for all vessels.

5.1.3.91 The MFCFWG will include the development of construction schedules which will potentially reduce impacts of construction on the commercial fishing industry. In addition, ongoing fisheries liaison, including the dissemination of information through FIRs, FLO and NtMs, will ensure that all potentially impacted stakeholders will be aware of ongoing construction works.

5.1.3.92 Vessels participating in the under-15 m *Nephrops* fishery, the creel fishery and the mackerel hand-lining fishery are considered to be of medium sensitivity and low magnitude. The cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms is considered to be **minor**, which is not significant in EIA terms.

5.1.3.93 Vessels scallop dredging, trawling for squid, trawling for whitefish and the over-15 m vessels trawling for *Nephrops* are considered to be of low sensitivity and low magnitude. The cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms is considered to be **minor**, which is not significant in EIA terms.

Modified OfTI, Three Consented Wind Farms, WDA and BOWL

5.1.3.94 The sensitivities of the fisheries are as defined for the site specific impact assessment previously (i.e. over-15 m *Nephrops* fleet is low, under-15 m *Nephrops* fleet is medium, scallop fleet is low and the squid fleet is low).

5.1.3.95 There is the potential for the maximum of eight 500 m safety zones (six simultaneous construction events within the three MORL consented wind farms and modified OfTI and two in the BOWL site and associated export cable route) plus additional safety zones in the MORL modified OfTI and WDA to result in minor increases to steaming times during the construction phase. Due to the discrete nature of these safety zones however, the magnitude of effect is considered to be low. The significance of the effect is therefore **minor adverse** for all vessels.

5.1.3.96 The Shipping and Navigation assessment (Chapter 5.2 of this ES) considers that there is a good prospect for fishing vessels to navigate within the consented operational wind farm sites, modified OfTI, WDA and BOWL project. The magnitude of effect is considered to be low during the operational phase. The significance of the effect is therefore, at worst, **minor adverse** for all vessels.

5.1.3.97 Vessels participating in the under-15 m *Nephrops* fishery, the creel fishery and the mackerel hand-lining fishery are considered to be of medium sensitivity and low magnitude. The cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA is considered to be **minor**, which is not significant in EIA terms.

5.1.3.98 Vessels scallop dredging, trawling for squid, trawling for whitefish and the over-15 m vessels trawling for *Nephrops* are considered to be of low sensitivity and low magnitude. The cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA is considered to be **minor**, which is not significant in EIA terms.

Modified OfTI, Three Consented Wind Farms and Unconsented but Reasonably Foreseeable Projects

5.1.3.99 Due to the high number of construction events which could occur simultaneously within the Forth and Tay area, it is considered that there may be some increases to steaming times during construction. This will, however, only apply to those vessels that target grounds in the area, namely the over-15 m *Nephrops* fleet and the scallop dredge fleet. The magnitude of effect for these vessels is therefore considered to be medium. The sensitivity of vessels is as defined above (i.e. low for both) and therefore the cumulative significance of effect is considered to be minor adverse. There is considered to be no additional cumulative effect for all other fisheries as a result of unconsented developments in the Forth and Tay.

5.1.3.100 It is generally considered that there is a good prospect for fishing vessels to navigate within the operational wind farm sites in the Moray Firth and Forth and Tay. The sensitivity of vessels is as defined above and the magnitude of effect is considered to be low during the operational phase. The significance of the effect is therefore, at

worst, **minor adverse** for vessels that fish grounds in the Forth and Tay area (i.e. over-15 m *Nephrops* fleet and scallop dredge vessels). There is considered to be no additional cumulative effect for all other fisheries as a result of unconsented developments in the Forth and Tay.

5.1.3.101 Vessels scallop dredging, and the over-15 m vessels trawling for *Nephrops* are considered to be of low sensitivity and low magnitude. The cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms and unconsented projects is considered to be **minor**, which is not significant in EIA terms.

5.1.3.102 No cumulative effects arising from the construction and operation of the modified OfTI in conjunction with the three consented wind farms and other unconsented projects on the under-15 m *Nephrops* fleet, squid trawlers, whitefish trawlers, creelers and mackerel hand-lining fishery have been identified.

Total Cumulative Effect

5.1.3.103 The total cumulative effect of all developments which have the potential to result in increased steaming times during the construction and operational phases is considered to be of **minor** significance, which is not significant in EIA terms.

Obstacles on the Seabed Post-construction
Modified OfTI and Three Consented Wind Farms

5.1.3.104 There is the potential for obstacles to be left on the seabed during- and post-construction which could result in damage to, or loss of, fishing gears, as well as representing a safety hazard. Offshore works such as construction vessel anchoring, jack-up legs or cable trenching can produce seabed obstructions which could cause fastenings and damage to fishing gears. The cumulative effect of the MORL three consented wind farms and the modified OfTI will be an increase in the scale of potential effect.

5.1.3.105 Offshore policy prohibits the discarding of objects or waste at sea (IMO Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter). The reporting and recovery of any accidentally dropped objects is also required. In addition, overtrawl surveys and seabed rectification measures will be undertaken in areas of all the consented developments and the modified OfTI in the Moray Firth.

5.1.3.106 Provided there is compliance to obligatory standards by all contractors and, if necessary, the implementation of seabed rectification measures, the cumulative effect is considered to be **within acceptable limits**, which is not significant in EIA terms.

Modified OfTI, Three Consented Wind Farms, WDA and BOWL

5.1.3.107 Due to commitments in the ES and consent conditions, it is assumed that BOWL will follow the same standard guidelines as outlined above and as such the cumulative effect would be **within acceptable limits**, which is not significant in EIA terms.

Modified OfTI, Three Consented Wind Farms and Unconsented but Reasonably Foreseeable Projects

5.1.3.108 Due to ES commitments and conditional consents awarded for other wind farm projects, it is assumed that the three unconsented developments will follow the same standard guidelines as outlined above and as such the cumulative effect would be **within acceptable limits**, which is not significant in EIA terms.

Total Cumulative Effect

5.1.3.109 The total cumulative effect of all developments which have the potential to result in obstacles on the seabed post-construction is considered to be **within acceptable limits**, which is not significant in EIA terms.

Displacement of Fishing Activity
Modified OfTI and Three Consented Wind Farms

5.1.3.110 Concerns were raised during consultation with fishermen and their representatives that any loss or restricted access to fishing grounds as a result of wind farm development could result in increased competition for grounds outside of the wind farm boundaries. This might result in either potential conflict between vessels competing for the same resource, or between different fishing methods (i.e. static and towed gear vessels).

5.1.3.111 Displacement of fishing vessels into other areas will be a function of the loss or restricted access to traditional fishing grounds as fishing areas are restricted by substrate type, operational ranges of vessels targeting the fishery and, in some cases, seasonality. As mentioned previously, the whitefish, creel and mackerel hand-lining fisheries will not experience cumulative effects due to the location of fishing grounds.

5.1.3.112 In the Moray Firth, there is the potential for fishing activity to be displaced from MORL's three consented wind farms during construction as a result of the safety risks associated with the installation of inter array cables. In addition, fishing vessels will be temporarily excluded from the area of the modified OfTI, until overtrawl surveys confirm the 'over-trawlable' status of the seabed.

5.1.3.113 Overtrawl surveys, and, if necessary, seabed rectification procedures, within the wind farm sites will also confirm the 'over-trawlable' status of the seabed. Fishing vessels will subsequently regain some degree of access to grounds within the operational wind farms. It is however recognised that individual skippers will ultimately decide whether they wish to resume fishing within the operational sites.

5.1.3.114 Subsequent to the above measures being satisfactorily completed, it is considered that fishing vessels will regain some degree of access to fishing grounds within the consented operational wind farm sites, although it is recognised that individual skippers, particularly those operating bottom towed gear, may consider it unsafe to continue fishing within the consented operational wind farm sites because of the presence of infrastructure.

5.1.3.115 The significance of the cumulative displacement of fishing vessels during the construction and operational phases of the three consented wind farms and modified OfTI is as identified previously for the complete loss or restricted access to traditional fishing grounds (i.e. **moderate adverse** for scallop dredge vessels and **minor adverse** for over and under-15 m *Nephrops* trawlers and squid trawlers).

5.1.3.116 As mentioned above (Sections 5.1.2.5-5.1.2.7), embedded mitigation will be implemented which will reduce impacts on the commercial fishing industry. Ongoing discussions through the MFCFWG will include the development of mitigation strategies and construction schedules. Cables will be buried or protected by other means where target burial depth is not possible and over-trawlability surveys will be undertaken as necessary. Liaison with the fishing industry will be ongoing via FIRs and the FLO. In addition, MORL will undertake scallop gear trials. This mitigation would result in a **minor adverse** residual effect on the scallop fishery.

5.1.3.117 The under-15 m *Nephrops* fishery is considered to be of medium sensitivity, low magnitude and the cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms is considered to be **minor**, which is not significant in EIA terms.

5.1.3.118 The over-15 m *Nephrops* fishery and squid fishery are considered to be of low sensitivity and medium magnitude, resulting in a cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms of **minor**, which is not significant in EIA terms.

5.1.3.119 The scallop dredge fishery is considered to be of low sensitivity and high magnitude, resulting in a cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms of **moderate**, which is significant in EIA terms. It is considered however, that the mitigation suggested above will result in a residual effect of **minor**, which is not significant in EIA terms.

5.1.3.120 No cumulative effects arising from the construction and operation of the modified OfTI in conjunction with the three consented wind farms on the whitefish, creel and mackerel hand-lining fisheries have been identified.

Modified OfTI, Three Consented Wind Farms, WDA and BOWL

5.1.3.121 The significance of the cumulative displacement of fishing vessels during the construction and operational phases of the three consented wind farms, modified OfTI, WDA and BOWL project is as identified previously for the complete loss or restricted access to traditional fishing grounds (i.e. **moderate adverse** for scallop dredge vessels and **minor adverse** for over and under-15 m *Nephrops* trawlers and squid trawlers).

5.1.3.122 As mentioned previously, mitigation has been suggested which will reduce the effect on scallop dredging activity to **minor adverse**. Potential mitigation for the BOWL project is unknown, however it is considered that as the majority of scallop dredging activity is located in the three consented wind farms and as BOWL are included in the MFCFWG, the mitigation suggested above would still reduce the effect to **minor adverse** for both the construction and operational phases.

5.1.3.123 The under-15 m *Nephrops* fishery is considered to be of medium sensitivity, low magnitude and the cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA is considered to be **minor**, which is not significant in EIA terms.

5.1.3.124 The over-15 m *Nephrops* fishery and squid fishery are considered to be of low sensitivity and medium magnitude, resulting in a cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA of **minor**, which is not significant in EIA terms.

5.1.3.125 The scallop dredge fishery is considered to be of low sensitivity and high magnitude, resulting in a cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA of **moderate**, which is significant in EIA terms. It is considered however, that the mitigation suggested above will result in a residual effect of **minor**, which is not significant in EIA terms.

5.1.3.126 No cumulative effects arising from the construction and operation of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA on the whitefish, creel and mackerel hand-lining fisheries have been identified.

Modified OfTI, Three Consented Wind Farms and Unconsented but Reasonably Foreseeable Projects

5.1.3.127 The significance of the cumulative displacement of fishing vessels during the construction and operational phases of the three consented wind farms, modified OfTI and other unconsented developments in the Forth and Tay area is as identified previously for the complete loss or restricted access to traditional fishing grounds (i.e. **moderate adverse** for scallop dredge vessels and **minor adverse** for over-15 m *Nephrops* trawlers).

5.1.3.128 Although mitigation has been suggested by MORL which reduce the residual effects of the three consented wind farms and modified OfTI to minor, mitigation has not yet been suggested for the unconsented wind farms in the Forth and Tay area. Due to the high levels of scallop dredging activity occurring in the area, it is considered that the cumulative residual effect will not be lowered by MORLs mitigation alone and as such the residual effect is considered to be **moderate adverse**.

5.1.3.129 The over-15 m *Nephrops* fishery are considered to be of low sensitivity and medium magnitude, resulting in a cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms and other unconsented projects of **minor**, which is not significant in EIA terms.

5.1.3.130 The scallop dredge fishery is considered to be of low sensitivity and high magnitude, resulting in a cumulative significance of effect during both construction and operation of the modified OfTI in conjunction with the three consented wind farms and other unconsented projects of **moderate**, which is significant in EIA terms.

5.1.3.131 No cumulative effects arising from the construction and operation of the modified OfTI in conjunction with the three consented wind farms and other unconsented projects on the under-15 m *Nephrops* fleet, squid trawlers, whitefish trawlers, creelers and mackerel hand-lining fishery have been identified.

Total Cumulative Effect

5.1.3.132 The total cumulative effect of all developments which have the potential to result in displacement of fishing activity during the construction and operational phases is considered to be of **moderate** significance for scallop dredge vessels, which is significant in EIA terms. The total cumulative effect on all other vessels is considered to be of **minor** significance, which is not significant in EIA terms.

Interference to Fishing Activities

Modified OfTI and Three Consented Wind Farms

5.1.3.133 All of the potential cumulative effects included in this assessment would cause interference to fishing activities. An additional effect to be considered is the potential for navigational conflicts arising between fishing vessels and construction, operation and maintenance vessels transiting to and from the sites. This could include the fouling of static gear marker buoys and dhans, or towed gear vessels being required to alter towing direction.

5.1.3.134 The potential for interference will be, in part, determined by the seasonality of construction, operation and maintenance works and the location of the works ports. At this current time, the ports are unknown, however a conservative approach has been taken that works vessels will have the potential to interfere with all fishing activities in the area.

5.1.3.135 Transiting works vessels will fully comply with COLREGS to negate the requirements for fishing vessels engaged in fishing to alter course. Transit routes will also be established prior to construction commencing to aid with maritime safety. Due to the high mobility of towed gear vessels, the sensitivity is considered to be low. As works vessels will comply with COLREGs to minimise interference with towed gear vessels, the magnitude is considered to be low. It therefore follows that the cumulative effect during construction on towed gear vessels will be **minor adverse**.

5.1.3.136 It should also be recognised that in order to minimise gear loss, static gear fishermen avoid deploying their gear in shipping routes and areas of high shipping activity. Works vessels will also comply with COLREGS which reduces risk to fishing gears being towed. Static gear vessels are considered to be of medium sensitivity as these vessels are restricted in the mobility and operational range. The magnitude of effect is considered to be medium as, although works vessels will comply with COLREGS to reduce risk to fishing gears being towed, there is still higher risk of this occurring when compared to interference with towed gear vessels. The cumulative significance of effect is therefore considered to be **moderate adverse** during construction.

5.1.3.137 During operation, it is considered that the number of works vessels required will be reduced; as such the magnitude of effect for both mobile and static gear vessels will be low, resulting in a **minor adverse** cumulative effect for both.

5.1.3.138 It should be noted that ongoing discussions through the MFCFWG will include the development of construction schedules. Additionally, information regarding construction activity and the vessel management plan will be distributed to the fishing industry through the means of the FIRs, FLO and through NtMs published in Kingfisher. Consultation with the fishing industry will be ongoing to minimise potential impacts on fishing activities. This will result in a residual effect of **minor adverse** on the static gear fleet during construction.

5.1.3.139 The sensitivity of towed gear vessels is considered to be low and the magnitude of effect is also low. The significance of effect during both the construction and operational phases of the modified OfTI in conjunction with the three consented wind farms is therefore considered to be **minor,** which is not significant in EIA terms.

5.1.3.140 During operation, the static gear fleet is considered to be of medium sensitivity and low magnitude. The significance of effect of the modified OfTI in conjunction with the three consented wind farms is therefore considered to be **minor,** which is not significant in EIA terms.

5.1.3.141 The static gear fleet is considered to be of medium sensitivity and there is expected to be a medium magnitude of effect during construction. The significance of effect of the modified OfTI in conjunction with the three consented wind farms during construction is therefore considered to be **moderate**, which is significant in EIA terms. It is considered however, that the mitigation suggested above will result in a residual effect of **minor**, which is not significant in EIA terms.

Modified OfTI, Three Consented Wind Farms, WDA and BOWL

5.1.3.142 There is the potential for interference to fishing vessels to increase due to the presence of works vessels for the BOWL project and WDA in conjunction with those present for the three consented wind farms and modified OfTI. Assuming BOWL follow the standard guidelines highlighted above, it is considered that there will be no increase in the cumulative effect on the towed gear vessels (i.e. **minor adverse** during the construction and operational phases) and static gear vessels (**moderate adverse** during construction and **minor adverse** during operation).

5.1.3.143 It is assumed that BOWL will have the same standard mitigation as discussed above and, as they are also a member of the MFCFWG, the residual effect on the static gear fleet will be **minor adverse**.

5.1.3.144 The sensitivity of towed gear vessels is considered to be low and the magnitude of effect is also low. The significance of effect during both the construction and operational phases of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA is therefore considered to be **minor,** which is not significant in EIA terms.

5.1.3.145 During operation, the static gear fleet is considered to be of medium sensitivity and low magnitude. The significance of effect of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA is therefore considered to be **minor,** which is not significant in EIA terms.

5.1.3.146 The static gear fleet is considered to be of medium sensitivity and there is expected to be a medium magnitude of effect during construction. The significance of effect of the modified OfTI in conjunction with the three consented wind farms, BOWL project and WDA during construction is therefore considered to be **moderate**, which is significant in EIA terms. It is considered however, that the mitigation suggested above will result in a residual effect of **minor**, which is not significant in EIA terms.

Modified OfTI, Three Consented Wind Farms and Unconsented but Reasonably Foreseeable Projects

5.1.3.147 There is the potential for interference to fishing vessels to increase due to the presence of works vessels for the unconsented developments in the Forth and Tay in conjunction with those present for the three consented wind farms and modified OfTI. It should be noted however that interference with these works vessels will only occur with fishing vessels operating in the Forth and Tay (i.e. over-15 m *Nephrops* vessels and scallop dredgers).

5.1.3.148 It is assumed that the unconsented project developers will follow the standard guidelines highlighted above and as such it is considered that there will be no increase in the cumulative effect on the towed gear vessels (i.e. **minor adverse** during the construction and operational phases).

5.1.3.149 The sensitivity of towed gear vessels is considered to be low and the magnitude of effect is also low. The significance of effect during both the construction and operational phases of the modified OfTI in conjunction with the three consented wind farms and the unconsented projects is therefore considered to be **minor,** which is not significant in EIA terms.

5.1.3.150 No cumulative effects arising from the construction and operation of the modified OfTI in conjunction with the three consented wind farms and unconsented projects on the static gear fleet have been identified.

Total Cumulative Effect

5.1.3.151 The total cumulative effect of all developments which have the potential to result in interference with fishing vessels during the construction phase is considered to be of **moderate** significance for static gear vessels, which is significant in EIA terms. It should be noted however that the mitigation discussed above will result in a residual effect of **minor** significance on the static gear fleet during construction, which is not significant in EIA terms.

5.1.3.152 The total cumulative effect on mobile gear vessels during both construction and operation is considered to be of **minor** significance, which is not significant in EIA terms.

Commentary on Developments
Other Offshore Wind Farms

5.1.3.153 The wide operational range of certain fishing vessels (in some instances all around the UK), may potentially result in some fisheries being affected by the development of other offshore wind farms around the UK. This is particularly the case for the nomadic scallop fishery, where there is the potential for temporary and/or complete loss of fishing grounds and the resulting displacement of fishing activity into other areas, to be a result of multiple offshore wind farm developments. The scale of displacement will depend upon the importance of scallop grounds in the vicinity of other developments, as well as the construction and operational programmes.

5.1.3.154 Additional consideration has been given to the nomadic scallop fishery. In the case of the nomadic scallop fleet, there are a number of proposed offshore wind farm developments around the UK which could affect the fishery in addition to the modified OfTI, MORL three consented wind farms, WDA, BOWL project and unconsented projects in the Forth and Tay. Proposed developments located in the vicinity of scallop fishing grounds are listed below and can be seen in **Error! Reference source not found.**:

- Rampion Round 3 Zone;
- Irish Sea Round 3 Zone; and
- First Flight Offshore Wind Farm Zone.

5.1.3.155 Although project details are available for the Rampion Round 3 Zone development, it has not been considered feasible to undertake a robust assessment on the nomadic scallop fleet on a national scale using the limited information currently available for the other projects. As such, a commentary has been provided to discuss the potential cumulative effects on the nomadic scallop fleet.

5 Human Environment

5.7 Other Human Activities

5.7.1 Baseline Information

Introduction

5.7.1.1 This chapter describes the Other Human Activities (with marine components) occurring within or in the vicinity of the modified offshore transmission infrastructure (OfTI) associated with the consented Telford, Stevenson and MacColl offshore wind farms, which incorporates the export cable corridor and offshore substation platforms (OSPs). Activities include offshore wind, wave and tidal energy projects and plans, carbon capture and storage plans, military activity, oil and gas activity and infrastructure, marine dredging and disposal, subsea cables and pipelines, telecommunications, unexploded ordnance and aviation. This chapter presents an assessment of the likely significant effects of the construction, operation and decommissioning of the modified OfTI on Other Human Activities (with marine components) in the Moray Firth, along with proposed mitigation measures, where considered necessary.

5.7.1.2 The description of baseline conditions that follows is based upon desktop reviews of publicly available information and the results of consultation with 'Other Human Activity' stakeholders with interests in the modified OfTI study area.

5.7.1.3 Note that the following chapters describe other marine activities:

- Chapter 5.1 – Commercial Fisheries;
- Chapter 5.2 – Shipping and Navigation; and
- Chapter 5.5 – Socio-economics.

Consultations

5.7.1.4 As part of the Environmental Impact Assessment (EIA) process for the Moray Offshore Renewables Limited (MORL) Environmental Statement (ES), consultation was undertaken with key stakeholders to gather information on the Other Human Activities that occur within the vicinity of the Telford, Stevenson and MacColl offshore wind farms and original transmission infrastructure. Table 5.7-1 below summarises the issues that were highlighted during consultation for the MORL ES which are also relevant to the modified OfTI; consultation responses are presented in full in the MORL ES (MORL, 2012 – ES Chapter 5.8 Other Human Activities). Where more recent consultation has been undertaken, the outcomes of that are also presented in Table 5.7-1.

Table 5.7-1 Summary of Consultation Responses Relevant to Other Human Activities

Organisation	Consultation Response	MORL Approach
Marine Scotland	Marine Scotland noted that the Moray Firth Round 3 zone lies close to the Beatrice Offshore Wind Farm within Scottish Territorial Waters of the Moray Firth, and that they welcome and encourage collaborative working between the developers in the area.	MORL is committed to ongoing collaboration as a member of the Moray Firth Offshore Wind Developers Group (MFOWDG) and adherence to the MFOWDG Cumulative Impact Assessment Discussion Document, which has involved joint gathering / sharing of baseline data and adherence to standardised impact assessment approaches.
Marine Scotland – Modified OfTI Scoping Opinion	The ES must include what measures are proposed to be in place to do a pre-sweep for Unexploded Ordnance ("UXO's"). If discovered, the time it takes to remove such an object may have detrimental effects on the project timelines. This is of particular importance as the cable route passes through a firing practice area. MS LOT recommend that MORL engage with the Ministry of Defence on this matter.	MORL commissioned a desk-based study to identify the risk posed to the MORL Project by unexploded ordnance (UXO) and to identify potential measures by which any risks may be reduced to an acceptable level. This study is discussed in this chapter.
Ministry of Defence (MoD) – Military Practice and Exercise	In response to the proforma submitted by MORL to the MoD at the Project scoping stage, the MoD stated that it would object to the Project unless mitigation measures are agreed that would minimise impacts upon danger area D807, which overlapped with parts of the wind farm sites and original transmission infrastructure. In March 2012, the D807 ceased to exist and subsequently the MoD has confirmed that they will not object to the Project on these grounds. During consent determination, the MoD objected to the MORL Project citing concerns about hazards to MoD nautical and aeronautical activities in the area. Following further discussions between MORL and the MoD, in 2014 the MoD removed their objection subject to conditions being applied to the consent. MORL will adhere to all conditions of consent. In relation to concerns about hazards to MoD nautical activities, a condition of consent requires that MORL submit a Lighting and Marking Plan (LMP) to Marine Scotland for their approval, with such approval to only be granted following consultation with advisors, including the DIO, prior to construction commencing. MoD consultation responses relevant to 'aeronautical activities' are presented below.	MORL will adhere to all conditions of consent.
Joint Radio Company (JRC) Limited	The JRC stated that they do not foresee the proposed developments resulting in any interference to scanning telemetry systems. MORL confirmed this position in April 2012.	No action required.

Organisation	Consultation Response	MORL Approach
Atkins Limited	Atkins stated that they do not foresee the proposed developments resulting in any interference to scanning telemetry systems. MORL confirmed this position in April 2012.	No action required.
Office of Communications (OFCOM)	OFCOM do not foresee the proposed developments resulting in any interference to civil microwave fixed links. MORL confirmed this position in April 2012.	No action required.
Health and Safety Executive (HSE)	During Project EIA consultation the HSE confirmed that no safety zones are present around the four abandoned well heads within the wind farm sites.	No action required.
SHE-T	Consultation ongoing.	Ongoing consultation to take place.
Faroese Telecom	Faroese Telecom is aware of the MORL modified OfTI. Further consultation is planned to determine SHEFA-2 cable crossing agreements, if required.	Ongoing consultation with Faroese Telecom to determine cable crossing agreements.
Suncor	Suncor have advised MORL on their proposed future exploration activity in Licence Block 12/27.	Ongoing consultation with Suncor to take place.
Civil Aviation Authority (CAA)	The CAA was consulted during MORL Project EIA and during MORL Project consent determination. They have raised no objection to the MORL Project. Conditions have been placed on the MORL Project consent to ensure the 'as built' wind farm is marked and lit as per MoD and CAA requirements, and communicated to the UK Hydrographic Office (UKHO) for aviation and maritime charting.	Any consent granted for the modified OfTI will include such conditions in relation to the marking, lighting and charting of the OSPs. MORL will adhere to all conditions of consent.
NATS En-Route Limited (NERL)	NATS objected to the MORL Project because of potential impacts on the Allanshill radar and associated air traffic operations. Following discussions between MORL and NATS, an agreement has been entered into between the two parties for the design and implementation of an identified and defined mitigation solution in relation to the Project. Consequently, NATS have withdrawn their objection. By default, the mitigation solution will encompass the OSPs that will sit within wind farm boundaries.	Implementation of mitigation solution.
NERL Safeguarding ("NATS") – Modified OfTI Scoping Opinion	NATS anticipates no impact from the Modified Transmission Infrastructure for the Moray Firth wind farms. As such NATS has no comments to make on the Scoping Report.	No action required.

Organisation	Consultation Response	MORL Approach
MoD - Aviation	The MoD initially objected to the MORL Project citing concerns with the Air Traffic Control radar at RAF Lossiemouth and the Air Defence Radar at RAF Buchan. Following discussions with the MoD, and further consideration of the mitigation proposals submitted by MORL, the MoD confirmed that it was prepared to withdraw their objection subject to conditions being attached to any consent. MORL Project consent conditions require MORL to, prior to the erection of any wind turbine generators (WTGs) on the site, submit an Air Traffic Control Radar Mitigation Scheme (ATC Scheme), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with the MoD. By default, the ATC Scheme will encompass the OSPs that will sit within wind farm boundaries.	MORL will adhere to all conditions of consent.
Offshore Helicopter Operators and Platform Operators	Consultation has been undertaken with CHC Scotia, Bond Offshore, Bristow, Ithaca, Wood Group, and Talisman. No objections to the MORL Project have been raised.	No action required.
British Telecom (Radio Network Protection Team) – Modified OfTI Scoping Opinion	BT Radio Network Protection do not have any comments to make.	No action required.
Highlands and Islands Airports Ltd – Modified OfTI Scoping Opinion	This development falls outside the safeguarded areas for Inverness Airport, therefore HIAL do not object to the modified Transmission Infrastructure.	No action required.

Desktop Studies

5.7.1.5 Other Human Activities have been described through desk-based study of available data and information gathered during the consultation process (see Section 1.1.2 above). The following data sources have been used to inform this chapter:

- Offshore Wind
  - Blue Seas – Green Energy, A Sectoral Marine Plan for Offshore Wind Energy in Scottish Territorial Waters (Part A, The Plan) (Marine Scotland, 2011);
  - The Crown Estate leasing information (The Crown Estate, 2014);
  - Offshore Wind Energy in Scottish Waters - Draft Regional Locational Guidance (Marine Scotland, 2012);
  - Offshore Wind Initial Plan Framework (Draft Plan Options) (Marine Scotland, 2013);
  - Potential Scottish Test Sites for Deep Water Floating Wind Technologies - Draft Regional Locational Guidance (Marine Scotland, 2014); and
  - Proposed project Scoping reports and Environmental Statements.

- Wave and Tidal
  - The Crown Estate wave and tidal information (The Crown Estate, 2014);
  - Wave and Tidal Regional Locational Guidance (Marine Scotland, 2012);
  - Wave and Tidal Initial Plan Framework (Draft Plan Options) (Marine Scotland, 2013); and
  - Proposed project Scoping reports and Environmental Statements.
- Carbon Capture and Storage
  - Carbon Capture and Storage – A Roadmap for Scotland (Scottish Government and Scottish Enterprise, 2012);
  - Scottish Carbon Capture and Storage (SCCS) website (SCCS, 2014); and
  - CO2 Stored website (British Geological Survey and The Crown Estate, 2014).
- Military Activity
  - Datasets from SeaZone Solutions.
- Oil and Gas Activity
  - Department of Energy and Climate Change (DECC) licensing rounds information (DECC, 2014);
  - UK Oil and Gas Data website (CDA, 2014); and
  - Operator websites and reports.
- Marine Dredging and Disposal
  - Datasets from Marine Scotland.
- Subsea Cables and Pipelines
  - Kingfisher Information Service - Offshore Renewable & Cable Awareness project (KIS-ORCA) website (Kingfisher Information Service, 2014); and
  - Datasets from SeaZone Solutions and UK DEAL.
- Telecommunications
  - SHEFA website (Faroese Telecom, 2014).
- Unexploded Ordnance
  - Moray Offshore Renewables Limited (MORL)-commissioned desk study (6-Alpha Associates, 2011).
- Aviation
  - Technical reports and assessments prepared in support of the MORL Project consent application (MORL, 2012).

5.7.1.6 In addition to the data sources listed above, reference was also made to DECC Strategic Environmental Assessment (SEA) outputs (e.g. DTI, 2004) and the Marine Scotland online National Marine Plan Interactive tool (Marine Scotland, 2014).

Legislative and Planning Framework

5.7.1.7 Scotland's Draft National Marine Plan (Marine Scotland, 2013) sets out strategic policies for the sustainable use of Scotland's marine resources out to 200 nautical miles (nm). The Draft Plan emphasises that development proposals which enable multiple uses of marine space are encouraged (Planning Policy Principle GEN 5) and it also provides sector-specific marine planning policies which variously support the economic growth of sectors, manage conflicts between marine users or manage

environmental impacts. Sectors included in the Draft Plan include Oil and Gas (Chapter 9), Carbon Capture and Storage (Chapter 10), Renewables (Chapter 11), Telecommunications (Chapter 14) and Defence (Chapter 15). Specifically in relation to Renewables, a Draft Plan Policy states that 'Developers bringing forward proposals for new developments must actively engage at an early stage with existing users of the area to which the proposal relates; and of adjoining areas which may be affected' (Marine Scotland, 2013, page 94). In line with this draft policy, MORL has engaged with 'Other Human Activities' stakeholders throughout the consenting of the Project and subsequently in relation to applying for a Marine Licence for the modified OfTI (see Section 5.7.1.2 above).

5.7.1.8 In sectoral plans relevant to the future of offshore wind in Scottish Territorial Waters (Marine Scotland, 2011, 2012a), it is noted that in the planning and licensing of future offshore wind farm developments, key issues that will need to be addressed in the Moray Firth region relate to potential interactions with 'aviation and radar', and 'defence activities' (Marine Scotland, 2012). MORL has considered these interactions within both the MORL ES and the modified OfTI EIA.

5.7.1.9 The assessment of impacts on Other Human Activities has been undertaken in line with guidance presented in the Draft Marine Renewables Licensing Manual (Marine Scotland, 2012). The Draft Manual states that EIA should take account of the following 'other sea users (... oil and gas; subsea pipelines; dredging and marine aggregate extraction; tourism and recreation; aviation; military activity; munitions etc)' (page 58). These topics have all been considered within this chapter, with the exception of tourism and recreation, which is considered in Chapter 5.5 – Socio-economics.

5.7.1.10 The impact assessment has also been undertaken with reference to the following guidance documents:

- Subsea Cables UK Guideline No 6 – The Proximity of Offshore Renewable Energy Installations & Submarine Cable Infrastructure in UK waters (Subsea Cables UK [SCUK], 2012);
- International Cable Protection Committee (ICPC) series of recommendations for marine cables. Recommendations 2 (ICPC, 2007a), 3 (ICPC, 2007b) and 13 (ICPC, 2010);
- 28th Seaward Licensing Round - Other Regulatory Issues (DECC, 2014); and
- The Crown Estate (TCE) Position Paper: Round 3 Offshore Wind and Oil & Gas – A Critical Interface (TCE, 2010).

Baseline Characteristics

Offshore Wind

5.7.1.11 The Beatrice Wind Farm Demonstrator Project is one of two operational offshore wind farms in Scottish waters and is located adjacent to the Beatrice oil field, immediately to the west of the Moray Firth Round 3 Zone. It is comprised of two 5 MW wind turbines and was developed in 2007 by Scottish and Southern Energy (SSE) and Talisman Energy. The Project has a proposed lifespan of five years and all electricity generated is fed to a nearby Beatrice oil platform.

5.7.1.12 In 2014 MORL was granted consent by the Scottish Ministers under Section 36 of the Electricity Act 1989 to construct and operate the Telford, Stevenson and MacColl offshore wind farms and OfTI within the Eastern Development Area (EDA) of the Moray Firth Round 3 Zone. The three offshore wind farms will have a maximum generating capacity of up to 1,116 MW. It is envisaged that turbine foundation installation will commence in 2017, with turbine installation and final commissioning running through to 2021. MORL are yet to confirm plans for project development within the Western Development Area (WDA) of the Round 3 Zone.

5.7.1.13 In 2014 Beatrice Offshore Windfarm Limited (BOWL) (a partnership of SSE Renewables and Repsol Nuevas Energias) was granted consent by the Scottish Ministers under Section 36 of the Electricity Act 1989 to construct and operate the Beatrice offshore wind farm, with a maximum generating capacity of up to 750 MW. Construction is expected to commence in 2016 and the Project will be operational by 2020.

5.7.1.14 The MORL and BOWL lease areas lie adjacent to one another. MORL proposes a buffer equivalent to five WTG rotor diameters along the MORL / BOWL boundary. There is potential for the MORL and BOWL construction schedules to overlap by up to four years.

5.7.1.15 In order to minimise conflict and encourage collaboration and in light of the potential for cumulative impacts to arise, MORL and BOWL have formed the Moray Firth Offshore Wind Developers Group (MFOWDG) in association with The Crown Estate (TCE). Via MFOWDG, MORL and BOWL have undertaken joint consultation and agreed upon standardised approaches to the EIA. It is envisaged that collaboration will continue through construction and into wind farm operation and potentially decommissioning.

5.7.1.16 The Hywind Scotland Pilot Park Project, located 25 km east of Peterhead and being developed by Statoil Wind Limited, is currently at the scoping stage. The proposal comprises up to five wind turbines, each with a maximum capacity of 6 MW, and each mounted on a floating structure which is then held in place by a mooring system on the sea bed. As there is no indication of an overlap in activity (spatially or temporally) between the proposed Hywind project and the modified OfTI, potential interactions have not been considered within this impact assessment.

5.7.1.17 Marine Scotland has published an Initial Plan Framework for Offshore Wind Energy in Scottish Waters (Marine Scotland, 2013). The Framework details the draft Plan Options for future commercial scale offshore wind developments on a regional basis around the Scottish coastline. In the North East region, within which the Moray Firth in located, there are two draft Plan Option areas for offshore wind development, referred to as 'OWNE1' and 'OWNE2'. OWNE2 is located closest to the three MORL consented wind farms and modified OfTI, lying to the east, off Rattray Head. The Plan areas are earmarked as medium to long term development options and there is unlikely to be any activity in these locations whilst the MORL and BOWL offshore wind farms are under construction. As such, and as these are draft Plan Options rather than defined projects, potential effects of the modified OfTI on Plan areas have not been considered further within this impact assessment.

Wave and Tidal Energy

5.7.1.18 Wave and tidal energy project development activity in Scottish waters is focused in Pentland Firth and Orkney waters to the north of the Moray Firth and along the west coast of Scotland (Marine Scotland, 2012, 2013).

5.7.1.19 Development activity within or immediately adjacent to the Moray Firth is limited. Within the Moray Firth, AWS Ocean Energy Limited holds an Agreement for Lease for a potential wave energy project off Burghead. The project is described as 'in planning'; no detailed project information is currently available.

5.7.1.20 To the north, in the area of the Pentland Firth closest to the modified OfTI, there are two existing tidal energy sites with Agreement for Lease. These are the Inner Sound Tidal Energy Project, being developed by MeyGen Limited and with a maximum generation capacity of 86 MW (MeyGen, 2014) and the Ness of Duncansby tidal energy site, being developed by ScottishPower Renewables with a maximum generation capacity of 95 MW (ScottishPower Renewables, 2014). The Inner Sound Tidal Energy Project was awarded consent by the Scottish Ministers in 2013. The construction start date and programme is currently unknown however the consent specifies that construction must commence within 5 years of the issue of consent.

Construction will therefore need to commence by 2018, and therefore has the potential to overlap with the construction of the modified OfTI (2017 – 2021). However there will be no spatial overlap between the projects. The Ness of Duncansby tidal energy site remains in the early stages of planning.

5.7.1.21 As a result of there being no data to indicate an overlap in activity (spatially and/or temporally) between wave and tidal lease sites and the modified OfTI, potential interactions have not been considered within this impact assessment.

Carbon Capture and Storage

5.7.1.22 The Scottish Government has a clear policy to decarbonise electricity generation by 2030 and it is intended that carbon capture and storage (CSS) will support this. A CCS demonstration project is being developed by SSE and Shell at Peterhead gas power plant, where carbon dioxide (CO_2) will be captured and transported via existing pipelines for offshore storage in Shell's Goldeneye depleted gas field. It is hoped that the demonstration project will be operational by 2017 (Scottish Carbon Capture and Storage website, 2014). Further potential offshore storage hubs for CO_2 in Scottish waters have been identified (Marine Scotland, 2013b), including a site within the Moray Firth, referred to as 'Mains'. In light of anticipated CCS project development timelines, it is unlikely that any offshore storage opportunities in the Moray Firth will be investigated prior to or during the installation of the MORL modified OfTI. On this basis, potential interactions between the modified OfTI and CCS activity have not been considered within this impact assessment.

Military

5.7.1.23 Practice and Exercise Areas (PEXA) are used for various military practice activities by the Royal Navy, the Army, the Royal Air Force (RAF) and the Ministry of Defence (MoD). Portions of the modified OfTI, within which OSPs may be located, lie within offshore Danger Area D809(South), which is used by the RAF for a variety of practice flying and firing exercises (see Figure 5.7-1).

5.7.1.24 The modified OfTI export cable corridor passes through offshore Danger Area D807, which has been used by the RAF for live firing, bombing and sonobuoy training. However, since 1st March 2012, D807 has been permanently and completely withdrawn (Notice to Airmen No. B0238 /12).

5.7.1.25 A portion of the modified OfTI lies within the large Air Force Department Area D712D, which is used for combat and training exercises and supersonic flight at an altitude of 22,000 to 25,000 feet.

5.7.1.26 The closest coastal Danger Area to the modified OfTI landfall is located approximately 35 km to the west at the Binn Hill Firing Range between Buckie and Lossiemouth.

Oil and Gas

5.7.1.27 There are three producing oil fields in the inner Moray Firth; two are located within / immediately adjacent to the Moray Firth Round 3 Zone and referred to as the 'Beatrice' and 'Jacky' fields (see Figure 5.7-2).

5.7.1.28 The Beatrice oil field (Block 11/30a) commenced production in 1981 and the Jacky oil field (Block 12/21c) commenced production in 2009. Infrastructure within the fields comprises the Beatrice Alpha, Bravo and Charlie platforms, the Jacky platform, and seabed cables and pipelines linking the platforms. Beatrice Alpha, Bravo and Charlie are owned by Talisman Energy and operated by Ithaca Energy. Production forecasts predict that 2014 will be the last year of production from the Beatrice field (Energy Voice website, 2014). The Jacky platform is owned and operated by Ithaca Energy. These fields and their associated infrastructure do not overlap with the proposed modified OfTI boundaries.

5.7.1.29 There are five plugged and abandoned wells within the modified OfTI boundary. Correspondence with the HSE has confirmed that there are no mandatory safety zones associated with the wellheads.

5.7.1.30 In terms of the potential for future exploration and production, the modified OfTI boundaries overlap with currently active, but as yet un-exploited, licence blocks. A licence for Block 12/21b is held by Sendero and Suncor holds licences for Blocks 12/26b and 12/27. On the basis of consultation with Suncor, MORL understands that the focus of any future exploration activity will be in Block 12/27, where a 'Significant Discovery' is located (DECC, 2014). In meetings with MORL, Suncor have stated their intentions to undertake geophysical survey within Block 12/27 in 2014, and available information indicates that a well will be installed by 2015 depending upon the outcome of survey (Noreco website, 2014).

5.7.1.31 The 28th oil and gas licensing round is ongoing, with licence applications submitted in April 2014. Several of the blocks on offer overlap with the modified OfTI (blocks 12/22, 12/23, 12/28, 18/2, 18/7 and 18/8). Potential awards are not expected to be made prior to MORL's application for a licence for the modified OfTI.

Marine Dredging and Disposal

5.7.1.32 Dredging and disposal activity within the Moray Firth is sporadic and associated with port and harbour maintenance and development and coastal marine disposal sites (see Figure 5.8-1). Where the proposed offshore export cable makes landfall, it will travel within several kilometres of the existing 'MacDuff' marine disposal site, which historically has received small volumes of dredge arisings, though at no point will overlap with it (DTI, 2001).

5.7.1.33 It is considered unlikely that the modified OfTI will result in any impacts upon dredging and disposal activity or marine disposal sites and as such these activities have not been considered further within the impact assessment.

Subsea Cables and Pipelines

5.7.1.34 There is one existing subsea cable in proximity to the modified OfTI corridor (Figure 5.8-1). This is the SHEFA-2 fibre-optic telecommunications cable, owned by Faroese Telecom, which links the Faroe Islands to mainland Scotland via the Northern Isles. It runs south from the Orkney Islands to the Scottish mainland at Inverboyndie (Seafish, 2013) and is buried under the seabed surface as it transits the Moray Firth and makes landfall. The modified OfTI export cables could potentially share a landfall point with the SHEFA-2 cable and may need to cross it. Discussions with SHEFA in relation to this are ongoing. Within 12 nm of the coast, SHEFA has specific seabed rights granted to them as part of their seabed lease with The Crown Estate. In particular, permission must be granted by the cable owner for any works planned to be undertaken within 250 m either side of the cable. Where works are within 1 km of the cable, the operator must be notified prior to any works being undertaken.

5.7.1.35 Scottish Hydro Electric Transmission plc (SHE Transmission [SHE-T]) is the licensed electricity Transmission Owner in the north of Scotland and they are committed to supporting the connection of renewables projects to the National Grid. SHE-T have proposed the Caithness – Moray Link, which will be a subsea High Voltage Direct Current (HVDC) reinforcement of the transmission network between Caithness and Moray with two onshore converter stations to allow for future connection to Shetland and offshore generation, along with upgrade of the onshore network in Caithness (SHE-T, 2014). The HVDC subsea cable would be installed by 2018 and cross the modified OfTI corridor. Consultation on the 'Needs Case' for the SHE-T proposal closed in May 2014 and a decision is awaited.

5.7.1.36 BOWL's proposed export cable will travel approximately 65 km from the BOWL wind farm, through the MORL WDA and make landfall at Portgordon, to the west of the modified OfTI landfall (BOWL, 2012). BOWL cable installation is scheduled to take place in 2016/2017, which may temporally overlap with MORL modified OfTI installation by up to one year. The modified OfTI does not spatially overlap at any point with the BOWL export cable. However MORL has objected to the BOWL export cable route on the basis that it passes through the WDA. MORL and BOWL will seek to meet mutual agreement on BOWL's cable routing and in the event of a failure to agree, The Crown Estate will determine a solution.

5.7.1.37 There are no pipelines within the modified OfTI footprint. Pipelines are located to the north and east of the modified OfTI footprint (see Figure 5.7-2).

Telecommunications

5.7.1.38 An initial screening exercise of the potential impacts of the development of the Moray Firth Round 3 Zone on telecommunications was undertaken in 2009 (Pager Power, 2009). The study stated that development in the EDA would not interfere with existing microwave links, scanning telemetry or non-aviation radar and would not cause TV or radio interference. Stakeholders requested that MORL sought re-confirmation of this position prior to consent application for the Project being made because the use of the spectrum is dynamic and the use of the band changes on an ongoing basis. Further consultation in April 2012 confirmed the development of the Telford, Stevenson and MacColl wind farms is not expected to result in any interference to existing telecommunications systems.

5.7.1.39 Telecommunications used by the Beatrice and Jacky oil platforms are set up via satellite and will therefore not be affected by wind farm development.

5.7.1.40 During MORL ES consent determination the Highland Council raised a concern that the Project could cause an impact upon television reception in the area around Helmsdale. The Scottish Ministers have therefore included a condition within the MORL consent which sets out the mitigation measures that would be taken to investigate and rectify any complaint made regarding television reception that is attributable to the MORL Project.

5.7.1.41 On the basis of consultation feedback to date and Project consent condition requirements that will be fulfilled by MORL, it is considered highly unlikely that the above-surface modified OfTI infrastructure, comprising two OSPs, would result in any adverse impacts upon telecommunications systems. Potential effects upon telecommunications have not been considered any further within this impact assessment.

Unexploded Ordnance

5.7.1.42 MORL commissioned a desk-based study (6 Alpha Associates Ltd, 2011) to identify the risk posed to the MORL Project by unexploded ordnance (UXO) and to identify potential measures by which any risks may be reduced to an acceptable level. The study identified potential UXO sources based on analysis of a variety of data and presented the results of a UXO risk assessment, which considered the hazards associated with the potential UXO sources. The study also recommended measures to be taken to minimise the risk posed by potential sources of UXO.

5.7.1.43 UXO threat within the Moray Firth offshore area is potentially the result of munitions and weaponry employed during World War I and World War II: sea-dumped munitions / explosives, shipwrecks carrying munitions / explosives, and sea mines represent the main sources of UXO within the region.

5.7.1.44 The probability of UXO encounter within the Moray Firth Round 3 Zone has been mapped on the basis of desk study findings. The majority of the MORL EDA, within which the OSPs will be located, is considered to have a background residual UXO threat resulting from general wartime and subsequent military training activities in

the region. Within the easternmost extent of the proposed Telford and MacColl wind farm sites, the probability of encountering UXO is slightly higher as a result of present military practice activity in danger area D809 South. In the southwest portion of the consented MacColl Wind Farm site, UXO encounter probability is defined as 'highly likely'. This is driven by the presence of historical 'live' bombing ranges.

5.7.1.45 UXO encounter is 'almost certain' on the wreck of the *HMS Lynx*, a steamer destroyer sunk in 1915, which lies outside of and to the south of the MacColl Wind Farm boundary and on the eastern boundary of the modified export cable corridor. *HMS Lynx* sank after striking a sea mine; she was armed with guns and torpedo tubes, though the volume of munitions being carried by the vessel at the time of sinking is unknown (6 Alpha Associates Ltd, 2011).

Aviation

5.7.1.46 The MORL ES presents baseline information relevant to the assessment of the potential effects of the Project on military and civil aviation receptors (MORL, 2012; ES Chapter 5.3 – Military and Civil Aviation). The EIA considered the effects of the WTGs, OSPs and offshore export cable on civil and military radar systems, Helicopter Main Routes (HMRs) and aviation operations.

5.7.1.47 Baseline information and impact assessment are not repeated within this modified OfTI ES on the basis that the previous assessment concluded that the original TI would not result in any significant effects upon aviation (MORL, 2012; ES Chapter 11.3 – Military and Civil Aviation). Potential effects upon aviation have not been considered any further within this impact assessment.

5.7.2 Impact Assessment

Summary of Effects and Mitigation

5.7.2.1 The assessment of effects has been focused on establishing potential for overlaps and therefore conflict between activities and operators in both a geographical and temporal context. The potential for the modified OfTI to disrupt activity associated with other proposed offshore wind farms and military practice areas is not expected to be significant.

5.7.2.2 Whilst there is no existing oil and gas infrastructure within the proposed modified OfTI footprint, two operators hold licences to explore the potential of licence blocks which overlap with the modified OfTI footprint. Taking a precautionary approach, the impact assessment assumes that licence holders may wish to explore the licence areas (e.g. undertake seismic survey) during modified OfTI construction, operation and decommissioning. During operation, the physical presence of modified OfTI infrastructure may exclude exploration activities from particular locations and the effect is judged to be of minor adverse significance. MORL is committed to ongoing consultation, aiming for co–existence where achievable.

5.7.2.3 There is potential for damage to subsea cables during modified OfTI construction activities, including where cable crossings are required. This has been assessed to be of moderate adverse significance during construction and minor adverse significance during operation. Implementation of industry standard measures such as crossing agreements will ensure that the residual effect will be of minor adverse significance during construction and not significant during operation.

5.7.2.4 There is a potential for unexploded ordnance (UXO) to be encountered on the seabed within the modified OfTI footprint. Construction activities have the potential to disturb UXO and any unplanned detonation may impact upon human health and safety, as well as infrastructure and equipment. Without mitigation, the consequences of such an effect will be of major adverse significance. MORL are committed to a suite of standard industry measures to minimise risk from UXO,

including a pre–construction UXO seabed survey, and therefore the residual effect will be of minor adverse significance during construction.

5.7.2.5 A summary of the impact assessment is shown in Table 5.7-2 below.

Table 5.7 -2 Other Human Activities Impact Assessment Summary

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Construction & Decommissioning				
Effects on offshore wind farm projects	Beatrice Offshore Wind Farm	Not significant	None	Not significant
Effects on military activity	D809 military practice and exercise area and regional military activity	Not significant	None	Not significant
Effects on oil and gas activity and infrastructure	Licence holders for oil and gas blocks 12/21b, 12/26b and 12/27	Not significant	Ongoing consultation with licence holders to remain informed of their exploration plans	Not significant
Damage to subsea cables	SHEFA-2 telecommunications cable	Moderate adverse	Cable burial protection measures Cable crossing / proximity agreements Adherence to appropriate guidance	Minor adverse
Health and safety risk associated with unexploded ordnance	Offshore construction workers	Major adverse	Pre-construction UXO survey UXO Safety Plan	Minor adverse
Operation				
Effects on offshore wind farm projects	Beatrice Offshore Wind Farm	Not significant	None	Not significant
Effects on military activity	D809 military practice and exercise area and regional military activity	Not significant	In relation to OSPs, adherence to any consent conditions on the lighting, marking and charting of infrastructure	Not significant
Effects on oil and gas activity and infrastructure	Licence holders for oil and gas blocks 12/21b, 12/26b and 12/27	Minor adverse	Ongoing consultation with licence holders to remain informed of their exploration plans Adherence to appropriate guidance to resolve conflicts of interest	Minor adverse

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Damage to subsea cables	SHEFA-2 telecommunications cable	Minor adverse	Adherence to appropriate guidance	Not significant
Health and safety risk associated with unexploded ordnance	Offshore operation and maintenance workers	Not significant	As per Construction/ Decommissioning mitigation measures, as required, where intrusive works are planned	Not significant

Introduction to Impact Assessment

5.7.2.6 The construction, operation and decommissioning of the modified OfTI has the potential to disrupt Other Human Activities, damage existing infrastructure or disturb UXO.

Details of Impact Assessment

5.7.2.7 This section of the chapter presents the results of the impact assessment, which has considered the potential for the modified OfTI to impact upon:

- Offshore wind farm projects and plans;
- Military activity;
- Oil and gas activity and infrastructure;
- Subsea cables; and
- Unexploded ordnance.

5.7.2.8 Potential cumulative effects upon Other Human Activities may arise where other existing or proposed projects and activities interact with the modified OfTI. The results of cumulative impact assessment are presented in Section 5.7.3.

5.7.2.9 The following Other Human Activities, which have been described in the baseline section above, are not considered within impact assessment: wave and tidal energy projects and plans; carbon capture and storage plans; marine dredging and disposal activity; telecommunications; and aviation. This is as a result of there being no physical and/or temporal overlap between the modified OfTI and the particular activity (i.e. wave and tidal projects, CCS, dredging and disposal), or where the MORL ES (MORL, 2012) demonstrated that the original OfTI would have no significant effect upon an activity and the results are applicable to the modified OfTI (i.e. telecommunications and aviation).

5.7.2.10 Likely significant effects upon commercial fisheries, shipping and navigation and socio-economics, tourism and recreation are discussed in the following ES chapters:

- Chapter 5.1 – Commercial Fisheries;
- Chapter 5.2 – Shipping and Navigation; and
- Chapter 5.5 – Socio-economics.

Rochdale Envelope Parameters Considered in the Assessment

5.7.2.11 For the purposes of the Other Human Activities impact assessment, a realistic worst case scenario has been defined and is presented in Table 5.7-3 below. In summary, it assumed a maximum infrastructure footprint (i.e. maximum number of OSPs, their maximum dimensions, and the maximum number of export cables of maximum

length) and a maximum construction window. The scenario defined below is also applied in the assessment of cumulative effects.

Table 5.7-3 Rochdale Envelope Parameters Relevant to the Other Human Activities Impact Assessment

Potential Effect	Rochdale Envelope Scenario Assessed
Construction & Decommissioning	
Damage / Disturbance / Disruption of Other Human Activities	Maximum footprint = 1.76 km² based on: • Length of cable corridor from boundary of the three consented wind farm sites to the landfall site = 52 km (not including micro-siting allowance); • No. of cable trenches = 4; • Width of trench affected area = 6 m; • Length of modified OfTI cable within three consented wind farms (including inter-platform cabling) = 70 km; • Area of seabed prepared for each OSP = 7,536 m²; • Maximum no. AC OSPs = 2 (installed at least one year apart); • Vessel anchors = 36,000 m²; and • Jack-up vessel footprint of 420 m² per installation. In addition, rolling safety zones / advisory exclusion zones may be applied for / recommended, extending 500 m around active installation works. Maximum construction activity: • Cable and OSPs likely to be installed in two phases: o Phase 1 (indicative timescales Q2 2017 – Q4 2018): installation of two cables and 1 OSP; o Phase 2 (indicative timescales 2020 – 2021): installation of two cables and 1 OSP. • 255 working days at sea to install 2 x OSPs and 4 x export cables • 72 vessel movements to install 2 x OSPs and 4 x export cables Maximum decommissioning activity: • Construction window, working days and vessel movements as per maximum construction activity above
Health and Safety Risk Associated with UXO	• Maximum construction footprint as defined above • Maximum construction activity as defined above • Maximum decommissioning activity as defined above

Potential Effect	Rochdale Envelope Scenario Assessed
Operation	
Damage / Disturbance / Disruption of Other Human Activities	Maximum operational footprint 0.09 km² based on: • Area per OSP foundation and scour material = 5,026 m²; • Cable protection (assuming protection is required to a distance of 100 m from the foundation to a width of 10 m and up to 20 "J" tubes (or cable connections) per OSP = 20,000 m²; • No. AC OSPs = 2; • Nominal area of cable protection material required along each export cable = 11,000 m2; • No. of export cables = 4; and • Use of rock cutting equipment in water depths < 10 m. In addition, rolling safety zones / advisory exclusion zones may be applied for/recommended, extending 500 m around major maintenance works. Maximum operational lifetime 25 years. Most frequent maintenance schedule.

EIA Methodology

5.7.2.12 The assessment has considered the likely significant effects of the modified OfTI as described in Chapter 2.2 (Project Description) on Other Human Activities. The scope of the assessment has been defined through a process of data gathering and consultation with the operators responsible for other activities and infrastructure within and in the vicinity of the study area, which covers the wider Moray Firth but is focused on activities and infrastructure that have the potential to overlap or be influenced by the modified OfTI.

5.7.2.13 In the absence of published guidelines regarding the assessment of effects of wind farm developments upon Other Human Activities, the following assessment criteria have been applied, as per the MORL ES (MORL, 2012).

5.7.2.14 In determining the magnitude of any given effect, the following have been considered:

- Spatial extent of the effect;
- Duration of the effect; and
- Frequency of the effect.

5.7.2.15 Sensitivity is also defined where appropriate, taking into consideration the:

- Vulnerability of the receptor;
- Recoverability of the receptor; and
- Value / importance of the receptor.

5.7.2.16 The significance of an effect has been assessed by combining the evaluations of the impact magnitude and the sensitivity of the receptor, as indicated in Table 5.7-4 and as defined in Chapter 1.3 (Environmental Impact Assessment).

Table 5.7-4 Significance of Effect Matrix

		Sensitivity of Receptor		
		Low	**Medium**	**High**
Magnitude of Effect	**Low**	Not significant	Minor	Minor / Moderate
	Medium	Minor	Moderate	Moderate / Major
	High	Minor / Moderate	Moderate / Major	Major

5.7.2.17 Effects were rated from 'not significant' where no effect is foreseen or where the effect will be indistinguishable from background variation, to 'major significance' where interaction between the MORL modified OfTI and Other Human Activities is likely to result in a measurable effect that exceeds acceptable limits or standards. The combination of receptor sensitivity and impact magnitude has been used to define the level of significance of an impact, as defined in Chapter 1.3 (Environmental Impact Assessment). For the purposes of this assessment, effects of moderate significance and greater are deemed to be significant in EIA terms. Where likely significant adverse effects are identified, mitigation measures are proposed to reduce the level of significance.

5.7.2.18 MORL has developed a draft Decommissioning Programme (Technical Appendix 1.3 E to MORL, 2012) but is yet to finalise its approach to project decommissioning. At the time of ES preparation it is considered likely that decommissioning will involve the removal of structures above the seabed, whilst subsea cabling is likely to be left in situ at the end of the modified OfTI's lifetime. Decommissioning activities are likely to have effects on Other Human Activities but for the purposes of this EIA they have been regarded as being comparable to those that occur as a result of construction activities. As a result, the effects of construction and decommissioning activities on Other Human Activities are considered together.

Impact Assessment

Construction / Decommissioning

Effects on Offshore Wind Farm Projects

5.7.2.19 The modified OfTI will not overlap with either the existing Beatrice Demonstrator Project WTGs or the consented BOWL wind farm and its offshore transmission infrastructure. BOWL and MORL developers have to date worked cooperatively (e.g. undertaking joint EIA studies) and would continue to do so during wind farm and transmission infrastructure installation, looking for opportunities to work together efficiently.

5.7.2.20 Project programmes indicate that it is possible that the BOWL and MORL Projects would be constructed concurrently, with temporal overlap by up to four years. BOWL and MORL developers will continue to share information on planned project activities and in line with the conditions of their project consents, will submit construction plans and method statements to Marine Scotland for approval. These standard practices would limit the potential for interaction between the sites and it is considered unlikely that one developer would hinder the other during construction. **No significant effect** is predicted.

5.7.2.21 Effects on other offshore wind farm projects associated with increased vessel traffic during the installation of the MORL modified OfTI are addressed in Chapter 5.2 (Shipping and Navigation).

Effects on Military Activity

5.7.2.22 The area within which OSPs may be located overlaps with D809, used by the Royal Air Force (RAF) for a wide variety of air flying, gunnery and subsurface exercises at altitudes up to 55,000 feet. The MoD also uses the wider Moray Firth, within which the modified OfTI is located, during surface and sub-surface naval activity and exercises. There is potential that the physical presence of vessels involved in the construction of the modified OfTI infrastructure could lead to temporary disruption or exclusion of military activity within D809 and across the wider Moray Firth or pose a hazard to ongoing military activity. However, the MoD has not highlighted any concerns regarding the potential effects of construction activity offshore and therefore, with a low sensitivity and magnitude, **no significant effect** is predicted.

Effects on Oil and Gas Activity and Infrastructure

5.7.2.23 Activities such as geophysical surveys will be spatially restricted over a relatively small area by the installation of the modified OfTI OSPs and export cabling. It is assumed for the purposes of this assessment that there is a degree of flexibility in terms of when a survey is undertaken and that a variety of survey techniques may be employed. Drilling and the placement of infrastructure would also be restricted by the presence of construction activities.

5.7.2.24 There is no existing oil and gas infrastructure within the modified OfTI footprint. There are five wells within the footprint, though all are plugged and abandoned and have no safety zone associated with them.

5.7.2.25 The modified OfTI does overlap with currently licensed oil and gas blocks held by operators Suncor and Sendero. These operators are yet to explore the potential of their licence blocks. Sendero's exploration plans are currently unknown. Consultation with Suncor has indicated that they intend to undertake geophysical survey within Block 12/27, which overlaps with the northern extent of the export cable corridor and a portion of the area within which OSPs may be located, in 2014. It is understood that dependent upon the outcome of survey, they would intend to install a well in Block 12/27 in 2015. MORL are not aware of any plans to install infrastructure within the licensed blocks that overlap with the modified OfTI.

5.7.2.26 At present, there is no indication that modified OfTI construction, which would not commence until 2017, would interfere with operators currently known plans. On the basis that the modified OfTI occupies only a proportion of the licenced blocks, and not the entire blocks, and due to the potential for directional drilling and ongoing consultation between MORL and the licence holders, the magnitude has been assessed as low and the sensitivity low, therefore the potential effect is deemed to be **minor significance**.

Damage to Subsea Cables

5.7.2.27 The modified OfTI export cables may need to cross the existing SHEFA-2 telecommunications cable. It is yet to be confirmed whether a crossing will be required but in line with precautionary principles, the impact assessment has assumed the MORL export cables will cross SHEFA-2.

5.7.2.28 As part of the modified OfTI export cable installation process, the following activities could impact upon the SHEFA cable:

- Cable installation and protection activity (via trenching, jetting, ploughing, etc.);
- Vessel anchoring; and
- Debris clearance operations.

5.7.2.29 Damage to subsea cables is expensive to repair and can cause disruption to international telecommunications. As a result, the sensitivity of the receptor is considered to be high. The magnitude of the effect will be medium assuming that

the SHEFA cable will have to be crossed. The unmitigated effect is therefore considered to be of **moderate adverse significance**. Following the application of the mitigation measures detailed in Section 5.7.2.43 below, the residual effect is predicted to be of **minor adverse** significance.

5.7.2.30 If the proposed SHE-T HVDC reinforcement gains approval, it is possible that installation of the modified OfTI export cable and SHE-T cable will run concurrently, although it is considered that this would be highly unlikely. As per the text immediately above, the modified OfTI export cable installation process could impact upon the SHE-T cable and the unmitigated effect would be of **moderate adverse significance**. Following the application of the mitigation measures detailed in Section 5.7.2.43 below, the residual effect is predicted to be of **minor adverse** significance.

Health and Safety Risk Associated with Unexploded Ordnance

5.7.2.31 There is potential for UXO associated with historic and current military activity to be encountered on the seabed in the area of the modified OfTI. During construction, activities which will have contact with the seabed, either directly (e.g. jack–up vessel, cable laying) or via the placement of material (e.g. foundations or cable protection), run the risk of disturbing UXO with potentially damaging and dangerous effects to both employees and equipment.

5.7.2.32 As human life is at risk, receptor sensitivity is considered to be high. Effect magnitude is considered to be medium and the effect is of potentially **major adverse significance**. Following the application of the mitigation measures detailed in Section 5.7.2.43 below, the residual effect is predicted to be of **minor adverse** significance.

Operation

Effects on Offshore Wind Farm Projects

5.7.2.33 Activity associated with the operation of the modified OfTI will be significantly reduced relative to the construction / decommissioning phases. Monitoring and maintenance vessels will require access, with any exceptional maintenance activity likely to have a temporary 500 m exclusion zone imposed around the relevant structure. It is theoretically possible for there to be a temporal overlap between temporary exclusion zones associated with exceptional maintenance activities for the modified OfTI and other offshore wind farm projects. However the potential for two such exceptional maintenance events occurring concurrently is considered to be unlikely and in light of established and ongoing coordination of works by MORL and BOWL, **no significant effect** is predicted.

Effects on Military Activity

5.7.2.34 The MoD has raised no concerns specifically in relation to the modified OfTI.

5.7.2.35 As a result of consultation with the MoD prior to and throughout consent determination for the MORL ES, a series of consent conditions were put in place for the Telford, Stevenson and MacColl offshore wind farms that addressed the MoDs concerns regarding the effects of the Project (primarily the WTGs) on military nautical and aeronautical activities. These conditions include the requirement for MORL to submit a Project Lighting and Marking Scheme and Air Traffic Control Radar Mitigation Scheme prior to construction commencing, for approval by the MoD and other relevant stakeholders. The OSPs will be captured within these Schemes and therefore the operation of the modified OfTI will have no significant effect on MoD interests.

Effects on Oil and Gas Activity and Infrastructure

5.7.2.36 As detailed above, the intentions of current oil and gas block licence holders beyond 2015 are currently not known by MORL.

5.7.2.37 Should licence holders seek to commence block exploration once the modified OfTI is operational, it is expected that activities such as geophysical survey will be spatially restricted over a relatively small area by the presence of OSPs and export cabling. It is assumed for the purposes of this assessment that there is a degree of flexibility in terms of when a survey is undertaken and that a variety of survey techniques may be employed.

5.7.2.38 Drilling and the placement of infrastructure would also be restricted by the presence of infrastructure. Should operators wish to drill or install infrastructure in close proximity to the operational modified OfTI, it is expected that MORL and any such operator would enter discussions and be steered by advice from relevant authorities, including DECC and Marine Scotland, as to how oil and gas operations could safely proceed in the vicinity of MORL operational infrastructure. On the basis that the modified OfTI occupies only a proportion of the licenced blocks, and not the entire blocks, and due to the potential for directional drilling and ongoing consultation between MORL and the licence holders, the magnitude has been assessed as medium and the sensitivity low, therefore the potential effect is deemed to be of **minor adverse significance**.

5.7.2.39 Effects associated with vessel access to existing oil and gas infrastructure are addressed in Chapter 5.2 (Shipping and Navigation).

Damage to Subsea Cables

5.7.2.40 During the operational phase, there is the potential for disturbance to subsea cables from maintenance activities, such as OSP foundation and cable repair work which could entail the use of jack–up vessels and the deployment of anchors. It is expected that any such activity will be subject to the same principles and agreements as established under construction.

5.7.2.41 The likelihood for damage to existing cables during such maintenance work is therefore remote and consequently the magnitude of effect is considered to be low. Damage to submarine cables is expensive to repair and can cause disruption to telecommunications and therefore, the value and sensitivity will be high. As a result the potential effect will be of a **minor adverse significance**. Following the application of the mitigation measures detailed in Section 5.7.2.43 below, the residual effect is predicted to be **not significant**.

Health and Safety Risk Associated with Unexploded Ordnance

5.7.2.42 The natural processes of the sea, including tidal action, seabed conditions, movement of sand waves, wave action and bad weather all contribute to the movement of objects on the seabed. Human activities such as seabed trawling will also contribute to the movement of objects, and as such, there is a risk of UXO moving into the modified OfTI corridor over time. This will have implications for maintenance and repair activities of foundations, cables and scour protection but the risk is expected to be limited as UXO will have previously been identified during pre–construction surveys. Therefore, **no significant effect** is predicted.

Proposed Monitoring and Mitigation

5.7.2.43 MORL will continue to engage with developers and operators with interests in the vicinity of the modified OfTI in order to share plans and programmes before, during and after the installation of the OSPs and export cable. This engagement will continue throughout the operational life of the modified OfTI and into decommissioning. Such engagement will limit any conflicts of interest and achieve co–existence where possible.

Construction / Decommissioning

Effects on Oil and Gas Activity and Infrastructure

5.7.2.44 MORL has been actively engaged in ongoing discussions at industry level with RenewableUK, Oil and Gas UK and the Department of Energy and Climate Change (DECC), aiming to develop a protocol by which any conflicts of interest between the offshore wind, oil and gas industries may be amicably resolved. MORL note that DECC, as of June 2014, have published a detailed framework that would be used to satisfactorily resolve any conflicts of interest between offshore wind developers and oil and gas operators (RenewableUK, 2014).

Damage to Subsea Cables

5.7.2.45 There are a number of mitigation measures that will be implemented as part of standard industry best practice that will serve to lower the risk of any impact on subsea cables. Where necessary, cable protection will be used to ensure future cable integrity and to separate sections of cable from potential risks (e.g. the risk of anchor penetration in areas where cable burial depth is restricted by geology).

5.7.2.46 Consultation has been undertaken with Faroese Telecom (the operator of the SHEFA–2 cable) and they have not raised an objection to the MORL Project. Further discussions will result in cable crossing / proximity agreements being secured which will include detailed crossing conditions and methodology. Faroese Telecom will also be notified of any MORL works within 1,000 m of the SHEFA–2 cable.

5.7.2.47 MORL, as part of the Connections Infrastructure Options Note (CION) process in 2013, and later as part of an ongoing initiative with SHE-T and National Grid, meets with both entities on a monthly basis in order to progress the grid connection and OFTO infrastructure. Since signature of the connection agreement at New Deer, SHE-T and National Grid have been informed on a monthly basis of the progress which is being made associated with the modified OfTI. This engagement will continue through to the construction phase for both MORL and SHE-T TI assets.

Health and Safety Risk Associated with Unexploded Ordnance

5.7.2.48 Although the Health & Safety at Work Act 1974 and the Construction (Design and Management) Regulations 2007 do not specifically require a dedicated UXO assessment, there is an obligation on those responsible for intrusive works to ensure that a comprehensive threat assessment is undertaken and risk mitigation measures are implemented with regard to all hazards on site. MORL will ensure that all practicable mitigation measures to minimise the risk of health and safety incidents associated with UXO are fully developed prior to construction. A UXO site survey will be undertaken prior to construction, where it is considered to be likely that UXO will be encountered, and site safety instructions will be prepared in the event that an item of UXO is located. All contractors' staff will be given munitions awareness briefings prior to and during the construction work. Should suspected items of UXO be discovered, their location will be accurately mapped and recorded for future assessment and possible removal / disposal or remediation in situ by a specialist contractor. The MoD and emergency services will also be consulted as appropriate.

Operation

Effects on Military Activity

5.7.2.49 In adhering to the conditions attached to any consent for the modified OfTI in relation to the lighting, marking and charting of infrastructure, MORL will ensure that the operational OfTI (specifically the OSPs) does not interfere with military activity.

Effects on Oil and Gas Activity and Infrastructure

5.7.2.50 As per mitigation during construction and decommissioning phases, MORL will continue to engage with oil and gas operators to achieve co–existence where possible and adhere to standard industry guidance in resolving any conflicts of interest.

Damage to Subsea Cables

5.7.2.51 The future arrangements made in any cable crossing agreement with Faroese Telecom, SHE-T and any other operators will serve to reduce the likelihood for effect.

Health and Safety Risk Associated with Unexploded Ordnance

5.7.2.52 As per mitigation during construction and decommissioning phases, MORL will implement the best practice measures described above where intrusive maintenance works are required.

Residual Effects

5.7.2.53 The significance of post-mitigation residual effects is presented in summary Table 5.7-2 above.

5.7.3 Cumulative Impact Assessment

Summary

5.7.3.1 The cumulative impact assessment has been focused on establishing potential for overlaps and therefore conflict between activities and operators in both a geographical and temporal context. The assessment firstly considers the cumulative effects associated with the construction/decommissioning and operation of the modified OfTI together with the Telford, Stevenson and MacColl consented wind farms, before assessing the whole project (modified OfTI and the Telford, Stevenson and MacColl consented wind farms) in relation to other relevant projects/plans.

5.7.3.2 The potential for the modified OfTI together with the Telford, Stevenson and MacColl consented wind farms, and for the whole project together with other projects and activities considered in the cumulative impact assessment, to disrupt activity associated with other proposed offshore wind farms and military practice areas is not expected to be significant.

5.7.3.3 Cumulative effects of minor adverse significance have been assessed for effects on oil and gas activity and infrastructure, in the event that the modified OfTI, Telford, Stevenson and MacColl consented wind farms and the BOWL project are built out together. This assumes that ongoing consultation will take place between Moray Firth operators.

5.7.3.4 Cumulative effects of minor adverse significance have been predicted during the construction phase in relation to subsea cables and UXO risk, and during the operational phase in relation to subsea cables (when considering all other projects and activities considered in the cumulative impact assessment), assuming implementation of industry standard practice by all proposed projects. No significant cumulative effect is predicted for UXO risk during operation. This also assumes implementation of industry standard practice by all proposed projects and that in most cases, buried cables / other buried structures will remain in-situ when projects are decommissioned.

5.7.3.5 A summary of the cumulative impact assessment is shown in Table 5.7-5.

Table 5.7-5 Cumulative Impact Summary

Effect/Receptor	Residual significance level for modified OfTI	Whole project assessment: Modified OfTI + Stevenson, Telford and MacColl	Mitigation Method
Construction / Decommissioning			
Effects on Offshore Wind Farm Projects	Not significant	Not significant	None
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.7.3.7 and 5.7.3.8 below)	Not significant		
Effects on Military Activity	Not significant	Not significant	None
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.7.3.7 and 5.7.3.8 below)	Not significant		
Effects on Oil and Gas Activity and Infrastructure	Not significant	Minor adverse	Assumes ongoing consultation amongst Moray Firth operators
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.7.3.7 and 5.7.3.8 below)	Minor adverse, assuming ongoing consultation amongst Moray Firth operators.		
Damage to Subsea Cables	Minor adverse	Minor adverse	Assumes implementation of industry standard practice by all proposed projects (note: also assumes that in most cases, buried cables / other buried structures will remain in-situ when projects are decommissioned).
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.7.3.7 and 5.7.3.8 below)	Minor adverse, assuming implementation of industry standard practice by all proposed projects (note: also assumes that in most cases, buried cables / other buried structures will remain in-situ when projects are decommissioned).		
Health and Safety Risk Associated with Unexploded Ordnance	Minor adverse	Minor adverse	Assumes implementation of industry standard practice by all proposed projects (note: also assumes that in most cases, buried cables / other buried structures will remain in-situ when projects are decommissioned).

Effect/Receptor	Residual significance level for modified OfTI	Whole project assessment: Modified OfTI + Stevenson, Telford and MacColl	Mitigation Method
Total Cumulative Impact Assessment (Whole project plus those developments listed in section section sections 5.7.3.7 and 5.7.3.8 below)	Minor adverse, assuming implementation of industry standard practice by all proposed projects (note: also assumes that in most cases, buried cables / other buried structures will remain in-situ when projects are decommissioned)		
Operation			
Effects on Offshore Wind Farm Projects	Not significant	Not significant	None
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.7.3.7 and 5.7.3.8 below)	Not significant		
Effects on Military Activity	Not significant	Not significant	None
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.7.3.7 and 5.7.3.8 below)	Not significant		
Effects on Oil and Gas Activity and Infrastructure	Minor adverse	Minor adverse	Assumes ongoing consultation amongst Moray Firth operators
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.7.3.7 and 5.7.3.8 below)	Minor adverse, assuming ongoing consultation amongst Moray Firth operators		
Damage to Subsea Cables	Not significant	Not significant	Assumes implementation of industry standard practice by all proposed projects
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.7.3.7 and 5.7.3.8 below)	Minor adverse, assuming implementation of industry standard practice by all proposed projects		
Health and Safety Risk Associated with Unexploded Ordnance	Not significant	Not significant	Assumes implementation of industry standard practice by all proposed projects

Effect/Receptor	Residual significance level for modified OfTI	Whole project assessment: Modified OfTI + Stevenson, Telford and MacColl	Mitigation Method
Total Cumulative Impact Assessment (Whole project plus those developments listed in sections 5.7.3.7 and 5.7.3.8 below)	Not significant, assuming implementation of industry standard practice by all proposed projects		

Assessment of Cumulative Effects

5.7.3.6 MORL's approach to the assessment of cumulative effects is described in Chapter 1.3 (Environmental Impact Assessment). The spatial context within which the cumulative assessment is set is based upon the range over which the proposed modified OfTI may overlap and / or interact with Other Human Activities in the Moray Firth.

5.7.3.7 The modified OfTI is firstly assessed cumulatively against the following developments to represent a whole project assessment:

- Consented MORL Telford, Stevenson and MacColl offshore wind farms.
- The whole project is then assessed together with the following other developments and activities:
- Consented BOWL Beatrice offshore wind farm and transmission infrastructure;
- Operational Beatrice Demonstrator Project turbines;
- Operational SHEFA-2 telecommunications cable;
- Operational Beatrice and Jacky oil platforms and their associated cable and pipeline infrastructure; and
- MORL Western Development Area (WDA) of the Moray Firth Round 3 Zone.

5.7.3.8 In addition, the following developments and activities have been identified which may have cumulative effects over the lifetime of the modified OfTI but there is currently insufficient information available on which to base a detailed assessment of effects:

- Licensed oil and gas blocks (intent of operators beyond the short-term plans of Suncor is unknown); and
- Proposed SHE-T HVDC offshore reinforcement (approximate route and completion data available).

Methodology

5.7.3.9 The assessment methodology has followed that outlined in the Moray Firth Offshore Wind Developers Group Discussion Document (ERM, 2011).

5.7.3.10 To inform the assessment, project parameters for the consented MORL and BOWL projects have been extracted from their respective ESs and publicly available consent documentation (See Table 5.7-6 and Table 5.7-7 below). MORL has provided parameters for the WDA of the Round 3 Zone (see Table 5.7-8 below). In each case these parameters represent a 'worst case' development scenario (i.e. maximum development footprint, maximum construction duration, etc.).

5.7.3.11 The connection between the WDA and the three consented wind farms necessitates a slightly different approach to assessment, as the effects arising from the "worst case" for the consented EDA cannot simply be added to the "worst case" scenario for the WDA. The potential capacity of the WDA (500 MW) when added to the consented capacity of the EDA (1,166 MW) exceeds the overall target capacity of the MORL Zone (1500 MW). It is not proposed that the target capacity for the MORL Zone will be exceeded. 500 MW represents the maximum development on the WDA, but in the event that MORL successfully constructs in excess of 1,000 MW in the three consented wind farm sites then the development in the WDA will be restricted accordingly to ensure the MORL Zone capacity is not exceeded.

5.7.3.12 Scenarios have not been supplied for the Beatrice Demonstrator Project, the SHEFA telecommunications cable or the existing oil and gas infrastructure in the Moray Firth. These developments are all operational and have known parameters.

5.7.3.13 The cumulative impact assessment firstly considers the cumulative effects associated with the construction/decommissioning and operation of the modified OfTI together with the Telford, Stevenson and MacColl consented wind farms, before assessing the whole project (modified OfTI and the three consented wind farms) in relation to other relevant projects/plans.

Table 5.7-6 Summary of MORL Telford, Stevenson and MacColl offshore wind farm Worst Case Parameters

Worst Case Parameters	Scenario Assessed
Up to 62 wind turbines per wind farm	
Gravity Base Structure or jacket foundations	Total footprint of three wind farm sites 5.99 km^2
Maximum 5 year construction window	Construction activities ongoing for five year period
Maximum operational lifetime of 25 years	Wind farm structures in place for 25 years
Maximum operation and maintenance schedule	

Table 5.7-7 Summary of BOWL Project Worst Case Parameters

Worst Case Parameters	Scenario Assessed
Up to 140 wind turbines, plus two AC OSPs and one AC/DC substation	
Foundations (either pin piles, suction piles or gravity bases)	
Gravity base and scour protection with combined permanent footprint of 11,690m^2 per foundation	Total footprint of 3.52 km^2
65 km export cable route	Construction activities ongoing for five year period
325 km inter-array cables with trench width of 3 m	Wind farm structures in place for 25 years
Maximum 5 year construction window	
Maximum operational lifetime of 25 years	
Maximum operation and maintenance schedule	

Table 5.7-8 Summary of MORL WDA Worst Case Parameters

Worst Case Parameters	Scenario Assessed
Installation of 100 turbines and one AC OSP with gravity base foundations and associated scour protection 130 km inter-array cables with trench width of 3 m Cable protection required up to 50 m distance from turbine Maximum 2 year construction window Operational lifetime of 25 years Maximum operation and maintenance schedule	Total footprint 1.20 km^2 Construction activities ongoing for two year period Wind farm structures in place for 25 years

Other Developments

5.7.3.14 In relation to other remaining projects and activities (i.e. the SHE-T HVDC reinforcement and possible exploration of licensed oil and gas blocks), parameters remain unconfirmed and the cumulative assessment has therefore taken a more qualitative approach in defining potential effects based on available information.

Cumulative Assessment

Construction / Decommissioning

Effects on Offshore Wind Farm Projects

5.7.3.15 The modified OfTI is an essential component of the Telford, Stevenson and MacColl consented wind farms. As such the projects are complimentary and there will be **no significant cumulative effect**.

5.7.3.16 The modified OfTI and the Telford, Stevenson and MacColl consented wind farms, together with the other offshore projects proposed within the Moray Firth are seen to be complimentary rather than conflicting and all are proposed in order to meet renewable energy targets in Scotland and the wider UK. Relationships and communication between all offshore developers are considered to be good. Continued sharing of plans with regard to construction schedules and methodologies will ensure all construction works, including those for the whole project are undertaken safely and as a result **no significant cumulative effect** is predicted.

Effects on Military Activity

5.7.3.17 The modified OfTI will be constructed concurrently with the Telford, Stevenson and MacColl consented wind farms, with construction scheduled to take place from 2017 – 2021. Construction activity has the potential to disrupt and interfere with military practice and exercise area (PEXA) activities. The MoD considers proposals on a case-by-case basis and to date has no outstanding objections to the consented Telford, Stevenson and MacColl offshore wind farms. Consultation responses to date indicate that there will be **no significant cumulative effect** on PEXA in the Moray Firth.

5.7.3.18 There is potential for the construction of the whole project (modified OfTI and the Telford, Stevenson and MacColl consented wind farms), BOWL projects and the SHE-T HVDC cable, to run concurrently. Construction activity has the potential to disrupt and interfere with military practice and exercise area (PEXA) activities. Whilst MORL, BOWL and SHE-T projects overlap in particular locations with military PEXA, the MoD considers proposals on a case-by-case basis and to date has no outstanding objections to the consented MORL Telford, Stevenson and MacColl offshore wind farms or the BOWL Project. MORL is unaware of the outcome of any consultation with the MoD undertaken by SHE-T. Consultation responses to date indicate that there will be **no significant cumulative effect** on PEXA in the Moray Firth. The WDA does not overlap with any PEXA.

Effects on Oil and Gas Activity and Infrastructure

5.7.3.19 The modified OfTI and the Telford, Stevenson and MacColl consented wind farms overlap with the licenced blocks 12/21b, 12/26b and 12/27 (see Table 5.7-9). The operators of these blocks have yet to explore the potential of the licence blocks and their exploration plans (beyond those communicated verbally to MORL by Suncor relating to planned activity in 2014 and 2015 in Block 12/27) are currently unknown. Construction of the modified OfTI and the three consented wind farms (2017 – 2021) will take place after the planned activity by Suncor in 2014 and 2015. However, if licence holders undertake exploratory surveys within their licence blocks during the construction of the modified OfTI and the three consented wind farms, survey activity would be excluded from the construction locations (and the associated safety zones). It is assumed for the purposes of this assessment that there is a degree of flexibility in terms of when a survey is undertaken and that a variety of survey techniques may be employed. Drilling and the placement of infrastructure would also be restricted by construction activities. On the basis that the modified OfTI and the three consented wind farm projects occupy only a proportion of the licenced blocks, and not the entire blocks, and due to the potential for directional drilling and ongoing consultation between MORL and the licence holders, the magnitude has been assessed as medium and the sensitivity low. The cumulative effect will therefore be of **minor adverse significance.**

5.7.3.20 Oil and gas licence blocks overlapping with the whole project (modified OfTI and the Telford, Stevenson and MacColl consented wind farms) and a number of other projects / activities are shown in Table 5.7-9 below.

Table 5.7-9 Oil and Gas Licence Blocks and Overlapping Projects and Activities

Operator (Licence Blocks)	Overlapping Projects and Activities
Sendero (12/21b)	Modified OfTI MORL Telford, Stevenson and MacColl offshore wind farms MORL WDA
Suncor (12/26b and 12/27)	Modified OfTI MORL Telford, Stevenson and MacColl offshore wind farms MORL WDA SHEFA-2 telecommunications cable Proposed SHE-T HVDC cable

5.7.3.21 As described above, it is possible that the licence holders may wish to undertake exploratory surveys within their licence blocks; if this is the case, survey activity would be excluded from the construction locations (and the associated safety zones) of the proposed projects in the Moray Firth. It is assumed for the purposes of this assessment that there is a degree of flexibility in terms of when a survey is undertaken and that a variety of survey techniques may be employed. Drilling and the placement of infrastructure would also be restricted by construction activities. On the basis that the whole MORL project and the other projects occupy only a proportion of the licenced blocks, and not the entire blocks, and due to the potential for directional drilling and assumed ongoing consultation between the developers and the licence holders, the magnitude has been assessed as medium and the sensitivity low, therefore the potential effect is deemed to be of **minor adverse significance**.

Damage to Subsea Cables

5.7.3.22 The modified OfTI export cables may need to cross the existing SHEFA-2 telecommunications cable and the proposed SHE-T cable. There are no cable crossings required within the sites of the Telford, Stevenson and MacColl consented wind farms (Figure 5.7-1), therefore the cumulative effect will remain as already assessed for the modified OfTI alone, **minor adverse significance**.

5.7.3.23 As shown in Figure 5.7-1, the BOWL export cable corridor overlaps with the landfall end of the proposed SHE-T cable. Therefore, the proposed SHE-T cable may need to cross/be crossed by both the modified OfTI export cable and the BOWL export cable. The BOWL export cable corridor also transits through the WDA. The unmitigated cumulative effect will be of moderate adverse significance and following the implementation of standard mitigation measures as described earlier in the chapter, the residual effect will be of **minor adverse significance**.

Health and Safety Risk Associated with Unexploded Ordnance

5.7.3.24 There is potential for UXO associated with historic and current military activity to be encountered on the seabed in the area of all proposed offshore projects in the Moray Firth. During construction, activities which will have contact with the seabed, either directly (e.g. jack-up vessel) or via the placement of material (e.g. foundations or scour protection), run the risk of disturbing UXO with potentially damaging and dangerous effects to both employees and equipment. However, there is an obligation on those responsible for intrusive works to ensure that a comprehensive threat assessment is undertaken and risk mitigation measures are implemented with regard to all hazards on site.

5.7.3.25 It is assumed that MORL will adhere to this obligation during the construction of the modified OfTI project and the Telford, Stevenson and MacColl consented wind farms. The cumulative effect will therefore be of **minor adverse significance**.

5.7.3.26 It is also assumed that MORL, BOWL and SHETL will adhere to this obligation and as such any cumulative effect will be of **minor adverse significance.**

Operation

Effects on Offshore Wind Farm Projects

5.7.3.27 Activity associated with the operation of the modified OfTI and the Telford, Stevenson and MacColl consented wind farms will be significantly reduced relative to the construction/decommissioning phases. Monitoring and maintenance vessels will require access, with any exceptional maintenance activity likely to require a temporary 500 m exclusion zone around the structure undergoing maintenance. As the modified OfTI is an essential component of the three consented wind farm projects, it is assumed that maintenance works for both would be coordinated and mutually beneficial. The cumulative effect of maintenance works carried out on these projects will therefore be **not significant**.

5.7.3.28 Activity associated with the operation of the whole MORL project, BOWL wind farm sites and other potential developments that may be installed within a similar timeframe (i.e. the SHE-T cable) will be significantly reduced relative to the construction / decommissioning phases. Monitoring and maintenance vessels will require access, with any exceptional maintenance activity likely to have a temporary 500 m exclusion zone imposed around the relevant structure. It is theoretically possible for there to be a temporal overlap between temporary exclusion zones associated with the wind farm sites and cables. The potential for two or more exceptional maintenance events occurring concurrently is considered to be unlikely and in light of established and ongoing coordination of works by MORL, BOWL and SHE-T, **no significant cumulative effect** is predicted.

Effects on Military Activity

5.7.3.29 As per the text above relating to 'construction / decommissioning' effects, consultation responses to date indicate that there will be **no significant cumulative effect** on PEXA in the Moray Firth.

Effects on Oil and Gas Activity and Infrastructure

5.7.3.30 As detailed above, the longer term intentions of oil and gas block licence holders are currently unknown.

5.7.3.31 Should licence holders seek to commence block exploration once the modified OfTI and the Telford, Stevenson and MacColl consented wind farms are operational, it is expected that activities such as seismic survey will be spatially restricted by the presence of turbines and platforms and any associated safety zones. Drilling and the placement of infrastructure would also be restricted by the presence of wind farm and modified OfTI infrastructure. Due to the greater footprint of the three consented wind farms, the greatest effect arises from the construction of the three consented wind farms rather than the modified OfTI. On the basis that the modified OfTI and the three consented wind farms infrastructure occupy only a proportion of the licenced blocks, and not the entire blocks, and due to the potential for directional drilling and ongoing consultation between MORL and the licence holders, the magnitude has been assessed as medium and the sensitivity low. The cumulative effect will be of **minor adverse significance**.

5.7.3.32 Should licence holders seek to commence block exploration once the whole MORL project, BOWL project, and potentially the SHE-T cable, are operational, it is expected that activities such as seismic survey will be spatially restricted by the presence of turbines and platforms and any associated safety zones. Drilling and the placement of infrastructure would also be restricted by the presence of the wind farms and their associated transmission infrastructure. On the basis that the whole project and the other offshore wind farm projects occupy only a proportion of the licenced blocks, and not the entire blocks, and due to the potential for directional drilling and assumed ongoing consultation between the developers and the licence holders, the magnitude has been assessed as medium and the sensitivity low. The cumulative effect will be of **minor adverse significance**.

Damage to Subsea Cables

5.7.3.33 The modified OfTI export cables may need to cross the existing SHEFA-2 telecommunications cable and the proposed SHE-T cable. As there are no cable crossings required within the sites of the three consented wind farms (Figure 5.7-1), the cumulative effect will be **not significant**, as assessed for the modified OfTI project alone.

5.7.3.34 During the operational phase of the whole MORL project and BOWL project, there is the potential for disturbance to subsea cables from maintenance activities, such as foundation and cable repair work which could entail the use of jack-up vessels and the deployment of anchors. It is expected that any such activity will be subject to the same principles and agreements as established under construction.

5.7.3.35 The likelihood for damage to existing cables during such maintenance work is therefore remote and consequently the magnitude of effect is considered to be low. Damage to submarine cables is expensive to repair and can cause disruption to telecommunications and therefore, the value and sensitivity will be high. As a result the likely cumulative effect will be of a **minor adverse significance**.

Health and Safety Risk Associated with Unexploded Ordnance

5.7.3.36 Any seabed UXO will have previously been identified and the risk mitigated prior to the construction of the modified OfTI and the Telford, Stevenson and MacColl consented wind farms, and the other offshore wind farm projects and their offshore

transmission infrastructure. The potential for UXO encounter during operation and maintenance activities would be managed by adherence to the good practice measures described earlier in this chapter. Cumulative effects will **not be significant** during operation.

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5 Human Environment

5.6 Traffic and Transport

5.6.1 Baseline Information

Introduction

5.6.1.1 This chapter details the assessment of likely significant transport and access effects associated with the modified Onshore Transmission Infrastructure (OnTI). This chapter focuses on the effects of increased traffic on the public road network during construction, operation and decommissioning. Such effects are most pronounced in close proximity to the area of the modified OnTI and the assessment is therefore restricted to the surrounding road network maintained by Aberdeenshire Council (the Council).

5.6.1.2 The chapter is supported by a series of Technical Appendices, namely:

- Appendix 5.6 A: Transport Assessment;
- Appendix 5.6 B: Construction Traffic Method Statement;
- Appendix 5.6 C: Construction Traffic Management Plan; and
- Appendix 5.6 D: Route Survey Report.

5.6.1.3 A previous assessment of the potential effects of the previous OnTI was carried out and is set out in the MORL ES (MORL, 2012). Since that time the location of the onshore substations has been changed (See Chapter 2.2 (Project Description)) from Peterhead to New Deer and the export cable landfall location has been altered from Fraserburgh to Inverboyndie. The export cable and onshore substations have been modified from Direct Current (DC) / Alternating Current (AC) infrastructure to AC infrastructure only. Accordingly, the impact assessment in this Chapter is a detailed assessment of the new infrastructure and location of the modified OnTI.

Consultations

5.6.1.4 Scoping discussions, summarised in Table 5.6-1 were undertaken with the Council and Transport Scotland (TS) in late May 2014. Discussions with the Council took the form of a meeting to discuss the scope and study parameters. Confirmation of the various points was summarised into a scoping letter and copied to TS.

5.6.1.5 Further consultation with the Council was undertaken on the suitability of the Abnormal Indivisible Load (AIL) route for the transformers and associated substation components with the AIL officers of the Council as noted in Technical Appendix 5.6 C.

Table 5.6 -1 Scoping Consultees

Organisation	Consultation Response	MORL Approach
Aberdeenshire Council	Satisfied with the proposed methodology. Principally concerned with traffic management measures rather than the likely traffic impact.	Development of detailed technical appendices 5.6 B, 5.6 C and 5.6 D.
Transport Scotland	No response from TS.	Transport Assessment (Technical Appendix 5.6 A) undertaken in accordance with available TS guidance.

Baseline Characteristics

5.6.1.6 The study area relating to transport issues is localised to those roads located either on the modified onshore export cable route corridor of the OnTI, near the OnTI or those providing access for the construction, operation or decommissioning of the OnTI.

5.6.1.7 The Transport Assessment Technical Appendix 5.6 A provides greater detail on the road network and its characteristics. The study area network is summarised as follows:

- A98: The primary east-west route through the northern coast of Aberdeenshire running between the A96 at Fochabers and Fraserburgh. The road is single carriageway along its entirety;
- A97: A distributor road route running from Banff south to Huntly and the A96. The road is single carriageway along its entirety;
- A947: A distributor road route running from Banff south through Turriff before joining the A96 south of Dyce. The road is single carriageway along its entirety;
- A948: A distributor road running from New Deer to Ellon and the A90. The road is single carriageway along its entirety;
- A981: A distributor road running from Fraserburgh to New Deer and the A948. The road is single carriageway along its entirety;
- B9105: A rural distributor road running from the A98 at Cook through Fintry to the A947 north of Turriff. The road is single carriageway along its entirety;
- B9170: A rural distributor road running from the A947 south of Turriff through Cuminestown and New Deer before proceeding south to Inverurie;
- B9121: A rural distributor road running between Whitehills and the A97 at Tipperty. A further section continues south from the A97 joining the B9025 at Slack of Scotston. The section of road within the study area is wide single track without passing places;
- The C9s: A minor rural road providing local access functions;
- The C7s: A minor rural road providing local access functions;
- The C29s: A minor rural road providing local access functions; and
- The C121B: A minor rural road providing local access functions.

5.6.1.8 The trunk road network is remote to the location of the OnTI and there are no rail facilities available that will be of practical use for the OnTI. As such, the vast majority of all transport associated with the OnTI will be focussed on road transport.

5.6.1.9 Port facilities for the import of AIL equipment are available at Peterhead to the east of the indicative location of the substations.

Desktop Studies

5.6.1.10 Desktop studies have been restricted to the identification of potential weight constraints relating to AIL deliveries and the collection of road traffic accident statistics. The results of these studies are presented in the AIL Route Survey Review (Technical Appendix 5.6 D) and Transport Assessments (Technical Appendix 5.6 A).

Site Specific Surveys

5.6.1.11 Traffic flow and speed data was not available from public sources and as such new traffic surveys using Automatic Traffic Counters (ATC) were undertaken over a full week in a month where flows are considered free of unusual occurrences or patterns (neutral month) to obtain representative traffic flows for use in the assessment. These counts collected data relating to vehicle flow, class of vehicle and speed for each direction and full details are provided in the Transport Assessment (Technical Appendix 5.6 A).

5.6.1.12 A summary of vehicle flows is provided in Table 5.6-2, Baseline Traffic Flows.

Table 5.6-2 Baseline Traffic Flows

Survey Location	Time Period	Cars / Light Vehicles	Heavy Goods Vehicles (HGV)	Total Vehicles
A98 west of Boyndie	12 Hours	3466	856	4322
	24 Hours	4174	989	5163
B9121 south of Fiskaidly	12 Hours	227	50	278
	24 Hours	279	58	337
A98 west of the B9038	12 Hours	5342	874	6217
	24 Hours	6475	1003	7478
A97 south of B9121	12 Hours	1003	215	1219
	24 Hours	1189	223	1411
A947 near Keilhill	12 Hours	5196	907	6103
	24 Hours	6471	1072	7543
C9S east of Foulzie	12 Hours	48	16	64
	24 Hours	59	18	78
C7S west of Gorrachie	12 Hours	109	31	140
	24 Hours	130	37	167
B9105 south of Fintry	12 Hours	1004	223	1227
	24 Hours	1217	255	1427
A947 north of Turriff	12 Hours	5196	907	6103
	24 Hours	6471	1072	7543
A947 south of the B992	12 Hours	3491	725	4216

Survey Location	Time Period	Cars / Light Vehicles	Heavy Goods Vehicles (HGV)	Total Vehicles
	24 Hours	4588	895	5482
A98 east of the B9027	12 Hours	2576	735	3311
	24 Hours	3029	838	3867
B9170 west of Cuminestown	12 Hours	1515	377	1892
	24 Hours	1870	438	2308
C29S south of Cuminestown	12 Hours	327	73	401
	24 Hours	416	87	503
C121B west of C29S	12 Hours	190	43	233
	24 Hours	234	51	285
B9170 west of New Deer	12 Hours	1232	354	1587
	24 Hours	1552	409	1962
A948 west of the B9028	12 Hours	826	188	1013
	24 Hours	1094	225	1319
A981 west of the B9028	12 Hours	2241	393	2634
	24 Hours	2865	465	3320

Legislative and Planning Framework

5.6.1.13 The assessment of traffic impact and consideration of access issues has been undertaken in line with the following policy statements and guidance:

- Scottish Planning Policy 2010;
- Draft Scottish Planning Policy document, published in 2013;
- Planning Advice Note 75 - Planning for Transport;
- Nestrans Regional Transport Strategy;
- Aberdeenshire Council Local Transport Strategy 2012; and
- Institute of Environmental Assessment (IEMA); Guidelines for the Environmental Assessment of Road Traffic, 1993.

5.6.1.14 Full details of the planning and guidance notes are provided in the Transport Assessment (Technical Appendix 5.6 A) accompanying this ES.

5.6.2 Impact Assessment

Summary of Effects and Mitigation

5.6.2.1 The assessment presents the potential effects of construction traffic, and identifies those which are likely to be significant enough in EIA terms to require further assessment, namely:

5.6.2.2 Severance – severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery resulting from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself. These effects are considered to be of **minor significance**;

5.6.2.3 Driver delay – these delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system. These effects are considered to be of **minor significance;**

5.6.2.4 Pedestrian delay – the delay to pedestrians, as with driver delay, is likely only at, or close to the capacity of the system. These effects are considered to be of **minor significance**;

5.6.2.5 Pedestrian amenity – the guidelines for the environmental assessment of road traffic suggest that a tentative threshold for judging the significance of changes in pedestrian amenity would be where traffic flow (or its lorry component) is halved or doubled. These effects are considered to be of **minor significance**;

5.6.2.6 Fear and intimidation – there are no commonly agreed thresholds for estimating levels of danger, or fear and intimidation, from known traffic and physical conditions. For reference, this effect has been combined into Severance;

5.6.2.7 Accidents and safety – the implications of local circumstances, or factors which elevate or lessen risks of accidents. These effects are considered to be of **minor significance**; and

5.6.2.8 Dust and dirt – the increased risk of dust or dirt on the public road or surrounding areas. These effects are considered to be of **moderate significance prior to mitigation.**

5.6.2.9 No consideration has given to operational traffic as the likely traffic generation levels are of such a low level that they do not meet the IEMA assessment criteria and as such no further consideration has been made as detailed in the Transport Assessment (Technical Appendix 5.6 A)

5.6.2.10 The mitigation measures for the various effects have been reviewed and are set out in a Construction Traffic Management Plan (CTMP), a framework document is included in Technical Appendix 5.6 C.

Summary of Effects

5.6.2.11 The summary of effects is presented in Table 5.6-3 and is based upon the detail contained in the Transport Assessment supplied in Technical Appendix 5.6 A. All effects are considered to be minor with the exception of Dust and Dirt which is considered to be moderate due to the large scale material movements associated with the construction of the OnTI. Following mitigation the effect is considered to be of **minor significance**.

Proposed Mitigation Measures and Residual Effects

5.6.2.12 Mitigation measures have been considered for the construction phase. The decommissioning phase will consider similar measures at that time, however the volumes of material being removed will be less than those associated with the construction phase and consequently any associated impacts will be reduced.

5.6.2.13 No consideration of the operational phase has been provided given the very low levels of traffic associated with the operation of the substation, maintenance of the landing point and associated cable maintenance.

5.6.2.14 Mitigation measures by design have been considered, for example the routing of construction traffic away from sensitive areas such as village centres, schools, etc. Given that the construction period is short lived and transitory, the principal mitigation measure is the provision of a CTMP to control construction traffic activities. The activities proposed are illustrated in greater detail in the CTMP, attached as Technical Appendix 5.6 C.

5.6.2.15 With the proposed mitigation measures in place, no significant residual effects are predicted.

Table 5.6-3 Impact Assessment Summary

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Construction & Decommissioning				
Severance & Intimidation	Links: B9105/B9121/C7s/C29s/C121B Settlements: Fintry and Cuminestown	Minor	None	Minor
Driver / Pedestrian Delay	Links: B9105/B9121/C7s/C29s/C121B Settlements: Fintry and Cuminestown	Minor	None	Minor
Pedestrian Amenity	Links: B9105/B9121/C7s/C29s/C121B Settlements: Fintry and Cuminestown	Minor	Construction Traffic Management Plan	Minor
Accidents & Safety	Links: B9105/B9121/C7s/C29s/C121B Settlements: Fintry and Cuminestown	Minor	Construction Traffic Management Plan & Abnormal Load Route Review	Minor
Dust & Dirt	Links: B9105/B9121/C7s/C29s/C121B Settlements: Fintry and Cuminestown	Moderate	Construction Traffic Management Plan	Minor
Operation				
N/A				

Introduction to Impact Assessment

5.6.2.16 The full Transport Assessment is provided as separate Technical Appendix 5.6 A. The approach taken to estimate the effect of the modified OnTI has considered the construction, operational and decommissioning phases of the project on the surrounding road network.

5.6.2.17 The installation of the modified OnTI will require materials to be transported to site by road and, in addition to the above, the provision of construction compounds, storage facilities and laydown areas during construction phases. These will include the movement of AIL traffic associated with the substation elements.

5.6.2.18 There will also be a need to bring construction plant and materials (cable drums, concrete, pipes, blockwork, steel, etc.) to both the substations and modified export cable route sites. These will be delivered by standard HGVs. Construction workers and operatives commuting during the construction, commissioning, operation and maintenance and decommissioning periods will also generate light–vehicle traffic, such as cars and Light Goods Vehicles (LGVs).

5.6.2.19 The numbers of vehicles required for each element has been estimated and a construction programme (Technical Appendix 5.6 A) developed to identify the peak construction period. The effect of these construction traffic movements has been considered in percentage terms against a future base year.

5.6.2.20 The percentage impact assessment (the percentage increase of traffic flows as a result of the imposition of construction traffic) is then used to determine the magnitude of any effects and the need and likely form of any necessary mitigation.

Details of Impact Assessment

5.6.2.21 The study area network comprises the parts of the public road network that could be used by construction and operational traffic accessing the site. The roads identified as forming the likely route to site by construction traffic include the A97 / A98 / A947 / B9105 / B9170 / B9121 / C92S / C7S / C295.

5.6.2.22 Using indicative design parameters, a peak traffic flow has been estimated and this flow has been used to form the basis of all the assessments contained in the assessment. It therefore provides for a robust worst case assessment of the whole modified OnTI. The indicative peak month for construction is May 2018.

5.6.2.23 Existing traffic flows have been factored to the 2018 levels using National Road Traffic Forecast (NRTF) High Growth factors. This approach provides a robust approach in assessing traffic flows and the likely effect of development flows on the network at that point in time. This approach has been approved by the Council and allows for committed development traffic flows associated with other schemes that have been granted planning permission. The Council has advised that it are not aware of any other schemes in the planning system that would have a significant transport effect and that should be included in an assessment. The use of High NRTF factors provides more than sufficient flexibility to account for any schemes that may become committed between the planning in principle and detailed application stage.

5.6.2.24 Construction traffic flows have been compared against the factored base flows and the percentage impact reviewed.

5.6.2.25 Significant effects related to traffic movements during the operational phase are unlikely to arise. The traffic generated once the site is operational would be associated mainly with service and maintenance trips using mainly 4x4 type vehicles with potentially occasional HGV movements to access the site for heavier maintenance and repairs.

5.6.2.26 At the end of the development's operational life, there may be an effect on the local road network due to the movements of HGVs associated with the removal of equipment and materials. However, the number of vehicle movements is anticipated to be lower than that predicted for construction and any baseline data collected for the purposes of this assessment would not be relevant so far in the future.

5.6.2.27 In addition to the assessment of the increase in vehicular traffic, the issues relating to the movement of AIL traffic, creation of access junctions and traffic management issues have all been assessed. No significant detrimental effects have been identified in any of these subjects and all the relevant reports are contained in Technical Appendices 5.6 A, 5.6 B, 5.6 C and 5.6 D.

Rochdale Envelope Parameters Considered in the Assessment

5.6.2.28 The modified OnTI scheme has been split into component parts to enable an estimate of the construction traffic potential to be calculated. A worst case scenario has been presented to provide a robust assessment. The principal design parameters that affect the traffic generation are summarised below in Table 5.6-4.

Table 5.6-4 Rochdale Envelope Parameters Relevant to the Onshore Transport Impact Assessment

Potential Effect	Rochdale Envelope Scenario Assessed
Construction & Decommissioning	
Changes to Construction Programme	A minimum construction period of 37 months has been assessed. Extending the programme would reduce the trips per day on the network, therefore a robust assessment has been undertaken. It has been assumed that 5.5 days per week construction is undertaken in line with normal practices of a scheme of this size.
Changes to the Size and Number of AIL Components	The assessment includes AIL components of a weight of 108 tonne by 7.8 m in length and a width of 3.75 m. This represents a maximum envelope to provide for a robust assessment.
Changes to Construction Methodology	The assessment assumes a worst case of excavating all cable trenches and removing any excess excavated material to provide a worst case flow of HGV trips on the road network.
Operation	
N / A	N / A

5.6.2.29 The assessment is based upon construction traffic estimates derived over the estimated 37 month construction period for all three elements of the modified OnTI (Transmission Owner substation, MORL substation and export cables). The estimated construction traffic movements are provided in full in the Transport Assessment and are summarised in Table 5.6-5. Traffic flows have been assigned to the road network using the likely supply of construction materials and supply of labour.

Table 5.6-5 Construction Traffic Flows

Survey Location	Time Period	Cars / Lights Vehicles	HGV	Total Vehicles
A98 west of Boyndie	12 Hours	0	50	50
	24 Hours	0	50	50
B9121 south of Fiskaidly	12 Hours	3	27	30
	24 Hours	3	27	30
A98 west of the B9038	12 Hours	16	77	94
	24 Hours	16	77	94
A97 south of B9121	12 Hours	3	28	31
	24 Hours	3	28	31
A947 near Keilhill	12 Hours	6	92	98
	24 Hours	6	92	98
C92S east of Foulzie	12 Hours	0	0	0
	24 Hours	0	0	0
C7s west of Gorrachie	12 Hours	4	30	34
	24 Hours	4	30	34
B9105 south of Fintry	12 Hours	9	68	77
	24 Hours	9	68	77
A947 north of Turriff	12 Hours	10	34	43
	24 Hours	10	34	43
A947 south of the B992	12 Hours	0	8	8
	24 Hours	0	8	8
A98 east of the B9027	12 Hours	0	54	54
	24 Hours	0	54	54
B9170 west of Cuminestown	12 Hours	3	26	29
	24 Hours	3	26	29
C29S south of Cuminestown	12 Hours	2	13	14
	24 Hours	2	13	14
C121B west of C295	12 Hours	21	42	62
	24 Hours	21	42	62
B9170 west of New Deer	12 Hours	23	7	30
	24 Hours	23	7	30
A948 west of the B9028	12 Hours	23	7	30
	24 Hours	23	7	30
A981 west of the B9028	12 Hours	0	0	0
	24 Hours	0	0	0

EIA Methodology

5.6.2.30 The assessment has been undertaken in accordance with the Institute of Environmental Management and Assessment (IEMA) 'Guidelines for the Environmental Assessment of Road Traffic' (1993). The IEMA guidelines include details on how the sensitivity of receptors should be assessed. Using that as a base, professional judgement was used to develop a classification of sensitivity for various receptors. The guidelines also identify the key effects that are most important when assessing the significance of traffic effects from an individual development: Table 2.2 of Volume 11, Section 2, Part 5 of the Design Manual for Roads and Bridges (DMRB) entitled 'Assessment and Management of Environmental Effects' sets out four levels against which the magnitude of these effects should be assessed – major, moderate, minor and negligible.

5.6.2.31 The receptors that may be subject to any traffic effects arising from the construction of the OnTI are likely to be settlements along the construction traffic route and construction traffic routes. These settlements are classified by size, function, presence of school and community facilities, traffic calming or traffic management measures, vehicle speed limits and position on the roads hierarchy, using the criteria identified in Table 5.6-6. This classification is based upon professional judgement and relative sensitivity to the potential traffic effects of the modified OnTI.

5.6.2.32 Identification of receptor sensitivity requires the definition of both baseline conditions and estimation of conditions for the appropriate year of assessment. Each receptor will have a different value and level of sensitivity to change. Quantification of environmental effects is easier for some receptors than others. Traffic noise has been extensively researched and methods of measurement developed. Other effects such as severance are more subjective as there are no current proven or reliable techniques for study. Table 5.6-6 provides descriptions of receptor sensitivity based on DMRB guidelines HA 205/08 'Assessment and Magnitude of Environmental Effects'.

5.6.2.33 For many effects there are no simple rules or formulae which define thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed up by data or quantified information where possible.

5.6.2.34 The IEMA guidelines identify general thresholds for traffic flow increases of 10 % and 30%. The guidelines also suggest that 30 %, 60 % and 90 % changes in traffic levels should be considered as "slight, moderate and substantial" effects respectively with regard to severance and intimidation. It is also generally considered that traffic flow increases of less than 10% are negligible, given that daily variation in background traffic flow may vary by this amount. Based on these guidelines and perceptions, the magnitude of the effect can be estimated for the traffic based effects using the criteria in Table 5.6-7.

5.6.2.35 To determine the overall significance of the effects, the results from the receptor sensitivity and impact magnitude classifications are correlated and classified using the scale summarised in Table 5.6-8. For the purposes of this assessment effects of Moderate or above are significant under the EIA Regulations.

Table 5.6-6 Receptor Sensitivity

Sensitivity	Description
High	Typically receptors with high importance and rarity on an international and national scale and with limited potential for substitution. To include large rural settlements containing a high number of community and public services and facilities, areas with traffic control signals, waiting and loading restrictions, traffic calming measures and minor rural roads, not constructed to accommodate frequent use by HGV.
Medium	Typically receptors with high or medium importance and rarity on a regional scale and with limited potential for substitution. To include intermediate sized rural settlements containing some community or public facilities and services, areas with some traffic calming or traffic management measures and local A or B class roads, capable of regular use by HGV traffic.
Low	Typically receptors with low or medium importance and rarity on a local scale (on-site or neighbouring the site). To include small rural settlements with few community or public facilities or services, areas with little or no traffic calming or traffic management measures and trunk or A-class roads, constructed to accommodate significant HGV composition.
Negligible	Typically receptors with little importance and rarity. To include roads with no adjacent settlements including new strategic trunk roads or motorways that would be little affected by additional traffic.

Table 5.6-7 Impact Magnitude

High	Medium	Low	Negligible
>90% increase in traffic	60% - 90% increase in traffic	30% - 60% increase in traffic	0% - 30% increase in traffic

Table 5.6-8 Matrix for Determination of Significance of Effect

Sensitivity / Magnitude	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

Impact Assessment

Construction

5.6.2.36 The construction traffic has been compared against the future base year (2018) traffic flows to determine the percentage impact on construction traffic on the road network. Table 5.6-9 illustrates the percentage increases in flows.

Table 5.6-9 Construction Traffic Peak Month Percentage Impact (Average Weekday)

Survey Location	Time Period	Cars / Light Vehicles % Increase	HGV % Increase	Total Vehicles % Increase
A98 west of Boyndie	12 Hours	0%	5.48%	1.08%
	24 Hours	0%	4.74%	0.91%
B9121 south of Fiskaidly	12 Hours	1.24%	50.94%	10.10%
	24 Hours	1.01%	43.55%	8.33%
A98 west of the B9038	12 Hours	0.28%	8.25%	1.42%
	24 Hours	0.23%	7.20%	1.18%
A97 south of B9121	12 Hours	0.28%	12.23%	2.38%
	24 Hours	0.24%	11.76%	2.06%
A947 near Keilhill	12 Hours	0.11%	9.50%	1.50%
	24 Hours	0.09%	8.04%	1.22%
C92S east of Foulzie	12 Hours	0%	0%	0%
	24 Hours	0%	0%	0%
C7s west of Gorrachie	12 Hours	3.45%	90.91%	22.82%
	24 Hours	2.88%	76.92%	19.10%
B9105 south of Fintry	12 Hours	0.84%	28.57%	5.88%
	24 Hours	0.69%	25.00%	5.06%
A947 north of Turriff	12 Hours	0.18%	3.51%	0.66%
	24 Hours	0.14%	2.97%	0.53%
A947 south of the B992	12 Hours	0%	1.03%	0.18%
	24 Hours	0%	0.84%	0.14%
A98 east of the B9027	12 Hours	0%	6.89%	1.53%
	24 Hours	0%	6.04%	1.31%
B9170 west of Cuminestown	12 Hours	0.19%	6.47%	1.44%
	24 Hours	0.15%	5.57%	1.18%
C29S south of Cuminestown	12 Hours	0.57%	16.67%	3.27%
	24 Hours	0.45%	13.98%	2.62%
C121B west of C295	12 Hours	10.34%	91.30%	24.90%
	24 Hours	8.40%	77.78%	20.39%
B9170 west of New Deer	12 Hours	1.75%	1.85%	1.77%
	24 Hours	1.39%	1.61%	1.43%
A948 west of the B9028	12 Hours	2.61%	3.49%	2.78%
	24 Hours	1.97%	2.92%	2.13%
A981 west of the B9028	12 Hours	0%	0%	0%
	24 Hours	0%	0%	0%

5.6.2.37 The impact review was undertaken for weekday conditions and the results indicate that the greatest impact of construction traffic will be on the B/C Class sections of the road network represented in the assessment by the B9105 / B9121 / C7s / C29s / C121B. This reflects the low number of trips and particular HGV trips on these sections of the road network. The comparison of development traffic flows with theoretical link capacities indicates that there is significant spare capacity on the local road network and no link capacity issues associated with the construction traffic would be anticipated.

5.6.2.38 With reference to the IEMA guidelines, total traffic flows are not predicted to increase by more than 30% on any link although HGV levels will increase by more than 30% on B9121 / C7s / C121B. The critical links are therefore considered to be the above along with B0105 and C29s which are considered to be sensitive locations. The maximum number of additional HGV movements per day is 92 on the A947. This is considered low when spread over the course of a day on an A Class road and equates to approximately 11 movements per hour.

5.6.2.39 A route evaluation has been carried out for the minor road network against the key environmental criteria identified by the IEMA guidelines. This is summarised in Table 5.6-3 for ease of reference.

Severance

5.6.2.40 The increase in traffic flow affecting receptors along the B9105 / B9121 / C7s / C29s / C121B is summarised in Table 8.3 of the Transport Assessment (Technical Appendix 5.6 A). Based on the two-way average daily total traffic flows, the severance / fear and intimidation effect is estimated to be of **minor significance** at the receptors along the access route and within Fintry and Cuminestown due to the low volumes of overall traffic. This effect is short lived and temporary only when construction works are ongoing at the affected areas.

Driver / Pedestrian Delay

5.6.2.41 There is the potential for limited driver delay during the peak construction phases due to the limited passing opportunities along the narrow sections of the B/C Class road network although localised improvements may be introduced where required to accommodate the safe movement of construction traffic. This effect is short lived and temporary only when construction works are ongoing in the immediate areas.

5.6.2.42 There is significant spare capacity along the links assessed and the driver / pedestrian delay impact is therefore estimated to be of **minor significance** at the receptors along the route.

Pedestrian Amenity

5.6.2.43 The magnitude of the impact on pedestrian amenity has been considered in terms of the threshold described in the Manual for Environmental Assessment (MEA). Therefore, based on the estimated two-way percentage increases in HGV traffic summarised in the Transport Assessment, the threshold for changes to pedestrian amenity has not been reached in any locations although the C7s and C121B are considered to be close to the threshold.

5.6.2.44 There are currently no pedestrian facilities along the C7s and C121B and limited pedestrian demand. Pedestrian footways are available within Cuminestown although the increase in HGV movements on the B9170 is lower at 6.47%.

5.6.2.45 With mitigation measures in place through the CTMP the pedestrian amenity impact is likely to be of **minor significance** at the receptors along the route and is considered short lived and temporary only occurring during construction periods in the local vicinity.

Accidents and Safety

5.6.2.46 Accident data was analysed along the B9105 / B9121 / C7s / C29s / C121B with the overall number of accidents considered to be low.

5.6.2.47 Due to the width of the route it will be necessary for construction vehicles to maintain a low speed along the minor road network. Construction working will also be limited to daytime working with the aim of further reducing the accident risk. With mitigation measures in place the accidents and safety impact is therefore estimated to be of **minor significance** at the receptors along the route. This effect is short lived and temporary only when construction works are ongoing at the affected areas.

Dust and Dirt

5.6.2.48 There are no specific guidelines to determine magnitude of effect of dust and dirt although its impact is likely to be limited to the immediate vicinity of the site access junctions, with mitigation proposed to ensure that the effect is of **minor significance**. This effect is short lived and temporary only when construction works are ongoing at the affected areas.

Operation

5.6.2.49 No operational traffic measures have been assessed due to the very low levels of traffic associated with this phase.

Decommissioning

5.6.2.50 The decommissioning phase is not considered as disruptive as the construction phase and as such no separate assessment has been undertaken.

Proposed Monitoring and Mitigation

Construction

5.6.2.51 All mitigation measures are detailed in the Construction Traffic Management Plan (CTMP) and AIL Route Survey Report (RSR) contained in Technical Appendices 5.6 C and 5.6 D).

5.6.2.52 The proposed access strategy has been designed to minimise the effect of construction traffic on rural C and U Class roads. Where possible, access junctions relating to the modified onshore export cable route will be positioned on the A and B class road network.

5.6.2.53 During the construction period the applicant will maintain a website containing the latest information relating to traffic movements associated with vehicles accessing the site. This will be agreed with the local roads authority.

5.6.2.54 The following measures are recommended in terms of site operation and maintenance during the construction phase:

- All materials delivery lorries (dry materials) will be sheeted to reduce dust and stop spillage on public roads; and
- Specific training and disciplinary measures will be established to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway, wheel wash facilities will be established at the site entrance.

5.6.2.55 The CTMP sets out measures to be put in place to reduce the effects of noise, dust and excessive speed.

5.6.2.56 Construction vehicles will be fitted with identification numbers to allow the public to identify any vehicles that may be speeding or causing specific issues and drivers will be required to pass through sensitive areas at low speed.

5.6.2.57 In order to mitigate against pedestrian amenity impacts, it is recommended that construction traffic is discouraged from travelling through settlements such as Fintry, Cuminestown, New Deer and New Blyth during peak school hours through the use of supply clauses in the principal contractor's contract.

5.6.2.58 A road sweeper would also be deployed on the various sections of the road network close to site access junctions to ensure that the road network is kept clean and free running.

5.6.2.59 Wherever possible, contractors will be encouraged to use low emissions vehicles through the CTMP to mitigate against air pollution.

Operation

5.6.2.60 No mitigation measures are considered necessary.

Decommissioning

5.6.2.61 Similar measures to the construction phase are proposed and will be investigated at that time.

5.6.3 Cumulative Impact Assessment

Summary

5.6.3.1 This section presents the results of assessment of the potential cumulative transport effects arising from the modified OnTI in conjunction with other existing or reasonably foreseeable onshore developments and activities. MORL's approach to the assessment of cumulative effects is described in Chapter 1.3: Environmental Impact Assessment.

5.6.3.2 Should any construction works associated with other developments, including those undertaken with respect to the MORL three consented wind farms or MORL Western Development Areas, be undertaken at the same time as the OnTI it is considered highly unlikely that any cumulative transport issues would result changes to the effects at identified receptors.

5.6.3.3 No committed developments are located within the vicinity of the study area that are not accounted for by the use of High NRTF factors in the future year flows and thus the cumulative effects will not be significant.

5.6.3.4 Cumulative issues relating to the operational phase are not considered significant.

5.6.4 References

Aberdeenshire Council (2012) Local Transport Strategy 2012.

The Highways Agency, Scottish Government, Welsh Assembly Government Llywodraeth Cynulliad Cymru and the Department for Regional Development Northern Ireland. Volume 11, Section 2, Part 5 of the Design Manual for Roads and Bridges (DMRB) 'Assessment and Management of Environmental Effects'.

Institute of Environmental Assessment (IEMA) (1993). Guidelines for the Environmental Assessment of Road Traffic.

Nestrans (2013) Regional Transport Strategy.

The Scottish Government (2005) Planning Advice Note 75: Planning for Transport.

The Scottish Government (2010) Scottish Planning Policy 2010.

The Scottish Government (2013) Draft Scottish Planning Policy.

5 Human Environment

5.5 Socio-Economics

5.5.1 Baseline Information

Introduction

5.5.1.1 This section describes the existing socio-economic environment and sets out a baseline of socio-economic indicators. These relate to:

- Economic indicators including employment and Gross Value Added (GVA)[1];
- Social indicators such as population, house prices, education and deprivation; and
- Tourism indicators including the number of visitors and profile.

5.5.1.2 The analysis uses several geographic areas. The main study area is the same as was used in the MORL ES (2012) and is defined as covering the Moray, Highlands, Aberdeenshire and Aberdeen City Local Authority areas (Figure 5.5-1). Moray and Aberdeenshire are the closest authorities to the modified export cable route corridor. Aberdeen City and Highlands are relevant given the number of energy-related businesses and potential supply chain.

5.5.1.3 Local authority areas are used because they provide the most common basis for providing data. For some data, where it is available, more detail has been provided for smaller geographical areas. Effects beyond the study area are likely to be weaker, although given the scale of investment, the likely economic impact on Scotland as a whole is also considered. For the tourism analysis, the focus is on the potential effect of the modified export cable landfall at Inverboyndie, the modified onshore export cable route and the two onshore substations to be sited at New Deer.

Consultations

5.5.1.4 Table 5.5-1 below summarises the consultation responses received with regards to socio-economics:

Table 5.5-1 Summary of Consultation Responses

Organisation	Consultation Response	MORL Approach
Marine Scotland Policy and Planning	The socio-economic aspects of this scoping report are satisfactory. In summary, we would expect the ES to include the gross and net employment impacts, and the gross and net GVA impacts. Both of these should be presented separately for the construction, O&M and decommissioning phases. They should also be reported at a range of appropriate geographic scales. To assist with that, it would be helpful to see a clear definition of the labour market catchment area. Background information on the industry structure and employment structure would be useful. Clear consideration and use of the concepts of additionally, displacement and leakage should also be demonstrated. Ditto regarding economic multipliers.	Results of the economic assessments are presented as the gross employment and GVA supported by the investment. Displacement, leakage and multipliers are discussed in the economic Impact Assessment Section 5.5.2. Data on the labour market structure is included in the baseline information 5.5.1.

[1] Gross Value Added is defined by the Office for National Statistics in its Productivity Handbook (2007) as "the difference between output and *intermediate consumption* for any given sector/industry. That is the difference between the value of goods and services produced and the cost of raw materials and other inputs which are used up in production."

Organisation	Consultation Response	MORL Approach
Aberdeenshire Council	This part of Aberdeenshire has a very different tourism market to that of the Highlands/Inverness and for the terrestrial element of the EIA it would not be appropriate to use a baseline based on data covering the Highlands. Both Sandend and Inverboyndie are very popular and well used by people for walking, surfing etc. The most significant impact is likely to be disturbance/closure during construction and the installation of the cable and this should be addressed as part of the mitigation.	The assessment provides a more detailed review of tourism assets within Aberdeenshire, although tourism numbers are only available at a regional level. Assessment recognises that Inverboyndie is well used and considers the impact of disturbance/closure.

Baseline Characteristics

5.5.1.5 The study area includes the cities of Aberdeen and Inverness with a series of smaller towns along the Aberdeenshire and Moray coast where the export cable comes onshore (Figure 5.5-1). The nearest town on the Moray coast is Buckie (population 8,100). The cable lands in Aberdeenshire at Inverboyndie a beach, close to Banff (population 3,900) and Macduff (3,700). Close to Inverboyndie beach, to the west, is Whitehills, a small fishing village with a population of around 1,000. The largest settlement further east is Fraserburgh (12,500). Inland, the closest town to the modified onshore export cable route corridor is Turriff (4,800), with a number of much smaller villages such as Cuminestown and Aberchirder close by.

5.5.1.6 Aberdeenshire Council and Aberdeen City Council areas are characterised by high levels of income (well above the Scottish average), higher house prices and higher proportions of the population working in oil and gas-related jobs. Banff and the Banffshire coast are designated as a priority regeneration area in the Aberdeenshire Local Development Plan 2012.

5.5.1.7 Aberdeenshire has a particularly fast rate of population growth. Incomes are lower in the Highland and Moray although unemployment rates in all four local authorities have been below the Scottish average since 2004.

Desktop-Based Studies

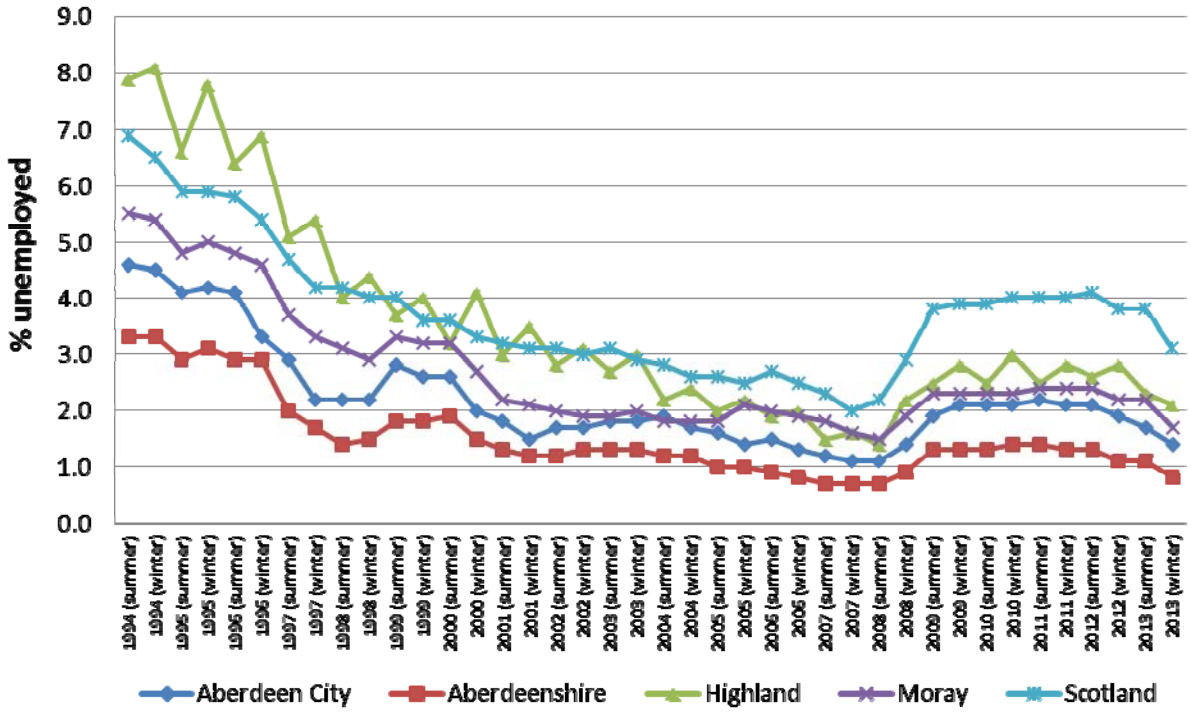
5.5.1.8 All the baseline data has been updated from that described within the MORL ES (MORL, 2012). Data is the most up to date available although in some cases this can be several years old.

Population

5.5.1.9 Across the study area the total population was 806,300 in 2012, whilst the number of working age people (aged 16 to 64) stood at 529,000 (Office for National Statistics, 2013). This represented 66% of the study area population, slightly higher than the equivalent figure for Scotland as a whole (65%). Aberdeen City had the highest proportion of working age residents (71%) across the study area, whilst Aberdeenshire (65%) was in line with the Scottish average and the Highlands and Moray were below (63% and 63% respectively). In these latter two authorities, the proportion of the population over 65 is slightly above the national average.

Unemployment

5.5.1.10 Unemployment rates in the study area have generally been below the Scottish average since 1994, as depicted in Plate 5.5-1 below (Office of National Statistics, 2014c). The exception is Highland where unemployment was consistently higher than the Scottish average until 1997. Since 2004, unemployment rates in all four local authorities have been below the Scottish average. Unemployment rates generally fell steadily between 2004 and 2008, and though they rose after the onset of the recession the increase was less pronounced than across Scotland as a whole. Data for recent years suggests that unemployment is once again falling.

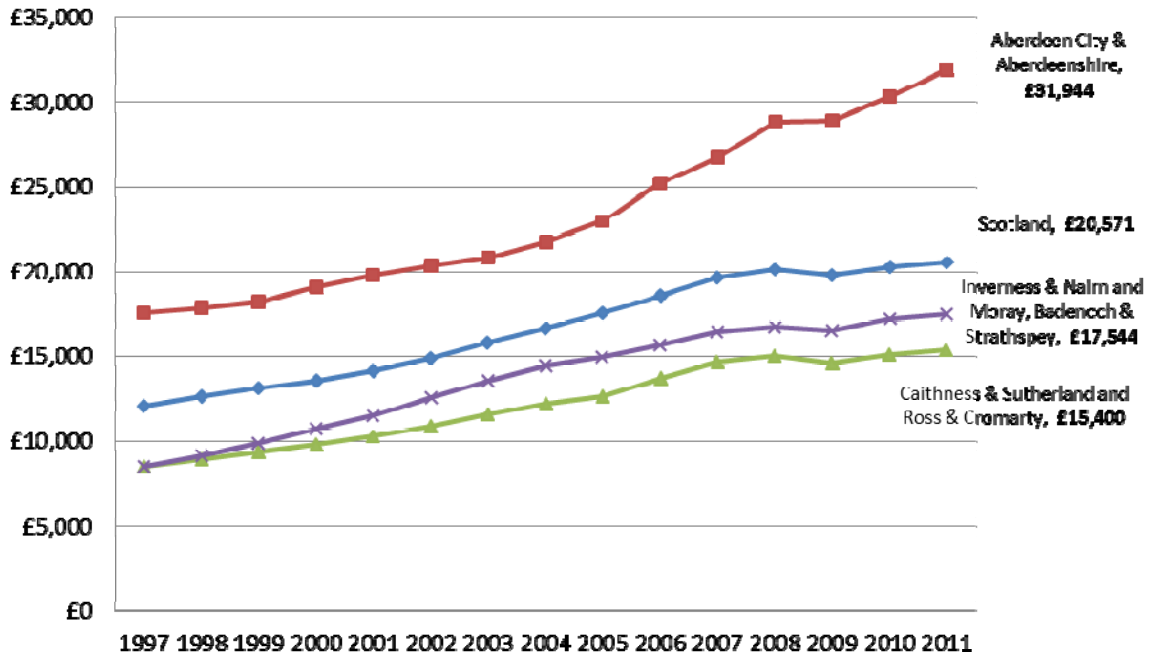


Source: (Office of National Statistics, 2014c)

Plate 5.5-1 Unemployment Rates within the Study Area

Gross Value Added (GVA)

5.5.1.11 There is a large difference in the GVA per head generated in Aberdeen & Aberdeenshire compared with the more rural Moray and Highland areas, as shown in Plate 5.5-2 below (Office of National Statistics, 2012b). This mostly reflects the very high value added of the oil and gas sector. GVA per head in Caithness & Sutherland and Ross & Cromarty is under half that of Aberdeen & Aberdeenshire, at a level below the figure for Scotland as a whole. GVA per head in Inverness & Nairn and Moray, Badenoch & Strathspey is also below the average for Scotland as a whole.



Source: ONS (2012b) Regional Accounts

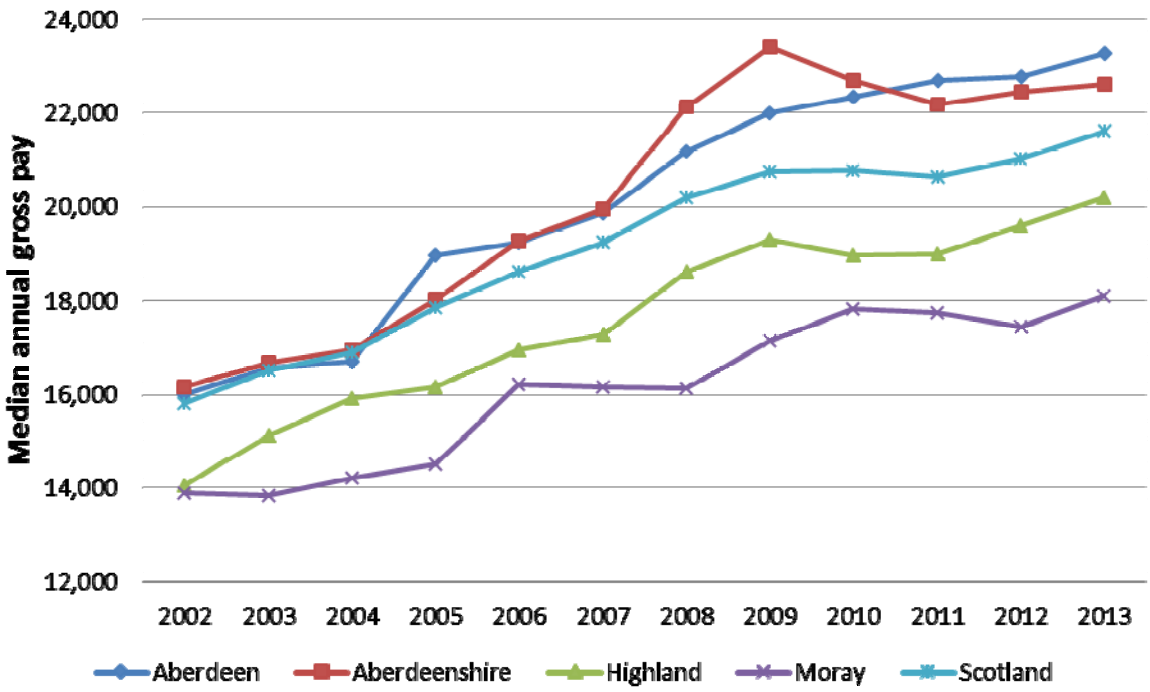
Plate 5.5-2 GVA per Head (NUTS[2] 3 Geographies within the Study Area)

Individual Median Earnings

5.5.1.12 Nationally, earnings increased steadily between 2002 and 2009, followed by a period to 2012 when they remained broadly stable, as shown in Plate 5.5-3 below (Office of National Statistics, 2014b). In Aberdeen, earnings increased in all years between 2002 and 2013, whereas Aberdeenshire suffered a fall in earnings between 2009 and 2011, with the Highlands also experiencing a small dip in earnings in 2010. In Moray, earnings fell between 2006 and 2008. Nationally and across all local authorities in the study area, earnings once again rose in 2013. The strength of the oil and gas sector has been important in maintaining both employment and earnings in the north east.

[2] Nomenclature of Territorial Units for Statistics – this is the system of geo-coding adopted for EU countries

5.5.1.13 In absolute terms, median earnings in Aberdeen and Aberdeenshire are well above the Scottish median, while Highland and particularly Moray are significantly below. Median earnings in Aberdeen are around 29% higher than in Moray.



Source: ONS (2014b) Annual Survey of Hours and Earnings - resident analysis

Plate 5.5-3 Individual Median Annual Gross Pay 2002-2013

House Prices

5.5.1.14 The pattern of house prices in the study area has closely followed the national picture (Registers of Scotland, 2013). There were sharp increases in house prices from 2003 onwards, peaking in 2008 just before the financial crisis and subsequent recession. House prices subsequently decreased slightly across all four local authorities in the study area, with the fall being most prolonged in the Highlands and Moray. Aberdeenshire and Aberdeen saw prices dip for only a single year, in 2009, before prices started to rise again. The highest median prices in 2012 were in Aberdeenshire, from where high earners commute to oil and gas related jobs in and around Aberdeen. The median of £188,000 was well above the Scottish national median of £130,050. Prices in Aberdeen City (£160,000) and in Highland (£140,000) were also well above the national figure. Moray, with lower levels of GVA per head and earnings had a slightly lower median house price (£130,000).

Education

5.5.1.15 Table 5.5-2 below sets out the highest level qualifications among the working age population, for each of the local authorities in the study area (Office for National Statistics, 2014a). Aberdeen City is the only local authority to have a higher proportion of its working age population (aged 16-64) educated to NVQ 4+, though every local authority with the exception of Moray have a greater proportion educated to NVQ 3+. All the areas are above the national average for qualifications equivalent to NVQ 2+ and NVQ 1+, and all have a lower proportion of people with no qualifications compared with the national average.

Table 5.5-2 Qualifications Jan 2013 – Dec 2013 by Local Authority area (% of pop aged 16-64)

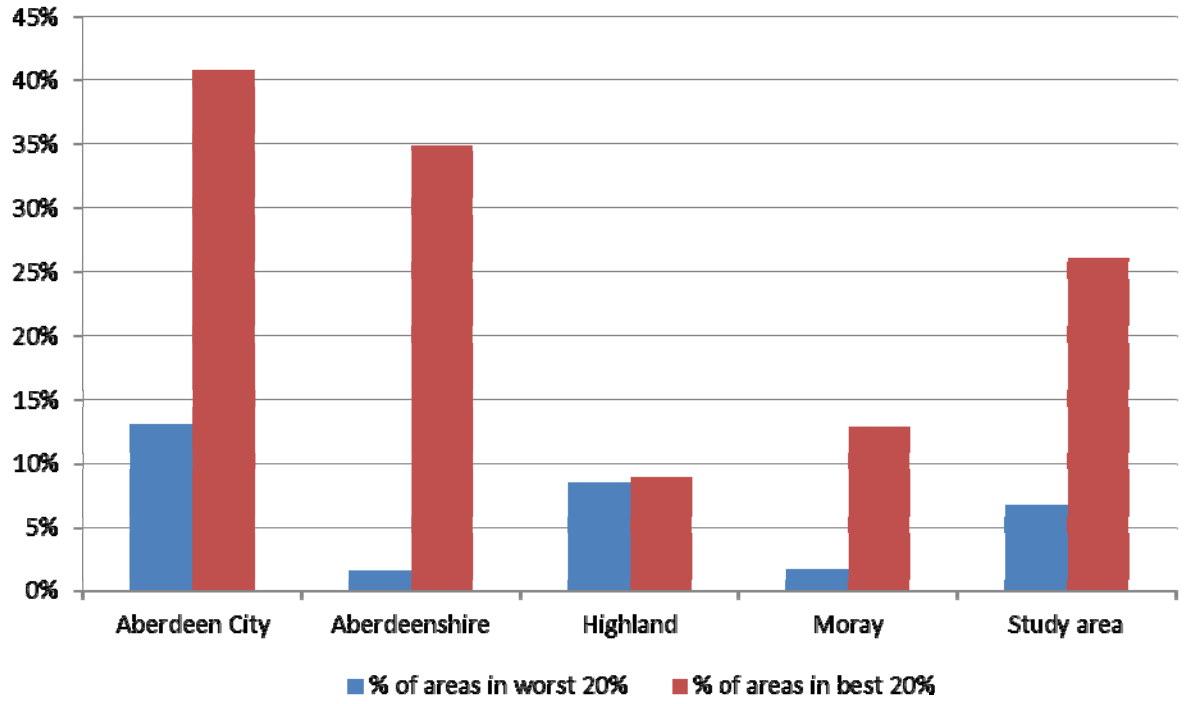
	Aberdeen City	Aberdeenshire	Highland	Moray	Scotland
NVQ 4+	45.5	39.3	38.7	32.6	39.4
NVQ 3+	64.9	61.9	62.1	55.2	59.3
NVQ 2+	79.3	75.1	76.2	75.0	73.7
NVQ 1+	85.6	86.0	87.4	86.9	83.4
None	7.1	7.9	6.6	7.3	10.3

Source: ONS (2014a) Annual Population Survey

Deprivation

5.5.1.16 One of the key measures of quality of life is captured by the indices of deprivation. Though not directly comparable, each index is based on the concept that dimensions of deprivation such as income, employment, education and health can be identified and measured separately. These dimensions, sometimes referred to as 'domains', are then aggregated to provide an overall measure of deprivation for each individual area. It should be noted that in more rural areas such as the Highlands, these scores are often not considered to be as accurate or reflective measures of deprivation as they are for urban areas.

5.5.1.17 Plate 5.5-4, below, shows that quality of life in Aberdeen City and Aberdeenshire compares positively with the Scottish benchmark (Scottish Government, 2012). Forty-one per cent of the neighbourhoods in Aberdeen are in the best 20% in Scotland and 13% in the worst 20%, whilst the figures for Aberdeenshire are 35% and 2% respectively. Whilst Highland and Moray have fewer deprived neighbourhoods than the Scottish benchmark, only 9% of neighbourhoods in Highland and 13% of neighbourhoods in Moray are in the best 20% in Scotland. Every local authority, nevertheless, has a higher proportion of neighbourhoods that are in the best 20% in Scotland than neighbourhoods that are in the worst 20% in Scotland.



Source: Scottish Government (2012) Scottish Index of Multiple Deprivation 2012

Plate 5.5-4 Proportion of neighbourhoods in the best and worst 20% in Scottish IMD rankings by Local Authority

5.5.1.18 Separately, the Scottish Household Survey 2012 collects residents' views of their neighbourhood and reports the percentage of residents that rate their neighbourhood as a "very good" place to live. In common with many of the indicators, Aberdeenshire scores well above the Scottish average (67% compared with 55% nationally), as do Highland (66%) and Moray (66%). Aberdeen City scores in line with the national average (55%) (Scottish Household Survey, 2012).

Employment

5.5.1.19 Oil and gas-related employment is important in Aberdeen and to a lesser extent Aberdeenshire, whilst professional, scientific and technical occupations are important in both areas (Office for National Statistics, 2012a). This is shown in Table 5.5-3. Food and drink production is a major employer in both Moray and Aberdeenshire, while tourism is more important in the Highlands. In Highland and Moray, the proportion of employment in health and education (mostly public sector) employment is above the Scottish average. Although the number of jobs in some sectors, such as fishing and tourism is relatively low, these are important jobs within some of the local towns and villages. Equally several large employers (Dounreay in Highland and the RAF airbases in Moray) have been crucial in maintaining levels of employment/economic activity this last decade. However, employment supported by both of these is declining as a result of the decommissioning of Dounreay and the changing status of RAF Kinloss.

Table 5.5-3 Employment by Sector for the Study Area and for Scotland (BRES data 2012)

Industry	Aberdeen City	Aberdeenshire	Highland	Moray	Scotland
Agriculture, Forestry & fishing	100	2,900	2,000	700	82,400
Mining & Quarrying (Oil & Gas Production)	23,900	3,900	400	100	32,600
Manufacturing	12,800	12,200	7,100	5,700	183,400
Electricity & Gas Supply	200	300	400	-	14,600
Water Supply & Waste	400	500	1,700	200	17,600
Construction	5,600	8,800	6,100	2,500	125,000
Retail	20,100	14,600	15,800	5,700	354,400
Transport & Storage	7,400	3,500	5,300	1,200	96,300
Accommodation & Food Services	11,900	6,100	11,800	2,400	167,100
Information & Communication	3,300	900	2,000	200	58,100
Financial Services	2,000	900	1,300	400	91,300
Real Estate	2,000	1,000	1,500	400	33,300
Professional, Scientific & Technical	24,900	10,100	5,100	1,000	172,500
Business Administration & Support Services	15,600	9,900	5,800	1,400	182,700
Public Administration & Defence	7,700	3,800	5,700	2,400	145,500
Education	9,700	7,200	7,800	3,000	179,700
Health & Social Work	25,300	9,800	18,100	5,400	376,200
Arts, Entertainment, Recreation & Other Services	6,000	4,600	5,000	1,700	113,200
Column Total	176,800	101,000	102,800	34,500	2,425,900

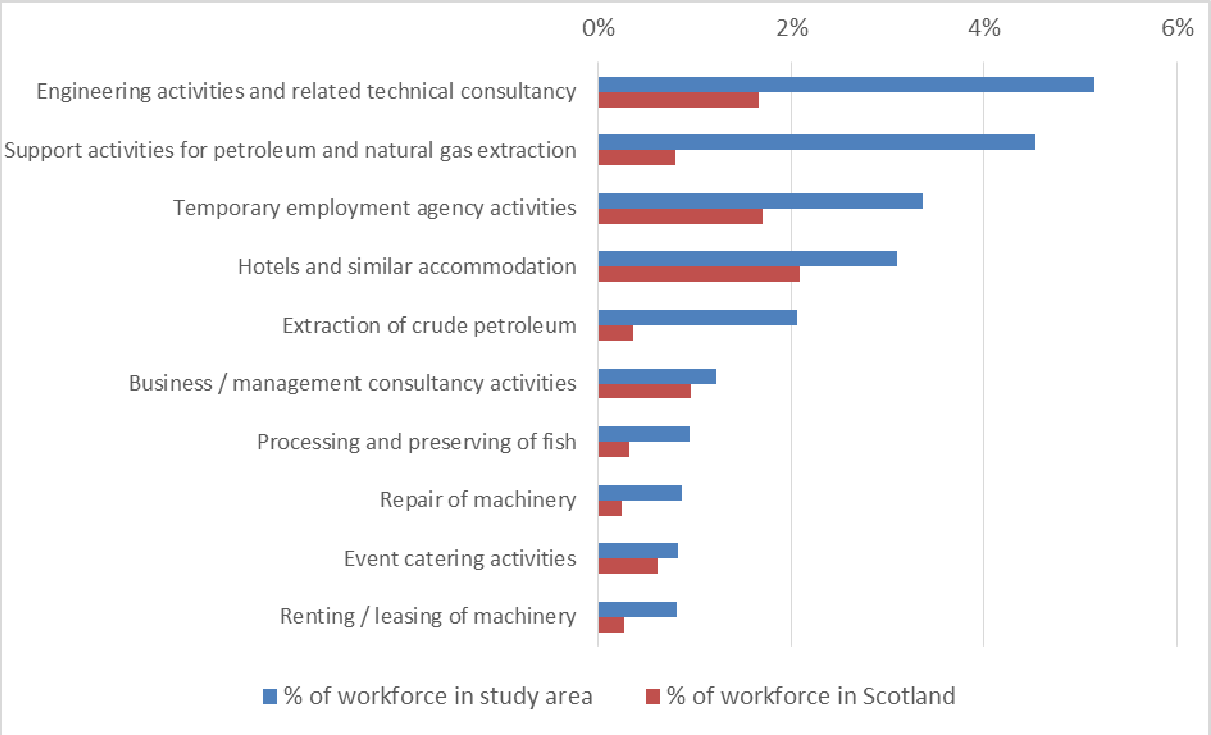
Source: ONS Business Register and Employment Survey (2012a) Note: Data Rounded to 100

5.5.1.20 Employment categorised as "professional, scientific and technical services" is also important in Aberdeen, much of this relates to the oil and gas sector. It includes, for example, engineers, chemists, technicians, designers and architects.

5.5.1.21 Plate 5.5-5 below uses four digit Standard Industrial Classification (SIC) data to show the key sectors in the study area and their importance relative with Scotland as a whole. It shows the importance of the oil and gas sectors and engineering, driven by Aberdeen, and the significance of tourism, which is largely in the Highlands.

5.5.1.22 Employment in Aberdeen City in support of activities for petroleum and natural gas extraction, engineering activities and related technical consultancy and extraction of crude petroleum comes to approximately 37,000, just over a fifth of the workforce. There is a similar pattern in Aberdeenshire with a high proportion of employment in engineering and oil and gas support.

5.5.1.23 It is important to note that the employment structure in Highland and Moray is quite different to Aberdeen, though all three have a high proportion of employment in hospital activities. In Highland there is a high proportion of hotel employment and the hazardous waste treatment at Dounreay. In Moray the dominant activities are in food manufacture, distilling, primary and secondary education.



Source: ONS Business Register and Employment Survey (2012a)

Plate 5.5-5 Key Sectors in the Study Area Relative to Scotland

Supply Chain

5.5.1.24 This section considers some of the recent activity in the supply chain in Scotland.

5.5.1.25 A study carried out by Scottish Renewables (Scottish Renewables, 2013) estimates that there were a total of 11,695 full time equivalent posts in renewable energy in Scotland in 2013. Of these, 1,842 work on offshore wind projects.

5.5.1.26 A report into the UK offshore wind supply chain (BVGA, 2014) notes several examples of recent supply chain activity in Scotland. For example, David Brown Wind UK has plans for a gearbox assembly facility close to Samsung Heavy Industries' proposed facility at Methil, in Fife. The Wind Towers Scotland operating tower manufacturing facilities in Campbeltown is one of only two sites in the UK, whilst Tata Steel has supplied steel plate for turbine towers from its facilities in Motherwell.

5.5.1.27 For the modified TI components the BVGA (2014) report describes the current capacity of the UK (not Scotland) supply chain.

- Subsea export cables – there has been no UK supply of subsea export cables to offshore wind to date;
- HVAC substations - most HVAC substations installed in the UK have been designed and built in the UK; and
- Subsea cable installation - a small number of vessels have been made in the UK and some vessel modification has been undertaken in the UK. The UK has world-class expertise in cable installation equipment and there are competitive operators.

5.5.1.28 Scotland also has a number of programmes that aim to support the supply chain. In 2013, Scottish Enterprise (SE) launched its Scottish Innovative Foundation Technologies (SIFT) fund, a £15m programme to support the demonstration of foundations for water depths of 30 m or more in return for an assurance that manufacturers will set up production facilities in Scotland. There is also support available for demonstrating new turbines, including the £35m Prototyping for Offshore Wind Energy Renewables Scotland (POWERS) fund to target inward investment for offshore wind turbine manufacturers. The Scottish Government, furthermore, is introducing new Renewable Obligation Certificate (ROC) bands to support offshore test and demonstration sites deploying innovative turbines or floating turbines.

5.5.1.29 Scottish Development International is working to try and secure inward investment in related manufacturing in Scotland. This will take time to establish the production facilities and then to demonstrate to the market that products are reliable. For the construction phase, Scottish-based firms appear well placed given the strong engineering base and oil and gas experience in the North Sea, however, the availability of suitable vessels and logistics could be a constraint. One of the largest interventions to support the supply chain has been the projects identified in the National Renewables Infrastructure Plan (Scottish Enterprise and Highlands & Islands Enterprise, 2010). This is supported by a £70m National Renewable Infrastructure Fund (N-RIF) within the SE area and with a commitment of support for specific investments in the Highlands and Islands.

5.5.1.30 As well as a number of announcements relating to potential inward investment to support offshore wind, there are a number of other related activities. Glasgow has been chosen as the location for the Offshore Renewable Energy (ORE) Catapult centre and the Green Investment Bank is in Edinburgh. Two potential suppliers, offshore engineering firms Technip and Subsea 7, have established renewable divisions in Aberdeen.

5.5.1.31 More generally, SE and Highlands and Islands Enterprise (HIE) have undertaken a number of other initiatives to support the supply chain. Both agencies have developed supply chain databases to better understand where the gaps are and to promote the opportunities from offshore wind and other renewables. SE has launched the Offshore Wind Expert Help programme and Offshore Wind Manufacturing Audits as well as awareness raising events.

Supply Chain Development - MORL Activities

5.5.1.32 MORL is working with HIE and SE in order to deliver a programme of engagement which is intended to enable existing enterprises to diversify and take the actions necessary to compete in the new markets which offshore wind development will bring to Scotland. This has involved sharing information about contracting strategy, project timescale and development and various other commercial aspects with existing local enterprises through collaboration with HIE and SE.

5.5.1.33 Most recently, this engagement included a series of supply chain engagement events in Aberdeen, Inverness and Wick, organised by HIE and SE on behalf of MORL. More than 300 local companies attended, and the events enabled MORL to put local companies in direct contact with a range of likely tier 1 suppliers and provided a forum for enabling access to other business support services provided by HIE and SE.

5.5.1.34 Through information-sharing it is intended that supply chain development can be focussed in a way which will allow local companies to participate competitively at the appropriate entry point to the supply chain.

5.5.1.35 In April 2014, MORL and Global Energy Group signed a memorandum of understanding to facilitate discussions about the use of Nigg Energy Park for assembly and fabrication activities, engineering services, and use of the port to provide onshore facilities to support the offshore activities associated with project delivery.

5.5.1.36 Consideration has also been given to the use of local ports and harbours for the long-term operations and maintenance of the facility, and it is expected that over the summer MORL will announce that other memoranda of understanding have been signed with local ports which are suitable for these purposes, including one in Aberdeenshire.

Skills Development

5.5.1.37 A related part of the effectiveness of the supply chain in Scotland will be the availability of people with the right skills. The jobs created will require a range of skills across the different phases of development, from environmental consultants, engineers, planners, welders, divers, technicians and vessel crew. There are major overlaps with the oil and gas industry.

5.5.1.38 An action plan for energy has been developed by Skills Development Scotland (Skills Development Scotland, 2011). This is being updated in 2014. It describes the main requirements for the sector and reported that the main skills gaps are in engineering (marine, structural, civil, structural and mechanical) leadership and management, project management, welders, turbine technicians and divers. The majority of these jobs require the equivalent of NVQ level 3 qualifications. It estimates that there are around 8,000 undergraduates in related subject areas along with 3,000 postgraduates, while Scotland's Colleges support around 25,000 to 30,000 learners in relevant subjects and there are about 3,000 new apprenticeship starts each year in engineering and energy related jobs.

Tourism

5.5.1.39 Tourism is an important part of the Scottish economy. The tourism sector contributes approximately £3 billion in GVA and employs over 180,000 people in over 13,000 tourism-related businesses across the country (Scottish Government, 2014). Despite difficult economic conditions and significant international competition, the industry has proved resilient and is playing an important role in supporting the economic recovery.

5.5.1.40 Using a different methodology, a recent Deloitte & Oxford economic report (Deloitte and Oxford Economics, 2013) on the 'tourism economy' estimates that, in Scotland, the sector accounted for around £11.6 billion GVA (10.3% of Scotland's GVA) and 292,000 jobs (10.9% of the workforce) in 2013.

5.5.1.41 There are several factors that differentiate tourism from other industries, which make it particularly important in relation to wind farm developments. The first is that it is often disproportionately important in rural and more remote parts of the country. It is one of a few industries that help retain population and income in these areas. The second is that many of the jobs it supports require fewer technical skills and qualifications.

5.5.1.42 Its importance to Scotland means that the tourism sector is one of a number of priority industries identified by the Scottish Government, SE and HIE. The national tourism aims are set out in "Tourism Scotland 2020" (The Scottish Tourism Alliance, 2013), which aims to grow annual overnight visitor spend to £6.5bn.

5.5.1.43 In the study area, the baseline employment data indicates that tourism is of greater importance in Moray and Highland, where the hotel and restaurant sectors comprise a higher proportion of the businesses and employment. Each of the areas has its own characteristics, but the coast is a major part of the tourism offer for Aberdeenshire in particular.

5.5.1.44 The impact of the modified TI construction and operation is an important effect to consider, particularly for the areas immediately located around the onshore substations and the modified export cable route corridor. There is no research on the potential effects of transmission infrastructure on its own; it is usually linked to the potential effects of wind farms. However, a report for the Welsh Government (Regeneris, 2014) notes that in relation to infrastructure; "*Wind farm specific studies as well as more general tourism research have found that wind farms tend to be ranked fairly low amongst the factors that could detract from tourism experience. However, electricity pylons tend to be ranked more highly than wind farms as having a negative effect on landscape value*".

5.5.1.45 The Regeneris study like several studies for VisitScotland (2012) finds that the majority of tourists are neutral about wind farms and do not expect their future visiting behaviour to be affected. The proportions reporting that they were less likely to visit as a consequence of a wind farm development are typically small.

5.5.1.46 In 2013 (the most recent data) Scotland attracted just under 15 million visitors a year of which 12 million were from within the UK (6.3 million were from within Scotland). Visitors in total spent nearly 63 million nights in Scotland and spent just over £4.6 billion (VisitScotland, 2014).

5.5.1.47 Although tourism is less important in Aberdeen and Aberdeenshire than in the Highlands overall, in particular areas – and for specific communities – it can be a major source of income and employment. The most recent tourism figures from VisitScotland for the relevant areas are shown in Table 5.5-4 (VisitScotland, 2013).

Table 5.5-4 Highland, Aberdeen & Grampian Tourism Data (2012)

		Number	Nights	Expenditure
Highland	**Overseas Visitors**	0.39m	1.43m	£116m
	Domestic (GB) Visitors	1.87m	6.84m	£393m
	Total	2.26m	8.27m	£509m
Aberdeen & Grampian	**Overseas Visitors**	0.28m	1.59m	£133m
	Domestic (GB) Visitors	1.43m	3.61m	£259m
	Total	1.71m	5.2m	£392m
Scotland	**Overseas Visitors**	2.23m	17.5m	£1,401m
	Domestic (GB) Visitors	12.75m	43.32m	£2,891m
	Total	14.98m	60.82m	£4,292m

Source: GBTS and IPS data 2012 Sourced from VisitScotland (2013b)

5.5.1.48 Domestic tourists are fairly evenly divided between English and Scottish visitors across Scotland as a whole, whereas in Aberdeen & Grampian over three-quarters of domestic visitors are from Scotland.

5.5.1.49 The strongest markets for overseas visitors to Aberdeen & Grampian are the USA (13%) with France second (11%). Overseas visitors to Scotland stay an average of 7.9 nights compared with Aberdeen and Grampian where this is 5.7. Visitors from within Great Britain stay an average of 2.5 nights in Aberdeen & Grampian compared with a total of 3.4 for Scotland.

Tourism characteristics of the Immediate Study Area

5.5.1.50 The following descriptions are adapted from VisitScotland and the Banffshire Coast Tourism Partnership (2014).

5.5.1.51 The north of Aberdeenshire combines fishing towns, villages and beaches on the coast while inland the main attractions are castles and distilleries.

5.5.1.52 The modified offshore export cable will come ashore at Inverboyndie (Boyndie Bay) which lies between Banff and Whitehills. Inverboyndie is a Blue Flag beach and recommended by the Marine Conservation Society. It is described by VisitScotland as a popular beach which attracts walkers, swimmers, surfers and windsurfers. Behind the beach is the Banff Links Caravan Park which has 38 touring stances with electricity, 20 stances for tents or touring caravans and an on-site shop.

5.5.1.53 The coast from Whitehills to Melrose the other side of Banff and Macduff is listed as a Site of Special Scientific Interest (SSSI). Whitehills has a redeveloped, village-owned marina with 47 berths. It holds an annual regatta. It also offers a number of walks, one of which connects the town to nearby Banff along the foreshore – a site of special scientific interest.

5.5.1.54 Banff is a Georgian town which attracted Robert Burns in the 1700s. Highlights include Banff Castle and Duff House (home to a permanent collection of art from the National Galleries of Scotland). It is possible to take a guided tour around Banff which takes in many architectural highlights, and the town's old harbour has recently been developed as a marina. There is an annual arts festival held in Banff in May and several walks nearby.

5.5.1.55 West of Banff lies Macduff, where commercial fishing vessels continue to come in and out of port and land their catch on the quayside. There is always a significant amount of activity at the local shipyard, where boats undergo construction or repair on the slipway. The town is also home to the award-winning Macduff Marine Aquarium. Further east of Macduff, lie Gardenstown, Crovie and Pennan – three picturesque villages – and the nearby RSPB bird reserve at Troup Head. Seabird City at Troup Head, is home to tens of thousands of birds – gannets, puffins, shags, kittiwakes, guillemots and razorbills.

5.5.1.56 Further inland and just south of the modified onshore export cable route corridor is Turriff, home to one of Scotland's best-known annual agricultural shows attended by up to 40,000 people. Just a few miles outside of Turriff lies Delgatie Castle.

5.5.1.57 Portsoy, west of Inverboyndie, stages the annual Aberdeen Asset Management Scottish Traditional Boat Festival, which attracts up to 16,000 people each year – one of the region's biggest events. Nearby there is Glenglassaugh Distillery as well as Findlater Castle.

Dolphin tourism

5.5.1.58 According to the Banffshire Coast Tourism Partnership Programme, the Moray Firth is home to a population of around 130 bottlenose dolphins which is a draw for UK and international tourists. There are around ten identified popular viewing points to see the dolphins, one of which is located at Inverboyndie Beach in Boyndie Bay, where the modified TI will come onland. Sixteen different species of cetaceans – whales, dolphins and porpoises – and other marine life have been recorded in the stretch of water.

5.5.1.59 In 2010, The Moray Firth Partnership commissioned Aberdeen Centre for Environmental Sustainability (ACES) to undertake a study to Value the Tourism Expenditure related to the East of Scotland Bottlenose Dolphin Population (Aberdeen Centre for Environmental Sustainability, 2010). The study estimated that the total direct expenditures related to the bottlenose dolphin population was at least £10.4 million, but around a third would potentially be spent elsewhere in Scotland even in the absence of opportunities to see these dolphins. It estimates that the additional tourism expenditure that depends on the presence of the east of Scotland bottlenose dolphin population was at least £4 million, supporting approximately 202 Full Time Equivalent (FTE) jobs. The study found 33% considered seeing dolphins as the main reason for their visit. Estimates were based on a 526 person survey of visitors to recognised dolphin viewing locations and centres around principally the Moray Firth. The bulk of dolphin tourist expenditure is received by general tourist providers around the Moray Firth region, particularly Highland (61%) and Moray (14%).

5.5.1.60 There are approximately 12 dolphin and wildlife watching boats and cruises operating around the Moray Firth, some of which sail from Banff, Macduff and Buckie. The tours allow tourists to get close enough to the dolphins – albeit at a safe distance – to take photographs. Visits to see the marine life along the Banffshire coast are often accompanied by the WDCS Wildlife Centre in Spey Bay and the Macduff Marine Aquarium.

Sailing

5.5.1.61 Data on recreational craft use was collected as part of the Shipping and Navigation Assessment and the types of risks that relate to recreational use are considered in more detail in Chapter 5.2: Shipping and Navigation.

Surfing

5.5.1.62 There are a number of sites on the south side of the Moray coast. Marine Scotland (Marine Scotland, 2011) reports a quote from Surfers Against Sewage that "surfing is popular on the south side of the Moray Firth". The beach at Inverboyndie is described by the website 'Welcome to Scotland' as "one of the best surfing spots on the north east coast". There are also surfing beaches further east at Fraserburgh and to the west at Lossiemouth. There are no estimates of the number of surfers throughout the year, although Inverboyndie is one of the most popular.

Walking and Cycling

5.5.1.63 The Banffshire Coast Tourism Partnership identifies over 30 walking routes along the Banffshire coast. There is no data on the number of people walking these routes. The walks that cross or come to close proximity of the modified onshore export cable corridor are the coastal walk from Banff to Whitehills. Away from the coast, there is a popular circular route which takes in the grounds of Duff House, the River Deveron and the Bridge of Alvah. There are more coastal walks to the west, around Cullen and east from Gardenstown, Crovie and Pennan, but these are further away from the modified cable corridor. In addition to the walking routes, six cycling routes are described by the Banffshire Coast Tourism Partnership. Of these the route along the coastal path and a circular route from Fyvie to Turriff via Cuminestown will cross the modified cable corridor.

Legislation and Planning Framework

5.5.1.64 There are no specific statutory guidelines for the assessment of socio-economic impacts, or in any other statutory or advisory guidance on the preparation of EIAs. The methodology here is the same as was used for the MORL ES (MORL, 2012) which was accepted in support of the consented wind farms and OfTI to Fraserburgh.

5.5.1.65 The concept of economic benefit is explicitly confirmed in the draft consolidated Scottish Planning Policy (2014). This fits with the priority of the Scottish Government to grow the Scottish economy and, more particularly, with the published policy statement "Securing a Renewable Future: Scotland's Renewable Energy". The development would also qualify as a National Project under the proposed NPF3.

5.5.1.66 The Scottish Planning Policy Consultation Draft (2014) considers that the planning system should "attach significant weight to economic benefit of proposed development as a material consideration, particularly the creation of new jobs, recognising and responding to economic and financial conditions" (paragraph 17).

5.5.1.67 The methodology used here draws on good practice guidance for assessing economic impact published by agencies including HM Treasury Green Book, English Partnerships (now the Homes and Communities Agency) Additionality Guide (2008) and Scottish Enterprise's Additionality & Economic Impact Assessment Guidance Note (2008).

5.5.1.68 The economic element of this assessment focuses on the scale of employment that would be associated or supported by the MORL Modified TI. This does not take into account any loss of employment or economic activity that may occur elsewhere as a result of, for example changes in the electricity market.

5.5.1.69 The scope of the economic element of the assessment is to estimate the significance of the employment and GVA that would be associated with the expenditure made in relation to the construction, operation and decommissioning of the modified TI investment. This is subsequently referred to as the economic impact.

5.5.2 Impact Assessment

Summary of Effects and Mitigation

5.5.2.1 The socio-economic effect of the modified TI is limited to the construction, operation and decommissioning of the:

- Supply and installation of 2 Offshore Substation Platforms (OSPs);
- Supply and installation of offshore export cables; and
- Supply and installation of onshore cables and substations.

5.5.2.2 The total number of jobs supported at its peak in the study area is anticipated to be between 40 and 220 and, in Scotland, between 160 and 250 during construction. This employment is relatively short term lasting up to five years.

5.5.2.3 While both the Base Case and High Case results are shown for employment and GVA, the assessment is undertaken using the Base Case results, given their higher degree of certainty than those associated with the High Case.

5.5.2.4 During construction the employment and GVA effects are considered to be **major positive**, while there is a **minor negative effect** on tourism and recreational walking as a result of the temporary construction close to the shore at Inverboyndie.

5.5.2.5 During operation the effects on employment and GVA are considered to be **minor positive** while the other effects are **negligible**. During decommissioning the effects are the same as for construction.

Proposed Mitigation Measures and Residual Effects

5.5.2.6 As there are no significant negative effects identified in the assessment, there are no mitigation measures and the residual effects are as the assessment conclusions. Table 5.5-5 below summarises the impact assessment.

Table 5.5-5 Impact Assessment Summary

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Construction				
GVA	Businesses	Major (+)	None	Major (+)
Employment	Residents/businesses	Major (+)	None	Major (+)
Leisure Tourism	Visitors/businesses	Minor	None	Minor
Business Tourism	Visitors/businesses	Negligible	None	Negligible
Walking	Residents/visitors	Minor	None	Minor
Surfing & Sea Kayaking	Residents/visitors	Negligible	None	Negligible
Operations				

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
GVA	Businesses	Minor (+)	None	Minor (+)
Employment	Residents/businesses	Minor (+)	None	Minor (+)
Leisure Tourism	Visitors/businesses	Negligible	None	Negligible
Business Tourism	Visitors/businesses	Negligible	None	Negligible
Walking	Residents/visitors	Minor	None	Minor
Surfing & Sea Kayaking	Residents/visitors	Negligible	None	Negligible
Decommissioning				
GVA	Businesses	Minor (+)	None	Minor (+)
Employment	Residents/businesses	Minor (+)	None	Minor (+)
Leisure Tourism	Visitors/businesses	Negligible	None	Negligible
Business Tourism	Visitors/businesses	Negligible	None	Negligible
Walking	Residents/visitors	Minor	None	Minor
Surfing & Sea Kayaking	Residents/visitors	Negligible	None	Negligible

Introduction to Impact Assessment

5.5.2.7 This section provides details of the methodology used to estimate the significance of effects that the modified TI will have on the economies that make up the study area (Aberdeen, Aberdeenshire, Moray and Highlands) and on Scotland as a whole.

5.5.2.8 It is not possible or appropriate for this analysis to provide an indication of who the successful contractors might be or where they might be based. The assessment should be considered as indicative of the pattern of expenditure anticipated, but may not reflect the actual procurement decisions when they are made.

5.5.2.9 It represents the "best estimates", at this time, of the ranges of expenditure and employment that could be supported. This chapter is presented in two parts covering:

- The approach to assessing the effect of project expenditure; and
- The approach to assessing the effect on tourism and recreation.

5.5.2.10 Recreation includes the effects on surfing, sea kayaking and walking. There are also potential recreational aspects related to fishing and sailing. The effects on fish and fishing are fully discussed in Chapter 4.2: Fish and Shellfish Ecology and Chapter 5.1: Commercial Fisheries. Recreational sailing is discussed in Chapter 5.2: Shipping and Navigation.

5.5.2.11 The modified TI elements considered in this assessment are:

- Supply and installation of 2 OSPs;
- Supply and installation of offshore export cables; and
- Supply and installation of onshore cables and substations.

5.5.2.12 This chapter contains relevant information on the modified TI to allow Aberdeenshire Council and Marine Scotland to make decisions on the applications for consent.

5.5.2.13 The Socio-Economics, Recreation and Tourism assessment interacts with assessments for the following receptors and where relevant linkages have been made within the assessment:

- Chapters 3.1: Hydrodynamics Sedimentary and Coastal Processes;
- Chapters 4.3: Marine Mammals;
- Chapters 5.1: Commercial Fisheries;
- Chapters 5.2: Shipping and Navigation; and
- Chapters 5.3: Seascape, Landscape and Visual Assessment.

Rochdale Envelope Parameters Considered in the Assessment

5.5.2.14 Relevant parameters defining the 'Rochdale Envelope' for Socio-Economics, Recreation and Tourism are presented in Table 5.5-6 below. The maximum foreseeable adverse scenario for Socio-Economics relates to the minimum predicted expenditure in transmission infrastructure to export energy from the three consented windfarms. Therefore these parameters are based on an indicative layout and outputs from financial models carried out by MORL which are available at the time of writing this assessment.

5.5.2.15 Tourism impacts relate to the maximum predicted seascape, landscape and visual effect and for recreation the maximum number of structures / longest modified export cable route option.

Table 5.5-6 Rochdale Envelope Parameters Relevant to the Socio-Economics, Recreation and Tourism Impact Assessment

Potential Effect	Rochdale Envelope Scenario Assessed
Construction, Operation & Decommissioning	
Employment and GVA	For employment and GVA impacts, uses the minimum predicted expenditure, in the local area and Scotland, to transport energy from the three consented wind farms. This provides the minimum jobs and GVA supported in these areas: • Maximum of 2 OSPs; • Two onshore substations with the following dimensions (280 m x 180 m and 290 m x 170 m by 12.5 m high); • Screening to be agreed; • Both unmanned; • Modified offshore export cable route corridor of 52 km from the three consented wind farms to landing; • Cable Trench width 4 m; • Target depth 1 m; • Maximum working width 60 m; and • Inverboyndie (length from shore to onshore substations at New Deer) 33 km.
Tourism and Recreation	For tourism and recreation uses, maximum predicted seascape, landscape and visual effect/maximum number of substructures/longest modified export cable route options.

EIA Methodology

5.5.2.16 The methodology adopted is the same as outlined in the MORL ES (2012) (Section 8.6.5 of Chapter 8.6: Socio-Economics, Recreation and Tourism). This includes the description of the scope and limitations of the analysis.

Assessment of Significance Criteria

5.5.2.17 The assessment combines conclusions on sensitivity and magnitude to produce an overall significance as shown in Table 5.1-7. For the purposes of this assessment a moderate effect or above is regarded as significant in EIA terms.

Significance Criteria

5.5.2.18 The assessment of significance is based on combining the degree of sensitivity of the receptor (i.e. the economy) with the magnitude of the predicted effects (scale and duration). These effects can be characterised as positive, negative or neutral.

Sensitivity of Receptor

5.5.2.19 This criterion considers how sensitive receptors are to changes. Sensitivity is defined using professional judgement based on the overview of the economy, for example, the levels of unemployment, skills and business capacity.

Magnitude of Effect

5.5.2.20 The magnitude of the effect within the study area will depend on a number of factors, primarily the scale and duration of effects. In some cases the effect is assessed directly from the estimates of the number of jobs and the value of GVA that would be supported by the project's expenditure. The duration relates to the length of time that the effect will last.

To determine an overall assessment as to whether the magnitude of effect is negligible, low, medium or high, the scale and duration of effect are considered together.

There is no specific number or guidance that defines whether the magnitude is negligible, low, medium or high and the conclusion is a professional judgement.

Table 5.5-7 Matrix of Significance Effect

		Magnitude			
Sensitivity		**Negligible**	**Low**	**Medium**	**High**
	Low	Negligible	Minor	Minor	Moderate
	Medium	Negligible	Minor	Moderate	Major
	High	Negligible	Moderate	Major	Major

Impact Assessment

5.5.2.21 Although the employment and GVA associated with the expenditure of the OSPs are included here, the visual effects of the OSPs are considered by the Seascape, Landscape and Visual Impact Assessment (SLVIA) (see Chapter 5.3) and are considered to be inseparable from the three consented wind farms. Therefore they are not included as part of the modified TI assessment for tourism and recreation.

5.5.2.22 In order to assess the employment and GVA that could be generated in Scotland and in the Study Area, estimates of expenditure were made by MORL, based on the best knowledge to date of the likely expenditure on each of the components of the modified TI investment. Given the uncertainties involved, this was done under two scenarios:

- Base Case - the total value of contracts that have been delivered, or are expected to be delivered, from within each geography, assuming the current supply chain.
- High Case – the total value of contracts that could be secured by firms based in Scotland (and the study area) with a stronger supply chain. This assumes that where Scottish-based firms are not currently in a position to tender for work, (but there is good reason to expect them to be in the future), they are successful.

5.5.2.23 Despite Base Case and High Case results being shown for employment and GVA, the assessment is undertaken using Base Case results given the higher degree of uncertainty associated with the High Case.

Displacement, Leakage and Multipliers

5.5.2.24 Displacement occurs where the new or supported economic activity created is at the expense of economic activity somewhere else. For example, if the new jobs and GVA created by constructing the modified TI were to reduce employment and GVA in other businesses at a local level, the economic activities supported through the investment are likely to be new and additional. The potential for displacement to result from supply bottlenecks, for example where several projects are developed at the same time, is considered in the Cumulative Impacts section.

5.5.2.25 Leakage occurs when the benefits of the investment do not accrue within the study area. For example where the investment supports jobs elsewhere. The analysis has been careful to use information from MORL about their expenditure with specific business *sites* from where goods and services would be delivered and not simply the companies that they may use. This means that the local employment and GVA should occur at these sites and should therefore exclude any leakage.

5.5.2.26 In addition to the direct employment effects, it is also important to consider the **indirect** and **induced** multiplier effects that the development investment will generate.

- Indirect effects – as suppliers increase output to meet the additional demand for their goods and services, there will also be a resultant increase in demand on their own suppliers and so on down the supply chain.
- Induced effects – as a result of the direct and indirect effects, household incomes will increase in line with the increased employment created by the development directly and throughout the supply chain. A proportion of this increased income will be re-spent on other goods and services creating employment.

5.5.2.27 Both the employment and GVA estimates include multiplier effects. The Scottish Input-Output Tables (Scottish Government) have been used to produce ratios of turnover to GVA for the different industries that would be likely to be contracted to carry out this work. Details of the calculations and the multipliers used are set out in the MORL ES (2012) (Section 8.6.6 Socioeconomics, Recreation and Tourism).

5.5.2.28 The assessment does not include land lease payments or compensation that may be made to landowners.

Construction

Employment Effects during Construction of Modified TI

5.5.2.29 The employment effects relate to the jobs associated with the expenditure on the three elements of the modified TI described. Employment will be supported through the supply and installation of OSPs, offshore and onshore export cables and onshore substations.

5.5.2.30 Table 5.1-8 below summarises the projected employment associated with the modified TI expenditure. For the study area, under the Base Case, the total number of job years is anticipated to be around 140, and 790 under the High Case. For Scotland as a whole this is from 560 to 920. Under the Base case, while a proportion of the substation work is expected to come from within Scotland, other installation activities are expected to be sourced from either the rest of the UK or overseas.

Table 5.5-8 Employment Effects in Job Years for Modified Transmission Infrastructure

	Study Area			Scotland		
	Direct	Indirect + induced	Total	Direct	Indirect + induced	Total
Base Case	90	50	140	310	240	560
High Case	510	280	790	580	340	920

5.5.2.31 Employment in relation to the supply and installation of the modified TI lasts only through the construction period, although it is substantial. Table 5.1-9 shows the peak employment under each of the scenarios.

5.5.2.32 In the peak year, including the multiplier (indirect and induced effects), under the Base Case, there are estimated to be around 40 jobs from within the local study area rising to 218 under the High Case. In Scotland (including the study area) the Base Case supports around 162 jobs and the High Case 251.

Table 5.5-9 Employment Effect Summary during Construction of Modified TI

		Construction Phase (Peak Employment in 2018)		
		Direct	Indirect + induced	Total
Study Area	**Base Case**	26	14	40
	High Case	140	78	218
Scotland (Including Study Area)	**Base Case**	90	72	162
	High Case	158	93	251

Sensitivity

5.5.2.33 Employment is a core measure of socio-economic activity, reflected in the importance attached to rates of employment and unemployment. Levels of unemployment and the availability of employment opportunities are very important for the economic health of communities, the Study Area and Scotland. Changes in employment are therefore considered to be of high sensitivity.

Magnitude

5.5.2.34 Within the study area the assessment suggests that employment associated with the modified TI, under the Base Case, is more short term than that supported by the operation of the wind farms. The employment effects from construction last only until 2021. Even so, there is the potential for a relatively large number of jobs to be supported depending on the contracts that are secured by businesses in Scotland.

5.5.2.35 At both the level of the Study Area and in Scotland, these levels of employment in the Base Case are considered to be of medium magnitude.

Significance

5.5.2.36 Combining the sensitivity and magnitude assessments, the employment associated with the modified TI in the Base Case is considered a **major positive** effect and is therefore significant in terms of the EIA.

GVA Effects during Construction of Modified TI

5.5.2.37 Table 5.1-10 provides a summary of the GVA effects for the Study Area, Scotland and the rest of the UK under the Base and High Cases. For the study area, it is estimated that the modified TI will generate £15 million in GVA under the Base Case and £71 million under the High Case, including the multiplier effects.

5.5.2.38 In Scotland the modified TI would generate GVA of between £56 million and £81 million, including the multiplier effects. The difference reflects the potential levels of local and national supply.

Table 5.5-10 GVA Effects in £ Millions (2014 prices) during Construction of Modified TI

	Study Area			Scotland		
	Direct	Indirect + Induced	Total	Direct	Indirect + Induced	Total
Base Case	10	5	15	33	23	56
High Case	48	23	71	53	28	81

Sensitivity

5.5.2.39 GVA represents the difference between the value of goods and services produced and the cost of raw materials, from which is paid wages, salaries and profits. It is therefore a core measure of economic wealth. Wages, salaries and income are all important elements in determining quality of life for residents in the study area and in Scotland. Sensitivity to changes in GVA is therefore considered to be high.

Magnitude

5.5.2.40 The magnitude of the GVA generated by the modified TI in the Base Case, both at the Study Area level and in Scotland, is judged to be medium. The figure of £15 million is signficant although a relatively small proportion of the overall GVA for the local area.

Significance

5.5.2.41 Combining the sensitivity and magnitude assessments, the GVA effect associated with the expenditure on construction of the modified TI in the Base Case is considered to be of **major positive** significance, and therefore significant in terms of the EIA.

Leisure Tourism during Construction of Modified TI

5.5.2.42 The tourism element of the analysis considers the effect of the modified TI on the volume and value of tourists visiting the study area and Scotland. The assessment excludes any visual impacts from the OSPs which were considered by the Seascape, Landscape and Visual Impact Assessment (SLVIA) to be inseparable from the three consented wind farms (see Chapter 5.3 Seascape, Landscape & Visual Assessment). Therefore they are also not included as part of the modified TI assessment for tourism and recreation.

5.5.2.43 The analysis distinguishes between two types of effect:

- **Direct effects** on local tourism 'assets' (e.g. physical changes to public rights of way, paths, scenic areas and so on) which the new development may cause. This could include factors such as closure or diversion of access to tourism assets or the removal of those assets.
- **Indirect effects** on local tourism assets. In this case, indirect effects mainly relate to changes in amenity through the permanent or temporary modification of land and seascapes. There could also be effects as a result of any disturbance or injury to terrestrial, coastal or marine wildlife interests (e.g. for wildlife watching) during construction, operation or decommissioning of the modified TI.

5.5.2.44 There is potential for the export cable laying activity offshore, and onshore, to limit access to the sea and/or areas of land during construction. While the impacts of the cable laying will be temporary (lasting only during the construction phase), the onshore substations will be permanent, or at least for the lifetime of the project.

5.5.2.45 A full assessment of the visual effects of the modified TI on seascape, landscape and visual receptors is provided in Chapter 5.3: Seascape, Landscape and Visual Assessment of this ES, and this has not been considered as part of the tourism assessment.

5.5.2.46 The main strengths of the tourism offer on the Banffshire coast and North Aberdeenshire are its unspoilt environment, wildlife, the coast, castles, walking, cycling and whisky. The construction of the modified offshore and onshore export cable route will not cause permanent changes to these assets but some temporary disruption for visitors. These are likely to be direct effects, limiting access to parts of the beach, and close to the shore while cables are laid. There will require to be diversions for walking routes, and noise from the construction work itself. These temporary effects are likely to impact on beach users, those staying nearby and users of the Whitehills marina. The number of people this will affect depends on the time of year the work will be done.

5.5.2.47 The onshore substations are permanent constructions, however their location and screening will mean that their effect on tourism will be very limited.

5.5.2.48 The marine mammal assessment states that no significant long term effects are predicted on the Moray Firth bottlenose dolphin population from the construction of the modified TI (Chapter 4.3: Marine Mammals of this ES) and therefore no significant effects are predicted on dolphin tourism.

5.5.2.49 Tourist sensitivity will be low when laying the cable further offshore. Nearer to the shore, construction will have a temporary impact on tourists visiting the coast, walking, staying in the caravan park or using the beach and marina. Sensitivity of tourists to the construction is considered to be medium.

5.5.2.50 The magnitude of the effect (which takes into account the level of effect, its duration and the number of people that are affected) relative to the study area is likely to be low as the effects will be temporary and the number of tourists affected small, relative to the overall tourism numbers in the study area as a whole. Together this indicates **minor** significance.

Business Tourism during Construction of Modified TI

5.5.2.51 The construction of the modified TI will generate some new trade for tourism related businesses locally. This would include accommodation, bar and restaurant services. The level of business tourism activity locally will be sensitive to the business that this would create, although the magnitude of the effect is considered to be negligible. This indicates **negligible** significance.

5.5.2.52 A summary of the effects on tourism during construction of the modified TI is shown in Table 5.5-11.

Table 5.5-11 Tourism Effect Significance during Construction of Modified TI

	Sensitivity	**Magnitude**	**Significance**
Leisure Tourism	Medium	Low	Minor
Business Tourism	Medium	Negligible	Negligible

Walking during Construction

5.5.2.53 The proposed route crosses the coastal walk between Whitehills and Banff and access may be limited for a short period during the export cable laying. The route will be used mainly by local day visitors along with tourists in the summer. Inland the construction of the substations will cause some disruption around New Deer, although it does not affect the Formatine and Buchan long distance routes which pass through Maud.

5.5.2.54 Sensitivity to the construction phase is medium for walkers using the coastal route, but the temporary nature of the work means that the magnitude is low and the significance is considered to be **minor**.

Surfing and Sea Kayaking during Construction

5.5.2.55 For surfers, the surfing wave quality is critical to the attraction of a location. The landfall point near a surf spot could interfere with the waves and installation of the export cables could restrict access. Sea kayaking, like surfing, also requires access and appropriate sea conditions. Any effect would be at Inverboyndie beach where the export cable comes ashore, but would be a temporary effect. The sensitivity of surfers and other recreational sea users during construction would be medium, but the magnitude of the effect would be negligible given the short duration and relatively small number participating. Combining the sensitivity and magnitude assessments, the recreation effect associated with the modified TI is considered to be **negligible**.

5.5.2.56 A summary of the recreation effects during construction of modified TI are shown in Table 5.5-12 below.

Table 5.5-12 Tourism Effect Significance during Construction of Modified TI

	Sensitivity	Magnitude	Significance
Walking	Medium	Low	Minor
Surfing, Sea Kayaking	Medium	Negligible	Negligible

Operation

Employment Effects during Modified TI Operation

5.5.2.57 The employment effects relate to the jobs associated with the operations and maintenance of the modified TI, and the operation of the onshore substations. There is no separate expenditure data on the costs of operating the modifed TI, which is essentially its maintenance and security. This is likely to support a small amount of employment as part of a maintenance and security contract. There is therefore considered to be **minor positive** significance for both employment.

5.5.2.58 The effect on GVA during operation is similar to employment. Although there is no separate expenditure data available for the maintenance and security of the modified TI once in operation, it is likely that there will be contracts tendered for provision of these services which will support GVA, although this will be low relative to the expenditure and GVA associated with construction. There is therefore considered to be **minor positive** significance for GVA under the Base Case.

Tourism Effects during modified TI Operation

5.5.2.59 The tourism element of the analysis considers the effect of the modified TI on the volume and value of tourists visiting the study area and Scotland.

5.5.2.60 Once in operation the landing point at Inverboyndie will be returned to its previous condition, where reasonably practicable, and the onshore export cables will be buried. The only element of the modified TI that could have an effect on tourism will be the onshore substations. The onshore substations are not located in an area that attracts significant numbers of tourists and therefore it is not considered that it will have an effect on the number of tourists in the study area. During operation the export cables will be buried and therefore have no effect on leisure tourism. The effect is assessed as being of **negligible** significance.

Business Tourism Effects during Modified TI Operation

5.5.2.61 During operation there is not expected to be any related business tourism associated with the modified TI. The significance of the effect during operation would be **negligible**. A summary of the tourism effects during operation are shown in Table 5.5-13.

Table 5.5-13 Tourism Effect Significance during Modified TI Operation

	Sensitivity	Magnitude	Significance
Leisure Tourism	Medium	Negligible	Negligible
Business Tourism	Medium	Negligible	Negligible

Walking

5.5.2.62 A direct effect on walking would occur where the modified TI would limit access or use of paths. During operation, the export cables will be buried and have no effect on access to walking routes. The onshore substations are not located where they would impact on recreational walking routes and the magnitude of the effect would be low. This indicates a **minor** significance.

Surfing & Sea Kayaking

5.5.2.63 During operation, the offshore export cables would be buried and would have no significant effect on waves (see Chapter 3.1: Hydrodynamics, Sedimentary and Coastal Processes) and surfing activity. The effect is considered to be **negligible**.

5.5.2.64 A summary of the recreation effects is shown in Table 5.5-14.

Table 5.5-14 Recreation Effect Summary during Operation of Modified TI

	Sensitivity	Magnitude	Significance
Walking	Medium	Low	Minor
Surfing, Sea Kayaking	Medium	Negligible	Negligible

Decommissioning

Employment and GVA Effects during Modified TI Decommissioning

5.5.2.65 The employment effects relate to the jobs associated with the decommissioning of the modified TI. There are no separate estimates of the employment of this part of the decommissioning work which would take place alongside the decommissioning of the three consented wind farms. The estimate for the full decommissioning is included in the wind farms impact assessment described in the MORL ES (2012) (Chapter 8.6: Socio-Economics, Recreation and Tourism). However, it should be noted that, although not quantified, a small proportion of these jobs could be attributed to the modified TI, and therefore this is considered to be of **minor positive** significance for both employment and GVA under the Base case.

Tourism Effects during Modified TI Decommissioning

5.5.2.66 As was covered in the construction phase, the tourism element of the analysis considers the effect of the modified TI decommissioning on the level of tourists visiting the study area and Scotland. As was identified in the construction phase there is the potential for the removal of the onshore export cables and substations to limit access to the areas of land (and sea shore).

5.5.2.67 There is likely to be temporary disruption to access to part of the seashore, coastal path and potentially some limitations to boat use. However the temporary nature of the work and the relatively small number of tourists means that the magnitude is considered to be negligible. Combined, significance is considered to be **negligible**.

Business Tourism during Modified TI Decommissioning

5.5.2.68 During decommissioning any related business tourism associated with the modified TI would be expected to be limited. The significance of the effect during decommissioning would be negligible. A summary of the tourism effects during operation are shown in Table 5.5-15.

Table 5.5-15 Tourism Effect Significance during Modified TI Decommissioning

	Sensitivity	**Magnitude**	**Significance**
Leisure Tourism	Medium	Negligible	Negligible
Business Tourism	Medium	Negligible	Negligible

Walking

5.5.2.69 A direct effect on walking would occur where the decommissioning of the modified TI would limit access or use of paths. As described for the construction phase, the modified onshore export cable route would cross the coastal path between Whitehills and Banff and the decommissioning work could directly prevent users from accessing parts of the route temporarily. For users, or potential users of the walk, sensitivity to this work would be medium. The effect would be temporary and require some diversions for users. The magnitude of the effect would therefore be low. Taken together this indicates a **minor** significance.

Surfing & Sea Kayaking

5.5.2.70 The modified export cable route will come ashore at Inverboyndie and decommissioning, although temporary, would impact on access for a short time, and only on part of the beach. The magnitude of the effect will depend on how quickly the work can be completed, the time of year and how much access to the beach is restricted. Sea kayaking, like surfing, also requires access and appropriate sea conditions which could be disrupted temporarily.

5.5.2.71 Sensitivity to the modified TI decommissioning is considered to be medium. The magnitude of the effect relates to its scale, its duration and the number of people affected. In this case although the beach is well used, the impacts will be for a short time. For both surfing and sea-kayaking, the temporary nature of the work and the small proportion of the population in the study area that would be affected indicate that the magnitude would be negligible.

5.5.2.72 Combining the sensitivity and magnitude assessments, the recreation effect associated with the modified TI is considered to be **negligible** and not significant in terms of the EIA.

5.5.2.73 A summary of the recreation effects during decommissioning of the modified TI are shown in Table 5.5-16.

Table 5.5-16 Recreation Effect Summary during Decommissioning of Modified TI

	Sensitivity	Magnitude	Significance
Walking	Medium	Low	Minor
Surfing, Sea Kayaking	Medium	Negligible	Negligible

Proposed Monitoring and Mitigation

5.5.2.74 From the assessment above there are no negative effects of moderate or greater significance and therefore no significant adverse effects have been identified. Accordingly, no mitigation is required.

5.5.3 Cumulative Impact Assessment

Summary

5.5.3.1 This section presents the results of assessment of potential cumulative Socio-economic effects arising from the modified TI in conjunction with other existing or reasonably foreseeable marine coastal and onshore developments and activities. MORL's approach to the assessment of cumulative effects is described in Chapter 1.3: Environmental Impact Assessment.

5.5.3.2 The developments and activities considered in detail within this assessment are listed below.

- MORL three consented wind farms;
- MORL Western Development Area (WDA);
- BOWL wind farm and TI; and
- SHE – T reinforcement (cable from Caithness to Blackhillock, coming onshore at Portgordon).

5.5.3.3 In relation to the employment and GVA cumulative effects, the timing of expenditure and the supply chain are important. If the development of the modified TI coincides with other demands for similar resources, it could lead to supply bottlenecks with more elements of the development being contracted from outside Scotland.

5.5.3.4 In the case of the modified TI, the supply chain is fairly specialised. There are not likely to be supply constraints caused by work on the main elements of the wind farm construction. The Base Case assumes a relatively small proportion of the TI construction would be sourced locally so this should not be constrained further by supply.

5.5.3.5 Considered cumulatively with the other TI construction (Beatrice Offshore Wind Farm (BOWL) TI and SHE-T) there may be slightly more chance of supply constraints as these projects require many of the same resources. Any effect is unlikely to be significantly large to change the conclusions for the modified TI. Cumulatively the significance for GVA and employment therefore remains **major positive** during construction and **minor positive** during operation.

5.5.3.6 For tourism, the projects considered in the assessment of cumulative effects include the three consented MORL wind farms and BOWL and the MORL Western Development Area (WDA). Given the distance between the wind farm sites and visible TI aspects there are no additional or exacerbated visual effects likely to impact on tourism (Chapter 5.3: Seascape, Landscape and Visual Assessment) and so these are not considered.

5.5.3.7 However, there may be some cumulative effects when considering the modified export cable construction together with the BOWL TI and SHE-T reinforcement. These would disrupt access to the beaches, the near shore and coastal paths. Together this would impact on the tourism experience. Although there is scope for slightly more disruption if the projects proceeded together, they would still be short term and the number of tourists affected would be small in the context of tourism in the study area.

5.5.3.8 The onshore substations for the modified TI will be approximately 30 miles from the substation at Blackhillock where the BOWL cable and SHE-T reinforcement meet and there will be no significant cumulative effect for the modified MORL TI. As a result, the cumulative significance on tourism remains **minor** during construction and **negligible** once in operation

5.5.3.9 For recreation, the wind farms are considered to be too distant to have any impact on recreation on the south side of the Moray Firth and so will have no cumulative impact associated with the modified TI. However, there may be some cumulative effects when considering the export cable construction together with the BOWL TI and SHE-T reinforcement, which would either exacerbate or extend the periods of disruption.

5.5.3.10 This would exacerbate disruption in access to the beaches, near shore and coastal path, affecting the use of the beaches for surfing, sea kayaking and for walking. For a short period of time the cumulative effect would be to further limit the options for recreation for residents and visitors. It is arguable whether the work on the three cables (MORL modified TI, BOWL TI and SHE-T) would be better taking place simultaneously, or separately.

5.5.3.11 Together there is scope for more disruption if the projects proceeded together, however, this would still be short term and the number of tourists affected would be small in the context of tourism in the study area. As a result the cumulative significance on recreation remains **minor** during construction and **negligible** once in operation.

5.5.3.12 Table 5.5.17 sets out the key projects and the cumulative impacts.

Table 5.5-17 Cumulative Impact Summary

Effect/Receptor	Residual Significance Level for Modified TI	Whole Project Assessment: Modified TI + Stevenson, Telford and MacColl Wind Farms	Mitigation Method
Construction			
Employment	*Major (+)*	*Major (+)*	None
Total Cumulative Impact Assessment	Effect remains major positive as development generates new employment. Capacity constraints from cumulative effects are unlikely to significantly change level of use of anticipated Scottish supply.		
GVA	*Major (+)*	*Major (+)*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	Effect remains major positive as development generates new GVA. Capacity constraints from cumulative effects are unlikely to significantly change level of use of anticipated Scottish supply.		
Leisure Tourism	*Minor*	*Minor*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	Cumulatively with the construction of the BOWL export cable route there could be slightly greater limitations, temporarily, on access to the coast. And this could cause additional disruption for tourists. However, this would not be sufficient to change the assessment of significance.		
Business Tourism	*Negligible*	*Negligible*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	Considered together with the other projects, the modified TI will not contribute to any changes in business tourism or availability of services e.g. accommodation.		
Walking	*Minor*	*Minor*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	The BOWL TI is situated 15 miles further west (onshore distance) and together with the MORL modified TI may cause additional temporary disruption on the coastal paths, but the significance will remain minor.		
Surfing, Sea Kayaking	*Negligible*	*Negligible*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	*The cumulative effects would be most likely if the BOWL TI was developed at the same time. This could reduce options for sea-based recreation slightly, but the temporary nature of both projects and the relatively low number affected indicates that the significance would remain negligible.*		
Operation			
Employment	*Minor (+)*	*Minor (+)*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	During operation there will be no supply chain issues as a result of considering the projects cumulatively and the significance remains minor positive.		
GVA	*Minor (+)*	*Minor (+)*	None

Effect/Receptor	Residual Significance Level for Modified TI	Whole Project Assessment: Modified TI + Stevenson, Telford and MacColl Wind Farms	Mitigation Method
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	During operation there will be no supply chain issues as a result of considering the projects cumulatively and the significance remains minor positive.		
Leisure tourism	*Negligible*	*Negligible*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	Once operating the only potential impact would be through the presence of the substations. There are no additional cumulative effects.		
Business tourism	*Negligible*	*Negligible*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	Effects are negligible and will not impact on supply of tourism facilities such as accommodation.		
Walking	*Minor*	*Minor*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	Once operating there are no additional cumulative effects.		
Surfing, Sea Kayaking	*Negligible*	*Negligible*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	Once operating there are no additional cumulative effects.		
Decommissioning			
Employment	*Minor (+)*	*Minor (+)*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	Significance remains minor positive. Capacity constraints from the cumulative effects are unlikely to significantly change level of use of Scottish suppliers.		
GVA	*Minor (+)*	*Minor (+)*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	Effect remains minor positive as decommissioning generates new GVA. Capacity constraints from cumulative effects are unlikely to significantly change level of use of Scottish suppliers.		
Leisure tourism	*Negligible*	*Negligible*	None

Effect/Receptor	Residual Significance Level for Modified TI	Whole Project Assessment: Modified TI + Stevenson, Telford and MacColl Wind Farms	Mitigation Method
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	Cumulatively with the decommissioning of the BOWL export cable route there could be slightly greater limitations, temporarily, on access to the coast. And this could cause additional disruption for tourists. However, this would not be sufficient to change the assessment of significance.		
Business tourism	*Negligible*	*Negligible*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	Considered together with the other projects, the modified TI will not contribute to any changes in business tourism or availability of services e.g. accommodation.		
Walking	*Minor*	*Minor*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	The BOWL TI is situated 15 miles further west (onshore distance) and together with the MORL modified TI may cause additional temporary disruption on the coastal paths during decommissioning, but significance remains negligible.		
Surfing, Sea Kayaking	*Negligible*	*Negligible*	None
Total Cumulative Impact Assessment ***(Whole Project plus those developments listed in Section 5.5.3.13)***	The cumulative effects would be most likely with the BOWL TI if both were decommissioned together. This would reduce options for sea-based recreation slightly, but the temporary nature of both projects and the relatively low number affected indicates that that the significance would remain negligible.		

Assessment of Cumulative Effects

5.5.3.13 The developments and activities considered in detail within this assessment are listed below.

- MORL three consented wind farms;
- MORL WDA;
- BOWL wind farm;
- BOWL TI; and
- SHE – T reinforcement (cable from Caithness to Blackhillock, coming onshore at Portgordon).

Methodology

5.5.3.14 The assessment methodology considers the same core receptors as the main assessment. Each of these has been assessed cumulatively with the projects set out above. The receptors identified for consideration in this cumulative assessment are:

- Employment;
- GVA;
- Tourism; and
- Recreation.

5.5.3.15 For the first two of these receptors, employment and GVA, the potential cumulative impacts relate to supply constraints from local businesses if the projects proceed simultaneously. This could limit the ability of local businesses to meet demand and lead to less local content than anticipated in the modified TI assessment. The assessment must consider the amount and type of local content anticipated by these projects to determine if this could reduce the positive effects for the local economy.

5.5.3.16 For tourism the cumulative effects include the consented MORL and BOWL wind farms and the MORL WDA. However, given the distance between the wind farm sites and visible TI aspects there are no additional or exacerbated visual effects likely to impact on tourism. The assessment therefore considers the cumulative effect of the three cable routes (MORL modified TI, BOWL TI and SHE-T) and onshore substations on tourism and recreation.

Other Developments

5.5.3.17 We also note that for employment and GVA the potential constraints on supply from Scottish suppliers would not just come from offshore wind projects, but also from oil and gas activity as well as other major infrastructure projects in Scotland.

Cumulative Assessment

Employment

5.5.3.18 The Base Case for the modified TI assumes that employment is generated through expenditure on local supply of the services and components. In practice the elements that involve most local content are the supply and construction of the substations and some of the export cable installation. If this took place at the same time as the other projects it could reduce the capacity of these suppliers to meet demand. However, the scale of the modified TI work is specialised and is less likely to interact with construction of the wind farms.

5.5.3.19 Scope for supply constraints would be more likely to occur in relation to the other cable projects (BOWL TI and SHE-T). Even then, the scale of the work to be delivered by Scottish suppliers is relatively modest under the Base Case and this would reduce the scope for supply constraints. While it may have a small negative effect when considered cumulatively it is concluded that the significance remains **major positive** during construction and **minor positive** during operation. The cumulative effect of decommissioning is likely to follow a similar pattern to construction. The positive employment effect could be reduced if there were supply constraints which further reduced the local and Scottish content of the work. This is not likely to be sufficient to change the level of signficance which remains **minor positive.**

GVA

5.5.3.20 Like employment, the Base Case for the modified TI assumes that GVA is generated through expenditure on the local supply of the services and components. In practice the elements which involve most local content are the supply and construction of the substations and part of the export cable installation. The main scope for supply constraints would occur in relation to the other cable projects (BOWL TI and SHE-T). Even then, the scale of the work to be delivered by Scottish suppliers is relatively modest under the Base Case which would reduce the likelihood of supply constraints. While it may have some small negative effect when considered cumulatively it is concluded that the significance remains **major positive** during construction and **minor positive** during operation. The cumulative effect of decommissioning is likely to follow a similar pattern to employment. The positive effect could be reduced if there were supply constraints which reduced the local and Scottish content of the work. This is not likely to be sufficient to change the level of significance which remains **minor positive.**

Tourism

5.5.3.21 For tourism, the cumulative effects include the consented MORL and BOWL wind farms and the MORL WDA. Given the distance between the three consented wind farm sites and visible TI aspects there are no additional or exacerbated visual effects likely to impact on tourism.

5.5.3.22 Cumulative effects could result from more severe access limits to the coast and beaches if both BOWL and SHE-T cable routes are constructed at the same time as the MORL modified TI. In this case the cumulative effect could detract from the tourist experience. It is arguable whether it would be better or worse for the projects to take place simultaneously or in series, over a longer period of time. Although the cumulative disruptive effect of constructing three cable routes together would be greater than constructing one, it may be less than would be caused by three, one after the other.

5.5.3.23 Inland, the BOWL export cable will come ashore at PortGordon, 16 miles west of Inverboyndie. It continues onshore 20 km to Blackhillock, near Keith. This is a sufficient distance to mean that the construction of the BOWL export cable route is unlikely to add to the cumulative impact of modified TI in this assessment, even if construction was undertaken at the same time. The SHE-T cable also comes onshore at Portgordon and crosses the modified MORL TI offshore. The onshore substations for the modified TI will be approximately 30 miles from the substation at Blackhillock and there will be no significant visual cumulative effect.

5.5.3.24 Whether the cable constructions happen simultaneously (in which case there would be a shorter period of greater disruption), or separately, the construction work will be short term and the effects felt by a relatively small number of tourists relative to tourism in the study area as a whole. Consideration of cumulative effects therefore does not change the original conclusion that the effect would be of **minor** significance for leisure tourism and **negligible** for business tourism during construction and **negligible** for both during operation

5.5.3.25 Cumulatively decommissioning will cause similar effects to construction, and similar arguments apply. This may for a short period exacerbate the disruption if undertaken at the same time as the decommissioning work for the other considered projects, but it is arguable whether this is better or worse than decommissioning separately. The conclusion therefore remains that significance for decommissioning is **negligible** for both leisure and business tourism.

Recreation

5.5.3.26 For recreation, the three consented wind farms are considered to be too far away to have any impact on recreation (walking, surfing and sea-kayaking) on the south side of the Moray Firth and so there is no additional cumulative impact associated with the modified TI. However, there may be some cumulative effect when considering the export cable laying activities together with the BOWL TI and SHE-T reinforcement, which would extent the periods of disruption.

5.5.3.27 For walking, with the construction of the BOWL TI to the west and the SHE-T reinforcement there may be some additional temporary disruption on the coastal paths, but significance remains **minor** given it is short term and will effect relatively few people. During operation the main issue effect on walking remains **minor.**

5.5.3.28 It could also reduce options for sea-based recreation, surfing and sea-kayaking (if access to two areas was restricted at once) but the temporary nature of both projects and the relatively low number affected indicates that that the significance would remain **negligible** during construction and operation. During decommissioning the main potential cumulative effect is through any increase in disruption and access. As for tourism, the cumulative effect would be as a result of extended periods of disruption but given the relatively short time periods this is not considered to change the conclusions which remain **minor** for walking and **negligible** for surfing and sea-kayaking.

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5 Human Environment

5.4 Archaeology and Cultural Heritage

5.4.1 Baseline Information

Introduction

5.4.1.1 This chapter is an assessment of the effects of the modified Transmission Infrastructure (TI) upon archaeology and cultural heritage receptors. It covers both offshore and onshore elements of the modified TI (modified offshore transmission infrastructure (OfTI) and modified onshore transmission infrastructure (OnTI)) and deals with direct, indirect and, setting and cumulative effects, together with mitigation.

5.4.1.2 The chapter is informed by a baseline review of onshore, intertidal and offshore archaeology and cultural heritage (Technical Appendix 5.4 A – Transmission Work EIA: Baseline Review of Offshore and Onshore Archaeology). Two archaeological study areas (ASAs) have been defined. These include:

- The OfTI, inclusive of the three consented wind farm areas (Telford, Stevenson and MacColl) in relation to the OSPs;
- The OnTI; and
- The chapter also has direct linkages with the following ES Chapters, details of which have been cross-referred here where applicable:
  - Chapter 3.1: Hydrodynamics, Sedimentary and Coastal Processes; and
  - Chapter 5.3: Seascape, Landscape and Visual Assessment.

Consultations

5.4.1.3 The following consultation responses relevant to cultural heritage were received (see Chapter 1.3 (Environmental Impact Assessment) of this ES for full scoping consultations). Responses relating to cultural heritage were received from Marine Scotland, Historic Scotland (HS) and Aberdeenshire Council (AC) as part of the formal Scoping Opinion (June 2014). In addition, a further consultation meeting was held with Historic Scotland (20th May 2014) to discuss the nature of the modified TI, the approach and methodology of the cultural heritage impact assessment presented in this chapter, and the approach to pre-construction geophysical and geotechnical assessment.

Table 5.4-1 Summary of Consultation Responses

Organisation	Consultation Response	MORL Approach
Marine Scotland	Consultation dated 13th June 2014: Requirement for ES focussing upon marine historic environment. Reiterated the Scottish Planning Policy including that Scheduled Monuments should be preserved in situ within an appropriate setting; listed buildings and their settings to be preserved.	Suggested Guidance and Methodology has been incorporated into the methodology for the modified OnTI and modified OfTI Cultural Heritage assessment
Historic Scotland (HS)	General agreement with methodology, with the following points: The majority of sites in the (Sites and Monuments Record) SMR are recorded rather than scheduled; Scottish Planning Policy 23: Planning and the Historic Environment has been superseded by the consolidated Scottish Planning Policy. Consultation dated 20th May 2014: It was highlighted that in terms of the archaeological assessment of marine geophysical data, there is a preference to include the results in the main consent submission. Given the timeframes for the acquisition of data for review however it was acknowledged that this may be included as a post-consent condition; or prior to the formal HS response to Marine Scotland if practicable.	Amendments made to methodology and legislation considered.
Aberdeenshire Council Archaeology	Having reviewed Section 5.3.9 'Archaeology and Cultural Heritage' of the submitted scoping report, it is confirmed that an EIA will be required for the historic environment given the scale, type and location of the proposed works and the potential that they have to impact upon archaeological remains. The recommended methodology as detailed within Section 5.3.9 is agreed however note the following comment: Page 149 – List of 'Best Practice Guidance' – replace Planning Advice Note 42 with the more up-to-date Planning Advice Note 2/2011	Amendments made to methodology and legislation considered.

Baseline Characteristics

Inter-tidal Cultural Heritage Receptors – Modified OfTI ASA

5.4.1.4 Baseline review has established that there no known cultural heritage receptors within the inter-tidal area of the modified OfTI at the Inverboyndie landfall (see Technical Appendix 5.4 A: Cultural Heritage; and Figures 1 and 2 as per technical figures).

Offshore Cultural Heritage Receptors – Modified OfTI ASA

5.4.1.5 There are eight documented wrecks (**WA 2000-2007**), and an aircraft loss (**WA 2008**) in the modified OfTI ASA offshore export cable route corridor outwith the area of the three consented wind farms (Figure 1 within Technical Appendix 5.4 A). These are based upon UKHO and NMRS records with substantial positional uncertainties and are WA **2000 – 2007** are noted as 'Dead' wrecks by the UKHO.

5.4.1.6 There are a further two geophysical anomalies identified from a previous assessment (Chapter 5.5 Archaeology, and Visual Receptors MORL 2012).

5.4.1.7 Cultural heritage receptors within the three consented wind farms area have been previously outlined as part of the baseline review for the three consented wind farms (Chapter 5.5 of MORL ES, 2012). The baseline review identified four known wrecks within the consented wind farm area. In addition, the archaeological geophysical assessment identified three anomalies of high archaeological potential and 17 anomalies of medium archaeological potential. The potential for submerged prehistoric remains to be encountered within the wind farm area was considered to be very limited.

Potential for Further Unknown Cultural Heritage Receptors – Modified OfTI ASA

5.4.1.8 At present it is not possible to establish the location, extent, and characteristics of all cultural heritage receptors within the modified OfTI outwith the area of the three consented wind farms. The baseline review presented in Technical Appendix 5.4 A has indicated the potential for three main types of receptor that may be encountered within in the modified OfTI.

Submerged Prehistory

5.4.1.9 The MORL ES (2012) included the assessment of marine geotechnical datasets. This identified fine-grained sediments and organic sediments in nearshore and coastal areas (Chapter 5.5 and Technical Appendix 5.5 A of MORL ES, 2012) which may relate to inundated coastal geomorphology that was exploitable by past human groups. Although this assessment did not include the modified OfTI ASA outwith the three consented wind farms, the findings provide general context prior to the assessment of bespoke geotechnical and geophysical datasets for the modified OfTI.

5.4.1.10 Palaeo-landscape features have potential for preserving submerged archaeological material and palaeoenvironmental archives of archaeological interest. Accurate baseline datasets regarding relative sea-level and the potential for encountering submerged prehistory are currently sparse or lacking for the area necessitating a precautionary approach to assessing submerged prehistory receptors.

5.4.1.11 From intertidal zone to further offshore there is potential for encountering early prehistory, particularly Mesolithic period archaeology, including artefacts and sites which is of high archaeological value due to its rarity. In addition, inundated palaeo-landscape features and associated sedimentary sequences are of high archaeological interest for establishing palaeoenvironmental character of the area and the palaeogeographical context for Early Prehistory.

Maritime

5.4.1.12 The use of the Moray Firth for transport and as a resource probably dates back at least several thousand years. More recently there has been significant naval use associated mainly with the Cromarty Firth and other anchorages and commercial activity associated with the oil and gas industry. However, the maritime history of the Firth has throughout been dominated by fishing.

5.4.1.13 Archaeological evidence by period in the modified OfTI is sparse or entirely lacking. No wrecks have been identified. There is some evidence to suggest that wreck material from 18th and 19th century wrecks could be present within the intertidal zone or just offshore at the Inverboyndie landfall. However, there is insufficient data to say anything further about potential at these locations, other than that it is probably low. The available data suggests that the potential for encountering wrecks elsewhere in the modified OfTI is also low, although the possibility cannot be discounted in either case.

Aviation

5.4.1.14 The Moray Firth became a centre of air activity during the Second World War, when a number of mainly training and Coastal Command bases were established. Aircraft wreckage has been recovered from the Firth and there are anecdotal reports of wreckage being washed up. However, no aircraft wrecks have been identified in the modified OfTI and although there is one relevant casualty record, it is based only upon a very approximate position of loss. Whilst the possibility cannot be discounted, particularly inshore, the potential for aircraft wreckage or debris within the modified OfTI is likely to be low.

Onshore Cultural Heritage Receptors

5.4.1.15 Overall there are 190 known Cultural Heritage Assets within the modified OnTI ASA (Technical Appendix 5.4 A, Figures 2-5); with potential for encountering unknown cultural heritage assets of prehistoric or more recent date. Within the application boundary, there are a range of Cultural Heritage Assets which have been considered for assessment in relation to potential direct physical impacts, these comprise:

- Lower Inchdrewer (**WA 1008**, B-listed);
- St Brandon's Church, Inverboyndie (**WA 1041**, B-listed);
- Hill of Alvah, cairns 1350m WSW of Mill of Alvah (**WA 1035**, Scheduled Monument);
- Boyndie Old Kirk, church 200m NW of Boyndie Bridge (**WA 1040**, Scheduled Monument);
- Hills of Boyndie, barrows & enclosures 700m SW of Mill of Boyndie (**WA 1010**, Scheduled Monument); and
- 76 undesignated Cultural Heritage Assets located within the Application Area; ranging from possible prehistoric cropmark features to post-medieval agricultural sites. These sites are listed in Technical Appendix 5.4 A, Appendix VI.

5.4.1.16 There are six designated cultural heritage assets within the visual envelope of the substation area which have been considered for indirect effects to their setting; the recumbent Stone circle at Auchmaliddie (**WA 1184**), the scheduled remains of Gight Castle (**WA 1168**) and doocot (**WA 1164**), the Designed Landscapes of Fyvie Castle (**WA 1108**) and Hatton Castle (**WA 1102**), and the Battle of Fyvie battlefield (**WA 1110**).

Potential for Further Unknown Cultural Heritage Receptors – Modified OnTI ASA

5.4.1.17 There is potential for encountering unknown Cultural Heritage Assets of any archaeological period within the modified OnTI ASA, ranging from Early Prehistory, Mesolithic archaeology, and more recent periods to the 20th century.

Desktop Studies

5.4.1.18 The ASAs for data searches for the baseline review are based on an iteration of the modified OnTI centreline buffered to 500m, incorporating the area of the modified OnTI which includes the onshore substations and modified onshore export cable route corridor. The modified OfTI ASA is based on the modified OfTI including a wide area around the modified OfTI outwith the area of the three consented wind farms. The use of a buffer enabled heritage assets adjacent to the ASA or whose location is only known approximately to be included (Figure 1 within Technical Appendix 5.4 A).

5.4.1.19 The modified OfTI ASA includes that part of the modified TI extending offshore from Mean High Water Springs (MHWS) at the modified export cable landfall, including the intertidal zone. The modified OnTI ASA includes the modified TI from MHWS at the Inverboyndie landfall to the onshore substation at New Deer. Background information was sought from a much wider area in order to provide a national and regional context for the review.

5.4.1.20 The modified OnTI was investigated by desk-top review followed by a walk-over survey. The modified OfTI was investigated by desk-top review; excepting the inter-tidal zone at the landfall which formed part of the modified OnTI walkover survey. Archaeological assessment of geophysical survey data acquired for the modified TI will be reported pre-construction, the results of which will be compiled into the Written Scheme of Investigation (WSI) for the project providing effective mitigation to potential direct effects.

5.4.1.21 The modified OfTI and modified OnTI baseline review relied on the following datasets:

- The Wrecks and Obstructions database held by the UKHO;
- The National Monuments Record Scotland (NMRS) held by Royal Commission on Ancient and Historic Monuments (RCAHMS);
- The Aberdeenshire Council Historic Environment Record (HER);
- Databases of designated assets held by Historic Scotland;
- Maps held by the National Library of Scotland;
- Relevant available archaeological assessments, including the MORL ES (2012) and Beatrice Offshore Wind Farm ES (2012); and
- Other readily available published sources.

Site Specific Surveys

5.4.1.22 Site visits and walkover surveys were undertaken by Wessex Archaeology across the modified onshore export cable route corridor where access was possible, between 27th and 28th May 2014. Due to the vast majority of the modified OnTI being under crop at the time of walkover survey access was restricted, intervening publically-accessible areas were selected to enhance the desk-based assessment. Full coverage of the intertidal zone portion of the modified OfTI was achieved at Inverboyndie Bay and all designated Cultural Heritage Assets within 5km of the proposed substation site were visited and assessed for setting effects.

Legislative and Planning Framework

5.4.1.23 In addition to the consultation responses, the following legislation, charters, conventions and planning documents have been considered in the preparation of this chapter in relation to the modified OfTI and modified OnTI (further details are provided in Appendix I of the Technical Appendix 5.4 A):

International Frameworks

- The Valetta Convention, 1992 – this defines archaeological heritage and requires the state to develop and maintain inventories of on and offshore cultural heritage assets and to legislate for its protection;
- The ICOMOS Charter on the protection and management of underwater cultural heritage, 1996 - this charter aims to provide decision-makers, such as curators and archaeologists, with criteria for assessing and managing marine archaeological projects; and
- The UNESCO Convention on the Protection of the Underwater Cultural Heritage, 2001 - this convention provides that a States Party shall use the best practicable means to prevent or mitigate any adverse effects that might arise from activities under its jurisdiction incidentally affecting underwater cultural heritage sites.

UK Legislation and Planning Policy

- Protection of Military Remains Act 1986 (PMRA 1986) – this provides protection for the wreckage of military aircraft and designated military vessels of any nationality;
- The Merchant Shipping Act 1995 (MSA 1995) – this regulates the ownership and disposal of underwater finds considered to be 'wreck';
- The UK Marine Policy Statement (UKMPS) 2011 - the only marine policy document currently in place for this geographical area. It provides the framework for preparing Marine Plans and taking decisions affecting the marine environment; and
- Ancient Monuments and Archaeological Areas Act 1979 (AMAA 1979) – this provides legal protection for heritage assets of national importance. AMAA 1979 primarily deals with terrestrial sites but there is provision to designate sites in territorial waters as Scheduled Monuments.

Scottish Legislation and Planning Policy

- Scottish Historic Environment Policy 2011 (SHEP) - this sets out Scottish Ministers' policies, providing direction for HS and a policy framework that informs the work of a wide range of public sector organisations;
- Marine (Scotland) Act 2010 - this provides for the establishment of national and regional marine plans and for offshore sites of national importance to be designated as a Historic Marine Protected Areas (Historic MPAs);
- Historic Environment (Amendment) (Scotland) Act, 2011 – the Act amends and harmonises existing legislation relating to the management of historic environment including the Historic Buildings and Ancient Monuments Act 1953, the Ancient Monuments and Archaeological Areas Act 1979 and Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997. Planning Advice Note (PAN) 2/2011: Planning and Archaeology – this provides advice to planning authorities and developers on dealing with archaeological remains with an emphasis which is proportionate to the relative value of the remains and of the developments under consideration; and

- Scotland's Draft National Marine Plan (due to be issued at the end of 2014) – this is currently available in consultation draft and provides a number of general marine policies that will apply to all marine development proposals. It includes statements on cultural heritage (GEN 13) with a focus on protecting and enhancing designated and undesignated heritage, and methods of suitable mitigation in relation to marine development.

Local Planning Policy

- Aberdeenshire Local Plan (2008) policies – particularly Env\18: Listed Buildings, Env\19: Archaeological Sites and Ancient Monuments, Env\20: Historic Gardens and Designed Landscapes, with the focus on conservation, and avoidance of adverse impacts to these cultural heritage resources; and
- Aberdeenshire Local Development Plan (2012) policies and supplementary guidance - SG Historic Environment1: Listed Buildings; SG Historic Environment 2: Conservation Areas; SG Historic Environment 3: Historic gardens and designed landscapes; and, SG Historic Environments 4: Archaeological sites and monuments. The policies focus on conservation, and avoidance of adverse impacts to these cultural heritage resources through the planning process.

5.4.2 Impact Assessment

Summary of Effects - Modified OfTI

5.4.2.1 The predicted and potential direct and indirect construction, operation and decommissioning effects of the modified OfTI upon cultural heritage receptors are summarised in Table 5.4-2 below.

5.4.2.2 There are eight documented wrecks (**WA 2000-2007**) within the modified OfTI ASA, and one reported aircraft crash site (**WA 2008)** (Technical Appendix 5.4 A: Figure 1).

5.4.2.3 Cultural heritage receptors within the three consented wind farms area have been previously assessed as part of the MORL ES (2012). The OfTI Rochdale Envelope has subsequently been amended from eight OSPs to two OSPs, located within the three consented wind farms area (modified OfTI).

5.4.2.4 Prehistoric, Maritime and Aviation receptors were assessed previously for the consented wind farm area (Chapter 5.5 and Technical Appendix 5.5 A of MORL ES, 2012). Unmitigated, the installation of OSPs could induce **major adverse effects** on Cultural Heritage Receptors, reducing to **negligible significance** following mitigation.

5.4.2.5 No indirect setting effects have been identified in relation to the two OSPs to be located within the three consented wind farms area. Previously effects for the scenario of installing the OSPs in the turbine area concluded potential indirect setting effects of the OSPs on Cultural Heritage Receptors to be **not significant** (Chapter 5.5 and Technical Appendix 5.5 A of MORL ES, 2012).

5.4.2.6 No significant indirect effects have been identified from changes to seabed processes which may induce adverse effects upon Cultural Heritage Receptors (see Chapter 3.1 Hydrodynamics, Sedimentary and Coastal Processes). In fact minor positive effects from increases in suspended sediment may benefit Cultural Heritage Receptors by increasing protective sediment cover.

5.4.2.7 Following consultation with HS, it was agreed that the assessment of geophysical and geotechnical data will be reviewed pre-construction in order to precisely define mitigation strategies for unknown cultural heritage receptors identified in the modified OfTI outwith the area of the three consented wind farms.

Summary of Effects – Modified OnTI

5.4.2.8 The predicted and potential construction, operation and decommissioning effects of the modified OnTI upon cultural heritage receptors are summarised in Table 5.4-3 below.

5.4.2.9 There are a number of Cultural Heritage Receptors within the modified onshore export cable route corridor which have the potential to experience direct physical effects during the construction phase. Indirect physical effects from vehicles and other construction machinery may also be induced along the modified OnTI export cable route corridor.

- Lower Inchdrewer (**WA 1008**, B-listed);
- St Brandon's Church, Inverboyndie (**WA 1041**, B-listed);
- Hill of Alvah, cairns 1350m WSW of Mill of Alvah (**WA 1035**, Scheduled Monument);
- Boyndie Old Kirk, church 200m NW of Boyndie Bridge (**WA 1040**, Scheduled Monument);
- Hills of Boyndie, barrows & enclosures 700m SW of Mill of Boyndie (**WA 1010**, Scheduled Monument); and
- 76 undesignated Cultural Heritage Receptors located within the Application Area comprising possibly prehistoric cropmark features to post-medieval agricultural sites (Technical Appendix 5.4 A, Appendix VI, Figures 2-5).

5.4.2.10 There are six designated cultural heritage assets within the wider onshore study area around the proposed substations area which have been considered for indirect effects to their setting;

- The recumbent Stone circle at Auchmaliddie (**WA1184**);
- The scheduled remains of Gight Castle (**WA1168**) and doocot (**WA1164**);
- The Designed Landscapes of Fyvie Castle (**WA1108**) and Hatton Castle (**WA1102**); and
- The Battle of Fyvie battlefield (**WA1110**).

Proposed Mitigation Measures and Residual Effects

5.4.2.11 Proposed mitigation measures and residual effects are set out in Table 5.4-3 below.

5.4.2.12 As regards "unknown" heritage, a realistic worst case approach has been adopted in assessing the possible magnitude and sensitivity of effects. A package of mitigation has then been proposed which ensures that there will be no significant effects on such assets (even on that worst case basis). It is proposed that geotechnical and geophysical survey work will be carried out pre-construction to finalise the appropriate mitigation from the package of options identified.

Table 5.4-2 Impact Assessment Summary – Modified OfTI

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Construction				
Direct effect as a result of installation of OSP	Recorded cultural heritage assets	No effect	Geophysical and geotechnical assessment facilitating micrositing and/or geoarchaeological assessment Written Scheme of Identification (WSI)	No effect
Direct effect resulting from installation of OSPs	Unknown cultural heritage assets	Minor-major, depending upon receptor sensitivity	Geophysical and geotechnical assessment facilitating micrositing and/or geoarchaeological assessment. WSI Reporting protocol for finds of archaeological interest	Minor / Negligible
Direct effect resulting from burial of inter-tidal cables	Unknown cultural heritage assets	Minor-major, depending upon receptor sensitivity	Geophysical and geotechnical assessment facilitating micrositing and/or geoarchaeological assessment WSI Reporting protocol for finds of archaeological interest	Minor / Negligible
Direct effect resulting from burial of offshore cables	Recorded cultural heritage assets	Major	Geophysical and geotechnical assessment facilitating micrositing and/or geoarchaeological assessment WSI Reporting protocol for finds of archaeological interest	Minor / Negligible
Direct effect resulting from burial of offshore cables	Unknown cultural heritage assets	Minor-major, depending upon receptor sensitivity	Geophysical and geotechnical assessment facilitating micrositing and/or geoarchaeological assessment	Minor / Negligible
Direct effect by construction vessel	Recorded cultural heritage assets	Major		Minor / Negligible

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Direct effect by construction vessel	Unknown cultural heritage assets	Minor-major, depending upon receptor sensitivity	Avoidance of effect through Exclusion Zones or offsetting through the recovery/preservation by record (depending upon WSI provisions) WSI Reporting protocol for finds of archaeological interest	Minor / Negligible
Indirect effect from construction vehicles and other machinery (inter-tidal)	Recorded cultural heritage assets	Major	Avoidance/micro-siting Programme of Archaeological Works	Minor / Negligible
Indirect effect from construction vehicles and other machinery (inter-tidal)	Unrecorded cultural heritage assets	Major	Programme of Archaeological Works	Minor / Negligible
Operation				
Direct effect by IMR (Inspection, Maintenance and Repair) vessel	Recorded cultural heritage assets	Major	Geophysical and geotechnical assessment facilitating micrositing and/or geoarchaeological assessment Avoidance of effect through Exclusion Zones or offsetting through the recovery/preservation by record (depending upon WSI provisions) WSI Reporting protocol for finds of archaeological interest	Minor / Negligible
Direct effect by IMR (Inspection, Maintenance and Repair) vessel	Unknown cultural heritage assets	Minor-major, depending upon receptor sensitivity		Minor / Negligible
Indirect effect due to changes in scour and sedimentation	Recorded cultural heritage assets	No effect		No effect
Indirect effect due to changes in scour and sedimentation	Unknown cultural heritage assets	Unknown (minor-major, depending upon receptor sensitivity)		Minor / Negligible
Indirect effect due to changes to the setting of designated Cultural Heritage Receptors	Recorded cultural heritage assets	Minor-major, depending upon magnitude of effect	Micro-siting, screening Effect removed on decommissioning	Minor / Negligible
Decommissioning				
As construction phase, but effects are considered to already have occurred if similar construction footprint is applied.				

Table 5.4-3 Impact Assessment Summary – Modified OnTI

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Construction				
Direct effect resulting from burial of onshore cables	Known cultural heritage assets	Minor-major, depending upon receptor sensitivity	Geophysical and geotechnical assessment facilitating micrositing and/or geoarchaeological assessment WSI Programme of Archaeological works	Minor / Negligible
Direct effect resulting from burial of onshore cables	Unknown cultural heritage assets	Minor-major, depending upon receptor sensitivity	WSI Programme of Archaeological works	Minor / Negligible
Direct effect resulting from construction of substation and associated buildings and infrastructure	Unknown cultural heritage assets	Minor-major, depending upon receptor sensitivity	Geophysical and geotechnical assessment facilitating micrositing and/or geoarchaeological assessment WSI Programme of Archaeological works	Minor / Negligible
Indirect effect from construction vehicles and other machinery	Recorded cultural heritage assets	Major	Avoidance through micro-siting WSI	Minor / Negligible
Indirect effect from construction vehicles and other machinery	Unrecorded cultural heritage assets	Major	WSI	Minor / Negligible
Operation				
Indirect effect due to changes to the setting of designated Cultural Heritage Receptors	Recorded cultural heritage assets	Minor-major, depending upon magnitude of effect	Micro-siting, screening Effect removed on decommissioning	Minor / Negligible
Decommissioning				
Effects arising from the decommissioning of the modified OfTI are considered to be the same as those arising in the construction phase. No predicted decommissioning effects are predicted from the decommissioning of the modified OnTI.				

Introduction to Impact Assessment

Relevant Guidance in relation to Cultural Heritage – Modified OfTI and Modified OnTI

5.4.2.13 The following relevant guidance documents have informed the EIA of the modified OfTI and modified OnTI:

- The Code of Practice for Seabed Development (The Joint Nautical Archaeology Policy Committee, 2008);
- Collaborative Offshore Wind Research Into the Environment (COWRIE), Historic Environment Guidance for the Renewable Energy Sector (Wessex Archaeology, 2007);
- COWRIE Guidance for Assessment of Cumulative Impact on the Historic Environment from Offshore Renewable Energy (Oxford Archaeology, 2008);
- Protocol for Archaeological Discoveries: Offshore Renewables Projects (The Crown Estate/Wessex Archaeology, 2010b);
- Model Clauses for Archaeological Written Schemes of Investigation: Offshore Renewables Projects (The Crown Estate/Wessex Archaeology, 2010a);
- Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (Leather & Gribble/COWRIE 2011);
- Managing Change in the Historic Environment: Setting (HS, 2010); and
- Standard and Guidance for Desk Based Assessment (Institute for Archaeologists, revised 2011).

5.4.2.14 Effects on known and potential receptors during all construction, operation and decommissioning activities identified by MORL have been considered. Three types of effects have been assessed: direct and indirect physical effects; and indirect setting effects.

5.4.2.15 A key factor in the assessment of physical impacts on Cultural Heritage Receptors is the extent of ground disturbance. All physical damage or removal of archaeological sites or material is effectively permanent and recovery is limited to stabilisation or re-burial, to limit further effects. Therefore, direct physical effects on Cultural Heritage Receptors are likely to induce high magnitude effects.

5.4.2.16 Recovery from indirect setting impacts is possible after decommissioning, where a development is removed and no longer visible from a receptor.

Details of Impact Assessment

5.4.2.17 This section considers the source and nature of the effects on the cultural heritage resource and the degree to which archaeological receptors are exposed to and affected by the modified OfTI and modified OnTI export cable route corridor and substations footprint. The impact assessment is considered in relation to the construction, operation and decommissioning of the cable corridor. The impact assessment is summarised in Table 5.4-2 and Table 5.4-3 above.

Rochdale Envelope Parameters Considered in the Assessment

5.4.2.18 The Rochdale Envelope considers all the potential modified TI parameters and scenarios, the details of which are presented in Chapter 2.2: Project Description. The potential to affect cultural heritage during the construction, operation and decommissioning phases of the modified OnTI and modified OfTI are based upon the 'worst case scenario' indicated in the Design Envelope and are specific to the potential effects assessed in this Chapter. This assumes that the agreed modified TI design involves:

- The greatest area of contact with the sea floor;
- The maximum number of locations at which that contact occurs;
- The greatest volume of disturbed sediments;
- The maximum number of cable trenches and transition pits at the landfall;
- The maximum width and depth of onshore and landfall trenching; and
- The greatest extent of proposed substation buildings, access and other infrastructure and facilities.

5.4.2.19 The details of the Rochdale Envelope parameters are summarised in Table 5.4-4 below. The summary assumes that decommissioning will have a similar Rochdale Envelope to that of construction.

Table 5.4-4 Rochdale Envelope Parameters Relevant to the Impact Assessment

Potential Effect	Rochdale Envelope Scenario Assessed
Construction & Decommissioning	
Direct effect as a result of installation of OSP	Damage and/or displacement of cultural heritage assets within footprint of pin piling or suction caissons. Damage and/or displacement of cultural heritage assets within construction footprint. Damage and/or displacement of cultural heritage assets within scour protection footprint. Worst case scenario involves an effect footprint of 3 m diameter pin piles or 20 m diameter suction caissons; with a maximum depth of effect of 60 m (pin piles). Scour footprint will be up to an additional 20 m diameter for suction caissons.
Direct effect as a result of burial of onshore, inter-tidal and offshore export cables	Damage and/or displacement of cultural heritage assets within footprint of cable trench. Damage and/or displacement of cultural heritage assets within footprint of directional drilling or trenching at landfall. Offshore: 70 km of cable for inter-platform cables and cabling up to the boundary of the three consented wind farms; and a maximum of 52 km export cable corridor length from the boundary of the three consented wind farms. 1m target burial depth, mattressing or rock emplacement for sections where burial not possible. Cable bundles separate by 4x water depth. Trench footprint 6 m per cable. Onshore: 33 km route. 1m target burial depth. Up to four trenches within a 60 m wide corridor – 4 m wide trenches. If 2 trenches used, 6 m trench width required. Landfall:. Worst case maximum area of seabed disturbance and therefore of direct effect for each trench is likely to be the length of each trench by a width of 6 m (in bundled) by 3 m maximum depth.

Potential Effect	**Rochdale Envelope Scenario Assessed**
Direct effect as a result of groundworks and construction of substation and associated buildings and infrastructure	Damage and/or displacement of cultural heritage assets within footprint of substation and associated buildings and infrastructure. The MORL Onshore Substation area is 270 x 135 m, covering an area of 45,900 m^2, the additional substation area is 270 x 135 m, covering an area of 36,450 m^2. Additional lay down areas, screening, landscaping and access, and other groundworks for sewerage or a septic tank. The depth of the foundations is unknown but is likely to require the removal of topsoil.
Direct effect by construction vessel or vehicle/machinery (cable corridor and substation footprint)	Damage and/or displacement of cultural heritage assets within footprint of jack-up spud cans during OSP installation. Damage and/or displacement of cultural heritage assets within construction vessel anchor pattern (caused by contact with anchors and/or their cables) during OSP and cable installation and general marine activities associated with construction. Damage and/or displacement of cultural heritage assets within footprint of construction vehicles and machinery such as mechanical excavators, Cable Plough, Direction Drilling rig and other attending vehicles (e.g. 4x4 vehicles transporting personnel and transport vehicles). Offshore: The spud cans of the four or six jack-up legs of the construction vessel will be in contact with the seabed and will penetrate 1-4 m. The worst case area of effect will be m^2 per vessel placement. Onshore: The onshore construction footprint around the cable trench and substation such as lay down areas is unknown at present but the construction footprint assessed here incorporates a trench width of 6 m and assumes a route located anywhere within the area of the modified OnTI to accommodate the footprint of the Cable Plough or vehicles involved in trenching.

Potential Effect	Rochdale Envelope Scenario Assessed
Operation	
Direct effect by IMR (Inspection, Maintenance and Repair) vessel	Damage and/or displacement of cultural heritage assets within footprint of jack-up spud cans during IMR work. Damage and/or displacement of cultural heritage assets within IMR vessel anchor pattern (caused by contact with anchors and/or their cables). Although it is likely that there will be some co-location, worst case area of effect will be a multiple of the installation figures.
Indirect effect due to changes in scour and sedimentation	Damage and/or displacement of cultural heritage assets caused by scour induced by the nearby presence of the OSPs and sections of offshore cables protected by rock placement or concrete mattresses. Changes in preservation environment of cultural heritage assets caused by sedimentation induced by the nearby presence of the OSPs and sections of offshore cables protected by rock placement or concrete mattresses. Worst case area of effect will depend upon the final design of the substructure and the characteristics of the chosen location. Assessed in conjunction with findings of Chapter 3.1: Hydrodynamics, Sedimentary and Coastal Processes.
Indirect effect due to changes to the setting of designated Cultural Heritage Receptors	Changes in the setting of designated Cultural Heritage Receptors caused by presence of the proposed substations in the landscape. The MORL Onshore Substation area is 270 x 135 m, covering an area of 45,900 m^2, the additional substation area is 270 x 135 m, covering an area of 36,450 m^2. The maximum height of the structures is 13 m. Up to 60 acres of 'disturbance' within the substations area may be required as part of landscaping.

EIA Methodology

Direct Physical Effects

5.4.2.20 Receptors may be upstanding features, buried or may be lying exposed on the seabed. Direct effects can therefore result from any activity that disturbs the ground surface, seabed or intertidal land surface or the water column immediately above it. Direct effects can have a significant effect upon both the receptor itself and upon the relationships between receptors and their wider environment, i.e. their physical setting or cultural heritage context. The effect of direct effects in development contexts remains poorly understood. A common sense attitude to the scale of effect has therefore been adopted: a receptor subject to pin piling or trenching for example is likely to be severely damaged.

Indirect Physical Effects

5.4.2.21 Indirect physical effects are processes that involve a chain reaction; and in this case are considered primarily for the modified OfTI ASA.

5.4.2.22 They typically occur when activities lead to changes in the environment that then have an effect upon receptors. For example, the construction of an OSP can lead to changes in current flow at that location which then produce scour or sedimentation around a nearby receptor. These effects can be either positive or negative. For example scour often leads to rapid and destructive changes in the condition of a receptor, whereas sedimentation can protect it by burying it. Indirect effects are difficult to predict and their complex effect upon cultural heritage assets is currently only partially understood.

5.4.2.23 Damage caused by direct and indirect effects is normally permanent and recovery is limited to stabilisation and the prevention of further effects.

Effects on the Setting of Cultural Heritage Receptors

5.4.2.24 Setting effects on cultural heritage receptors are often considered to be indirect; and in this case are particularly considered for designated receptors within the modified OnTI ASA within the vicinity of the proposed substation.

5.4.2.25 These occur when the visible elements of a development's infrastructure or the effects upon the land- or seascape caused by its presence are inter-visible with cultural heritage receptors. Setting includes the way in which the surroundings of a historic asset or place contribute to how it is experienced, understood and appreciated and setting effects are not therefore limited to visual changes. Assessing setting effects and particularly the magnitude of their effect is therefore a complex process that depends upon more than proximity. Setting effects have only been considered for the operational phase of the modified OfTI, as effects during construction and decommissioning are considered to be very short term only.

5.4.2.26 The methodology for assessment of setting effects upon the cultural heritage significance of the selected receptors has been undertaken in line with Managing Change in the Historic Environment: Setting (HS, 2010). The approach taken is to:

- Identify the cultural heritage assets that might be affected;
- Define the setting of each of these receptors without reference to the development; and
- Assess how the development will affect this defined setting.

5.4.2.27 The setting assessment included in this chapter has been carried out to identify where changes in setting have a potential to affect the cultural heritage significance of assets as distinct from the aesthetic land and seascapes. Therefore there is no direct correlation between the magnitude and significance of setting effects identified in other chapters of this EIA (Chapter 5.3: Seascape, Landscape and Visual Assessment).

Impact Assessment Criteria

5.4.2.28 Where the importance (or sensitivity as it is defined here) of a cultural heritage receptor has been assessed, this is based upon an analysis of the archaeological and historical evidence available. Sensitivity is defined spatially in local, regional, national and international terms. A very wide range of contributing factors is typically considered, including: the receptor's age; what type of asset it is; how rare or alternatively how representative of a type or other group it is; how much of it survives; what condition it is in; its vulnerability; whether it is associated with non-archaeological evidence; what its associations are; and what its potential is, for example in terms of research or public interest and outreach.

5.4.2.29 Offshore, with the exception of assets that are automatically protected such as crashed military aircraft, statutory protection is only usually given to assets that are nationally important and often only when this is combined with other factors, most typically vulnerability. The principle reason appears to be lack of data. However, the UK Marine Policy Statement makes it clear that nationally important non-designated assets are to be considered subject to the same planning policies as designated assets.

Defining Receptor Sensitivity

5.4.2.30 For the purposes of this impact assessment, the definitions in the Table 5.4-5 have been used to assess the importance or sensitivity of receptors.

Table 5.4-5 Receptor Sensitivity

Sensitivity	Definition
High	Above average example and / or high potential to contribute to knowledge and understanding and / or outreach. Receptors with a demonstrable international or national dimension to their importance or those considered to be rare are likely to fall within this category. Sites with statutory protection (i.e. those protected under the Marine (Scotland) Act 2010, Ancient Monuments and Archaeological Areas Act 1979 or the Protection of Military Remains Act 1986, A-listed Buildings, Scheduled Monuments, Gardens and Designed Landscapes, Inventory Battlefields, Conservation Areas) plus as-yet undesignated sites that are demonstrably of equivalent cultural heritage value. Palaeogeographic features with demonstrable potential to include artefactual and / or palaeoenvironmental material, possibly as part of a prehistoric site or landscape.
Medium	Average example and / or moderate potential to contribute to knowledge and understanding and / or outreach. Receptors with a demonstrable regional dimension to their importance or those considered to be comparatively rare are likely to fall within this category. Includes B-listed buildings plus as-yet undesignated sites that are demonstrably of equivalent cultural heritage value. Includes wrecks of ships and aircraft that do not have statutory protection or equivalent, but have moderate potential based on formal assessment of their importance in terms of build, use, loss, survival and investigation ('BULSI' system, Wessex Archaeology 2011a-d). Onshore sites with a regional importance. Prehistoric deposits with moderate potential to contribute to an understanding of the palaeoenvironment.
Low	Below average example and / or low potential to contribute to knowledge and understanding and / or outreach. Receptors with a demonstrable local dimension to their importance are likely to fall within this category. Onshore sites with a local importance. Included C-listed buildings plus as-yet undesignated sites that are demonstrably of equivalent cultural heritage value. Also, Includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have low potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation ('BULSI' system, Wessex Archaeology 2011a,b). Prehistoric deposits with low potential to contribute to an understanding of the palaeoenvironment.
Negligible	Poor example and / or little or no potential to contribute to knowledge and understanding and / or outreach. Assets that are not considered to be rare with little or no surviving archaeological interest.

Defining Magnitude of Effect

5.4.2.31 The definitions in the Table 5.4-6 have been used to assess the magnitude of effect upon receptors.

Table 5.4-6 Magnitude of Effects

Magnitude	Definition
High	Total loss or major alteration to key elements / features of the existing baseline (pre-development) conditions such that post-development character / distinctiveness / composition / attributes will be fundamentally changed and may be lost from the site altogether. Includes permanent/irreversible changes to existing baseline conditions.
Moderate	Loss or alteration to one or more key elements / features of the existing baseline conditions such that post-development character / distinctiveness / composition / attributes of the baseline will be partially but considerably changed. Includes permanent/irreversible changes to existing baseline conditions.
Low	Minor shift away from existing baseline conditions. Change arising from the loss / alteration will be discernible but underlying character / distinctiveness / composition / attributes of baseline condition will be similar to pre-development circumstances / patterns. Includes temporary (throughout project duration) changes.
Negligible	Very slight change from existing baseline conditions. Change barely distinguishable, approximating to the 'no change' situation or temporary (for part of the project duration) change.

Defining Significance of Effects

5.4.2.32 In line with standard EIA practice, sensitivity and magnitude of effect have been cross referenced to determine the significance of effects on cultural heritage receptors indicated in Table 5.4-7 below.

Table 5.4-7 Significance of Effects

	Magnitude				
Sensitivity	High	Moderate	Low	Negligible	No change
High	Major	Major	Moderate	Minor	No impact
Medium	Major	Moderate	Minor	Negligible	No impact
Low	Moderate	Minor	Minor	Negligible	No impact
Negligible	Minor	Negligible	Negligible	Negligible	No impact

5.4.2.33 Significance can be defined as follows in Table 5.4-8.

Table 5.4-8 Definition of Significance

Significance	Definition
Major	Very large or large change in receptor condition, adverse or beneficial, which are likely to be important considerations at a regional or district level. Major beneficial effects may contribute to achieving national, regional or local objectives in providing a significant positive gain to the environment. Major adverse effects could result in exceeding statutory objectives and / or breaches of legislation and give rise to serious concern. Such effects are deemed significant in EIA terms.
Moderate	Intermediate change in receptor condition, adverse or beneficial. Moderate beneficial effects may provide some gain to the environment. Moderate adverse effects may give rise to some concern and are likely to be an important consideration at a local level. Such effects are deemed significant in EIA terms.
Minor	Small change in receptor condition, adverse or beneficial. Minor beneficial effects may have some environmental benefits. Minor adverse effects may be undesirable, but of limited concern. Such changes are unlikely to be important in the decision making process and are deemed not significant in EIA terms.
Negligible	No discernible change in receptor condition. The effect is deemed not significant in EIA terms.
No impact	No change in receptor condition. The effect is deemed not significant in EIA terms.

5.4.2.34 There is a high level of uncertainty often applied to cultural heritage assets, due to the often inherent incompleteness of information associated with them, particularly on the sea bed. Geophysical surveys may locate previously unknown wrecks but identification is often difficult or impossible. As a result the 'Precautionary Principle' is normally applied to impact assessment. Available guidance, COWRIE: Historic Environment Guidance for the Renewable Energy Sector (Wessex Archaeology 2007) states that this principle should be applied if at the time of decision-making:

- There is good reason to believe that the historic environment may be subject to harmful effects; and
- The level of uncertainty about the consequences or likelihood of these effects is such that risk cannot be assessed with sufficient confidence to inform decision-making.

Offshore Impact Assessment – Modified OfTI

Construction

Introduction

5.4.2.35 Potential direct and indirect effects within the modified OfTI ASA comprise direct damage to archaeological deposits and material and the disturbance or destruction of relationships between deposits and material and their wider surroundings; and indirect effects through changes in scour and sedimentation, which can be seen as both positive and negative.

5.4.2.36 Potential direct and indirect effects during construction comprise damage, disturbance or destruction of submerged prehistoric archaeology, shipwrecks and crashed aircraft from a number of identified activities. These have been assessed independently below.

5.4.2.37 It is noted that indirect effects relating to changes in scour and sedimentation are considered to be **not significant** with regard to the construction phase.

Installation of OSPs

5.4.2.38 Cultural heritage receptors within the three consented wind farms area have been previously assessed as part of the MORL ES (2012). The OfTI Rochdale Envelope has subsequently been amended from eight OSPs to two OSPs, located within the three consented wind farms area (modified OfTI).

5.4.2.39 The jacket design to be used for the OSPs requires either the drilling of pin piles, which will destroy receptors within the footprint of the pile, or suction caissons, which will destroy or damage receptors within their footprint. Both will require the laying of scour protection, which may damage or destroy receptors within its footprint' depending upon their depth of burial. This is a direct, short term (construction), permanent and adverse effect.

5.4.2.40 Previously Prehistoric, Maritime and Aviation receptors were assessed (Chapter 5.5 and Technical Appendix 5.5 A of MORL ES, 2012). Unmitigated, the installation of OSPs could induce **major adverse effects** on Cultural Heritage Receptors, reducing to **minor to negligible significance** following mitigation.

Installation of Inter-tidal and Offshore Export Cables

5.4.2.41 The cable installation method has not yet been finalised. The cable will be buried by trenching where possible. Trenching options for the landfall are dredging, back-hoe dredging, mechanical rock cutter/excavator and direction drilling. Options for the rest of the offshore export cable are trenching, cable plough, jetting and mechanical rock cutter/excavator. Any receptors present within the area of effect are likely to be destroyed, damaged or displaced, regardless of the trenching method. This will be a direct, short term (construction), permanent and negative effect. Directional drilling, will likely affect receptors in the path of or immediately above or below the drill string.

5.4.2.42 There is potential for encountering submerged prehistory receptors within the modified OfTI ASA outwith the area of the three consented wind farms, both archaeological and palaeogeographical which are potentially of **high sensitivity**. Direct physical impacts to such receptors would induce **high magnitude** effects. The significance of effect in the absence of mitigation is **major**. Following mitigation (see Proposed Monitoring and Mitigation Section below) however, the significance of effect will be reduced to an acceptable level in terms of EIA, likely to be no more than **minor**.

5.4.2.43 Baseline review has established that there are no known cultural heritage receptors within the inter-tidal modified OfTI at the Inverboyndie landfall. There will therefore be **no effect**.

5.4.2.44 Documented wrecks (**WA 2000 - 2007**) are classified as 'dead'. In the absence of positive identification their sensitivity is regarded as high. Magnitude of effect is considered to be high and in the absence of mitigation the significance of effect is **major**. Following mitigation however, the significance of effect will be reduced to an acceptable level in terms of EIA, likely to be no more than **minor**.

5.4.2.45 There is one reported aviation loss (**WA 2008**) within the modified OfTI outwith the area of the three consented wind farms. In the absence of positive identification the sensitivity is regarded as **high**. Magnitude of effect is considered to be **high** and in the absence of mitigation the significance of effect is **major**. Following mitigation however, the significance of effect will be reduced to an acceptable level in terms of EIA, likely to be no more than **minor.**

Vessel activity during construction

5.4.2.46 Although no method statement is currently available, the OSPs are likely to be installed by a self-elevating vessel or platform (jack up), within the three consented wind farms area only. Any receptors present within the area of effect may be destroyed or damaged or displaced downwards. This will be a direct, short term (construction), permanent and negative effect. It is conceivable that there may also be a short term indirect effect caused by scour or sediment deposition induced by the presence of the jack up legs.

5.4.2.47 Direct physical impacts to such receptors would induce **high magnitude** effects. The significance of effect in the absence of mitigation is **major**. Following mitigation however, the significance of effect will be reduced to an acceptable level in terms of EIA, likely to be no more than **minor**.

5.4.2.48 Effects caused by the cable laying vessel/s will depend upon the station keeping method. A Dynamic Positioning (DP) vessel is unlikely to cause an effect as it does not have gear in contact with the seabed. However, a vessel that manoeuvres on anchors may cause an effect. The effect will arise in the footprint of each anchor, which may be linear as some movement of the anchor towards the vessel may occur when tension is placed on its cable. This cable itself may cause an effect along its length and possible in an arc as tension is applied to it. Contact between anchors and their cables and archaeological material tends to be highly destructive. It will be a direct, short term (construction), permanent and negative effect. A similar effect may result from anchoring of support vessels in the modified OfTI, including diving support vessels used for hook up activities.

5.4.2.49 The magnitude of any effect is considered to be **high**. The significance of effect in the absence of mitigation therefore is **major**. Following mitigation however, the significance of effect will be reduced to an acceptable level in terms of EIA, likely to be no more than **minor**.

Operation

Vessel activity during IMR (Inspection, Maintenance and Repair)

5.4.2.50 The worst-case scenario anticipates that each OSP will require five visits by a jack up vessel during its operational life. These visits are likely to replicate the effects of OSP installation, which will be direct, short term (operation), permanent and negative effects. Sensitivity and magnitude can be expected to be similar, although magnitude of effect will be reduced if the footprint of the spud cans is co-located with those of construction.

5.4.2.51 The magnitude of any effect is considered to be **high**. The significance of effect in the absence of mitigation therefore is **major**. Following mitigation however, the significance of effect will be reduced to an acceptable level in terms of EIA, likely to be no more than **minor** to **negligible**.

Changes in Scour and Sediment Deposition Patterns

5.4.2.52 In the event that the presence of the OSPs and any proposed export cable matressing causes erosion (scour) and sediment deposition in their vicinities, receptors within the footprint of these changes may be subject to indirect effects. Significant effects are likely to be complex and difficult to predict for Cultural Heritage Receptors. They will be long term (operational life of the wind farm), temporary and/or permanent and either positive (sediment deposition) or negative (erosion). The assessment of sensitivity and magnitude is the same as that for OSP construction and offshore export cable installation. The potential indirect effect through the construction of the OSPs may be reversed by the removal of the jacket during decommissioning and may therefore be temporary, although any negative effect may already have become permanent.

5.4.2.53 **No significant indirect effects** have been identified from changes to seabed processes which may induce adverse effects upon Cultural Heritage Receptors (see Chapter 3.1 Hydrodynamics, Sedimentary and Coastal Processes). In fact **minor positive effects** from increases in suspended sediment may benefit Cultural Heritage Receptors by increasing protective sediment cover.

Indirect setting effects

5.4.2.54 In terms of the effects on the setting of onshore receptors, the OSPs have been considered as part of the MORL ES, 2012 (MORL ES Chapter 5.5 and Technical Appendix 5.5 A of MORL ES, 2012).

5.4.2.55 Due to distance offshore and the reduced number of OSPs, **no significant effects** from OSPs located in the consented wind farm areas have been identified.

Decommissioning

5.4.2.56 The effects of decommissioning will depend upon the methodology applied. It is assumed that they are at least equivalent to or lesser than the effects predicted for construction.

Onshore Impact Assessment – Modified OnTI

Construction

Installation of Onshore Cables

5.4.2.57 The cable installation method has not yet been finalised but may include cable plough or trenching. Any receptors present within the area of effect are likely to be destroyed, damaged or displaced, regardless of the trenching method. Additionally, each method has a footprint around the cable trench where direct physical impacts may occur. This will be a direct, short term (construction), permanent and negative effect. The visibility of archaeological receptors encountered using a cable plough may be significantly reduced and effective mitigation may require additional methodologies such as geophysical assessment.

5.4.2.58 The Scheduled Monuments, Boyndie Old Kirk (**WA 1040**), Hill of Alvah cairns (**WA 1035**) and The Hills of Boyndie Scheduled area around the prehistoric barrows and enclosures (**WA 1010**) are located in the area of the OnTI. As scheduled monuments these sites are considered of **high value** and would, in the absence of mitigation potentially be subject to direct physical impacts of **high magnitude**. The significance of effect in the absence of mitigation therefore is **major adverse**. Following mitigation, i.e. micrositing to avoid these receptors the significance of the effect will be reduced to **no effect**.

5.4.2.59 There are 76 undesignated Cultural Heritage Receptors within the modified onshore export cable route corridor which may be encountered by the cable trenching. Avoidance where possible comprises inherent mitigation within the design of the cable route. Where avoidance is not possible or previously unknown receptors are encountered during construction direct physical effects will occur to receptors within the footprint of the cable trenching, of **high magnitude**. The sensitivity of the receptors varies but they are likely to vary between local and regional importance – i.e. **low** and **medium sensitivity**. For example, the designed landscape around Eden House (**WA1063**), and possible sub-surface prehistoric cropmark features at Lower Inchdrewer (**WA1006**) (and similar types of features) are likely to be regarded as of regional importance, highlighted by the Environmental Policies of the Aberdeenshire Local Plan. The significance of effect in the absence of mitigation therefore is **moderate** or **major**. Following mitigation however the significance of the effect will be reduced to **negligible** (reduced to an acceptable level in terms of EIA).

Groundworks and Construction of Substation and Associated Buildings and Infrastructure

5.4.2.60 The construction of the substation site and associated structures which require groundworks or damage the ground surface may encounter unknown archaeological receptors. It is assumed that indirect physical effects from vehicles and machinery are working within the construction footprint. There are currently no known Cultural Heritage Receptors within the substation building footprint.

5.4.2.61 There are no known cultural heritage receptors within the footprint of the substation area, but there is potential for unknown receptors to be encountered. Direct physical effects to unknown receptors are likely to be of **high magnitude** to receptors of **unknown sensitivity,** leading to unmitigated effects of **minor to major significance**. Following mitigation, post-mitigation effects are likely to be reduced to **minor or negligible significance**.

Operation

Indirect Setting Effects

5.4.2.62 There are six designated cultural heritage assets within the visual envelope of the substation area which have been considered for indirect effects to their setting (Figure 5 of Technical Appendix 5.4 A: Transmission Work EIA: Baseline Review of Offshore and Onshore Archaeology); the recumbent Stone circle at Auchmaliddie (**WA1184**), the scheduled remains of Gight Castle (**WA1168**) and doocot (**WA1164**) the Designed Landscapes of Fyvie Castle (**WA1108**) and Hatton Castle (**WA1102**), and the Battle of Fyvie battlefield (**WA1110**).

5.4.2.63 The remaining two megaliths (one probably the Recumbent Stone and a flanker) within the recumbent stone circle at Auchmaliddie (**WA1184**) lie prone at the edge of an arable field (Photo-1060); striking quartzite stone suggesting the monument was an impressive and distinctive monument prior to falling into disrepair. Views towards the proposed substation site are to the west at a distance of around 4.5 km. Views are open, across rolling arable farmland. The existing overhead power line is the dominant modern element in the landscape as viewed to the west. The scale of the substation within the landscape, at this distance, is not judged to be a large change to the setting of this monument. As a scheduled monument, the receptor is of high sensitivity. Indirect effects to the setting of the receptor are judged to be of low magnitude. Therefore, it is judged that effects in the absence of mitigation are of moderate adverse significance. Following mitigation however the significance of the effect will be reduced by screening proposed for the substations area, which are judged to represent effective mitigation.

5.4.2.64 Gight Castle (**WA1167**, **1168**) and Doocot (**WA1164**) are located to the south of the substation site at a distance of around 5 km. The receptor is located within the upper slopes of the River Ythan and with effective screening by the topography and mature trees (Photo-1065). Therefore, it is judged that there is no effect.

5.4.2.65 Fyvie Castle (**WA1108**) and the Battle of Fyvie battlefield (**WA1110**) are located to the southwest of the substation site at a distance of over 6 km (Photo-1072). Considering the combined influence of distance from the site, intervening topography and mature tree cover, it is judged that there is no effect.

5.4.2.66 The designed landscape of Hatton Castle is located to the west of the proposed substation site, at a distance of over 6 km. Considering the combined influence of distance from the site, intervening topography and mature tree cover, it is judged that there is no effect.

Decommissioning

5.4.2.67 The effects of decommissioning will depend upon the methodology applied. It is assumed that they are at least equivalent to or lesser than the effects predicted for construction.

Proposed Monitoring and Mitigation

Approach to Mitigation

5.4.2.68 The following measures are designed to mitigate the effect of the construction, operation and decommissioning phases upon known Cultural Heritage Receptors, and to establish the presence of, and appropriate mitigation for, unknown assets. The generic measures proposed here apply to offshore and inter-tidal elements of the modified OfTI and modified OnTI ASAs. Measures specific to the modified OfTI for each area is described in the relevant section below. The primary aim of the 'Precautionary Principle' is the prevention of damage to receptors by proactively putting in place protective measures, rather than attempting to repair damage (which may be irreversible) after it has occurred. Specific mitigation includes:

- Avoidance of the Scheduled Monuments (**WA 1010**, **1035**, **1040**) by micrositing within the area of the modified OnTI;
- Avoidance of known undesignated Cultural Heritage Assets by micrositing where possible within the modified OfTI and modified OnTI export cable route corridors; and
- Mitigation in respect of previously identified geophysical anomalies (MORL 2012: HAID 40, 42) will depend upon whether they are re-located during the assessment of geophysical data – within the modified OfTI export cable corridor.

5.4.2.69 In addition, the following mitigation measures are proposed in addition to embedded mitigation within the modified OfTI and modified OnTI Rochdale Envelope.

5.4.2.70 No mitigation is proposed for the potential indirect effects of the operational phase of the modified OfTI.

Modified OfTI

Geophysical and Geotechnical Assessment

5.4.2.71 Geophysical and geotechnical datasets being acquired for the modified OfTI will be subject to archaeological assessment enhancing the Written Scheme of Investigation comprising an agreed program of Works in consultation with Curators (see reference 5.4.2.76 below). The modified OfTI design, and mitigation measures will be reported on pre-construction.

Exclusion Zones

5.4.2.72 The preferred method of mitigation is avoidance. Exclusion Zones placed around all discrete archaeological sites or more extensive areas identified within an EIA prohibit development related activities within their extents and have been widely applied in offshore contexts to sites and anomalies with known or potential archaeological significance. As the marine historic environment in Scottish and UK waters is still largely unknown and poorly documented, it is often not possible to fully assess the extent or importance of an archaeological site. In many instances, therefore, to assist developers with planning a scheme layout, the implementation of buffers around sites may be more appropriate.

5.4.2.73 In view of their potential archaeological significance, development exclusion zones will be placed around **WA 2000-2008**. Although these receptors have been classified as 'Dead' or have substantial positional uncertainties, remains may still be present; either fragmentary or buried within the modified OfTI ASA. A minimum exclusion zone of 50 m around each of these receptors will be implemented, pending further clarification on the presence or not of any remains through the assessment of the marine geophysical data. The WSI will also set out Exclusion Zones in relation to the OSPs located within the consented wind farm area in cognisance with the baseline previously assessed (MORL ES, 2012).

5.4.2.74 Wreck material can often be spread over a wide area in the vicinity of a wreck site and the buffers are expected to incorporate such material within their boundaries. In order to further refine the exclusion zone it is suggested that the results of any pre-construction seabed survey (i.e. Remotely Operated Vehicle (ROV)), and any other sites of potential archaeological interest are inspected by a suitably qualified archaeologist and it may be appropriate to have a suitably qualified archaeologist(s) involved in such survey fieldwork. In addition, in order to maximise the potential benefits of such work, it would be advantageous to seek archaeological advice prior to its implementation.

5.4.2.75 It is proposed that all exclusion zones will be marked on the scheme masterplans, including contract documents. The final modified OfTI will take account of these buffers, which may evolve as the project progresses subject to scheme design and survey requirements. If effects cannot be avoided measures to reduce, remedy or offset disturbance will be set out in a Written Scheme of Investigation (WSI) agreed with HS as outlined below.

Written Scheme of Investigation (WSI)

5.4.2.76 Following completion of geophysical and geotechnical assessment, a Written Scheme of Investigation (WSI) will be prepared in consultation with Aberdeenshire Council and Historic Scotland – reviewing and updating the existing WSI included as part of the 2012 MORL ES (Technical Appendix 1.3 A of MORL ES, 2012). This WSI will be compliant with existing archaeological guidance (specifically The Crown Estate/Wessex Archaeology 2010a) and should apply to all construction, operation and decommissioning activities with potential to have an effect upon cultural heritage receptors. It should be incorporated into the final environmental management plan for the modified OfTI and OnTI. The WSI will set out:

- When, how, why and by whom archaeological mitigation measures are to be implemented (including archaeological exclusion zones and buffers and micro-siting allowances); and
- Provide for the appointment of a retained archaeologist to carry out and/or co-ordinate archaeological mitigation activities and to monitor compliance with the WSI during construction.

Protocol for Archaeological Discoveries (PAD)

5.4.2.77 All construction, operation and decommissioning activities will be subject to a scheme-specific protocol document for dealing with archaeological discoveries. This will be compliant with existing archaeological guidance (specifically The Crown Estate/Wessex Archaeology, 2010b) and incorporated into the WSI (in line with the draft WSI included within Technical Appendix 1.3 A of the MORL ES, 2012). Compliance with the protocol will be monitored by the retained archaeologist during construction and installation.

Modified OnTI

Geophysical Assessment

5.4.2.78 The use of a Cable Plough during construction for the modified OnTI may preclude visual inspection of the subsurface. Therefore other methods of investigation, such as geophysical survey and assessment prior to cable installation, may be required to verify known sites or features of archaeological interest, and the potential for unknown receptors along the modified OnTI export cable corridor including the proposed substation site and associated buildings and infrastructure; particularly in relation to identified crop mark features. This will be discussed and agreed in consultation between MORL and the Aberdeenshire Council Archaeologist.

Screening

5.4.2.79 Indirect effects which maybe induced by the substations will be mitigated through screening of the substation structures.

Written Scheme of Investigation (WSI)

5.4.2.80 A WSI will be provided for the modified OnTI, outlining specific mitigation requirements identified by the Aberdeenshire Council Archaeologist, which will include the requirements for further investigation where necessary through a suitable programme of archaeological works.

5.4.3 Cumulative Impact Assessment

Summary

5.4.3.1 No significant cumulative effects have been identified within the modified OnTI and modified OfTI. This includes consideration of indirect effects to the setting of Cultural Heritage Receptors and the range of wind turbines considered for CIA with Chapter 5.3: Seascape, Landscape and Visual Assessment. No development is intervisible between sites assessed to potentially be subject to indirect effects (i.e. Auchmaliddie recumbent stone circle, WA 1184), the closest, the three turbines at Balquhindachy are judged to have no effect to key views between the receptor and the proposed development.

Assessment of Cumulative Effects

5.4.3.2 The specific developments that have been considered within this assessment are as follows:

- Beatrice Offshore Wind Farm (BOWL) and associated TI;
- Telford, Stevenson and MacColl Wind Farms (three consented wind farms);
- SHEFA-2 cable; and
- SHE-T cable, Caithness – Moray HVDC link.

5.4.3.3 Cumulative effects pertaining to BOWL were previously assessed to be not significant (MORL ES, 2012). Mitigation strategies relating to cultural heritage receptors have already been developed for BOWL, the MORL three consented wind farms.

5.4.3.4 The precise landfall and cable corridor for SHE-T is not currently known and therefore the potential geographical overlap with the modified OfTI is also unknown. However, should the SHE-T interact with the modified OfTI then it is considered that potential cumulative effects to unknown Cultural Heritage Receptors will be effectively mitigated by the strategies set out in this ES.

5.4.3.5 No other development likely to be of significance to cumulative impact assessment has been identified. The likelihood of cumulative effects from developments outside of the Moray Firth is considered to be remote.

Methodology

5.4.3.6 The assessment methodology has followed that outlined in the Moray Firth Offshore Wind Developers Group Discussion Document presented in Chapter 1.3: Environmental Impact Assessment.

5.4.3.7 As defined for the purposes of this assessment, cumulative effects are those which could occur as a result of the proposed development in conjunction with other, existing or planned offshore wind farms or other planned marine and coastal developments or activities. Cumulative effects may therefore occur to cultural heritage receptors that have the potential to be incrementally affected by other existing, consented and / or proposed developments or activities. These effects may be regarded individually as minor but collectively as significant. However, the emphasis is on the assessment of potentially significant effects rather than on comprehensively cataloguing every conceivable impact that might occur.

5.4.3.8 Individual sites at specific locations represent both archaeological receptors in themselves, but are also part of the archaeological resource as a body of data and as collective heritage. Hence, not only is it necessary to consider the full range of other plans or projects across the region, not just those in close proximity, but it is also necessary to consider how a number of effects upon a specific aspect of the collective heritage may result in a significant cumulative impact.

Cumulative Assessment

5.4.3.9 Cumulative effects in relation to the three MORL consented wind farms and modified OfTI (Whole Project) are only likely to occur at cable crossings (offshore cable and inter-array). The significance of effect is considered to be of **minor/negligible** significance following mitigation.

5.4.3.10 There is no geographical overlap between the Whole Project and the Beatrice development but there is a potential for overlap with the SHEFA-2 landfall in Boyndie Bay. Therefore a cumulative impact with other offshore development is considered to be **minor/negligible** following mitigation.

5.4.3.11 There is however the potential for unknown cultural heritage receptors to be encountered in relation to the Project and at the Boyndie Bay landfall of SHEFA-2. While the sensitivity and magnitude of effects could potentially be high, the significance of effect in the absence of mitigation is **major**. Mitigation strategies relating to cultural heritage receptors have already been developed for the consented wind farm projects. As such the same mitigation will apply for the modified OfTI. It is unknown at this time the mitigation strategies set out for the SHE-T and SHEFA-2 cable schemes. Potential cumulative impacts from cable schemes (SHE-T and SHEFA-2) will be reduced by the mitigation methods set out in this document (Table 5.4-3). The significance of any potential post-mitigation effect is therefore considered to be of **minor significance**.

5.4.3.12 Setting effects on Cultural Heritage Receptors in relation to the onshore substations has been considered taking into account the range of wind turbines considered for CIA with Chapter 5.3: Seascape, Landscape and Visual Assessment. No development is intervisible between sites assessed to potentially be subject to indirect effects (i.e. Auchmaliddie recumbent stone circle, **WA 1184**), the closest, the three turbines at Balquhindachy are judged to have **no effect** to key views between the receptor and the proposed development.

5.4.4 References

BOWL (2012) Beatrice Offshore Wind Farm Environmental Statement. Arcus Renewable Energy Consulting Ltd.

MORL (2012) Telford, Stevenson, MacColl Wind Farms and associated Transmission Infrastructure Environmental Statement: Technical Appendix 5.5A – Archaeology Technical Report, Moray Offshore Renewables Ltd.

Wessex Archaeology (2010a) Model Clauses for Archaeological Schemes of Investigation: Offshore Renewables Projects, The Crown Estate.

Wessex Archaeology (2010b) Protocol for Archaeological Discoveries: Offshore Renewables Projects, The Crown Estate.

Wessex Archaeology (2011a) Assessing Boats and Ships: Methodology Report, Unpublished report ref: 70861.04

Wessex Archaeology (2011b) Characterising Scotland's Marine Archaeological Resource, Unpublished report ref: 76930.04.

5 Human Environment

5.3 Seascape, Landscape and Visual Impact Assessment

5.3.1 Introduction

5.3.1.1 The Seascape, Landscape and Visual Impact Assessment (SLVIA) considers the effect on the seascape and landscape character and the effect on visual amenity (views) of the modified transmission infrastructure (modified TI) (Figure 5.3-1). The modified TI consists of modified Offshore Transmission Infrastructure (modified OfTI) - Offshore Substation Platforms (OSPs) and modified Offshore Export Cable Route Corridor; and modified Onshore Transmission Infrastructure (modified OnTI) - modified Onshore Export Cable Route Corridor and Onshore Substations. A Rochdale Envelope setting out the design parameters has been defined for the modified TI and is described further as it applies to the SLVIA in Section 5.3.2. The effects of the three consented wind farms (Telford, Stevenson and MacColl) were assessed in detail in the MORL ES (MORL, 2012).

5.3.1.2 The term Seascape, Landscape and Visual (SL&V) Receptors refers to the landscape and seascape character of the Moray Firth, and the communities of people who experience this environment, the relationships that they have with each other and the physical environment. Seascape character is an extension of landscape character, but emphasises other elements that are slightly different or more important at the coast, when defining the character of seascape compared to landscape.

5.3.1.3 Photomontages, panoramic photographs and plan / map figures, which form the visualisation section of this ES and support the written SLVIA are bound into one complete A3 document entitled 'Volume 4: Moray Offshore Wind Farm Modified TI SLVIA Photomontages and Visualisations'.

5.3.2 Rochdale Envelope Parameters Considered in the Assessment

Modified Offshore Transmission Infrastructure (Modified OfTI)

Offshore Substation Platforms

5.3.2.1 Indicative locations of the OSPs have been assumed for the SLVIA; up to two AC OSPs are planned within the three consented wind farm sites. The indicative locations of the OSPs assumed for the SLVIA Rochdale Envelope are shown Figure 5.3-2 and are identified as OSP 1 (to the north-west) and OSP 2 (to the south) to represent the worst-case scenario.

5.3.2.2 Both OSPs will have a maximum platform length of 100 m, platform width of 100 m and platform height of 70 m. The maximum height of 70 m is the total height of the topside structure (the substation 'box') and visible jacket foundations / air gap, above LAT. Jacket foundations are assumed for the SLVIA. The SLVIA assumes that the interface level (the height of visible jacket structures above water) is 20 m above LAT and the height of the topside structure is 50 m. The jacket foundations for the OSPs will have four sides and up to 6 legs per jacket structure, supported in a lattice tower arrangement and painted yellow for navigational marking.

5.3.2.3 OSPs will be constructed with suitable installation vessels. The Rochdale Envelope assumes 240 vessel days are required over the construction period (described in Chapter 2.2), with an additional 40 vessel movements to and from port. Illustrative photographs of OSP installation vessels are shown in Figure 5.3-2 to demonstrate the types of vessel which will be visible during the OSP construction period.

Modified Offshore Export Cable Route

5.3.2.4 The Rochdale Envelope for the SLVIA assumes that up to four offshore export cables will be installed in a cable trench in the sea bed, between the OSPs and the modified export cable landfall at Inverboyndie (approximately 52 km from the southern boundary of the three consented wind farms), within the modified offshore export cable route corridor shown in Figure 5.3-2. The Rochdale Envelope for the modified offshore export cable consists of up to four sub-sea trenches, which would not be visible, laid within the modified offshore export cable route corridor of maximum 1200 m width (as a result of each cable being spaced four times water depth apart).

5.3.2.5 The Rochdale Envelope for the SLVIA assumes that the modified offshore export cable route will be laid by a cable laying vessel, as described in Chapter 2.2 (Project Description), operating during the construction period. The assessment also assumes that there will be a maximum of 240 cable laying days over a two year period. Movements to and from port will be dependent on the port location, which has not yet been selected, but the Rochdale Envelope for the modified offshore export cable route is based on 40 vessel movements to and from the construction port and site. Illustrative photographs of cable laying vessels are shown in Figure 5.3-2 to illustrate the types of vessel which will be visible during the cable laying construction period.

Modified Onshore Transmission Infrastructure (Modified OnTI)

5.3.2.6 The Modified Onshore Transmission Infrastructure (Modified OnTI) consists of the modified export cable landfall (intertidal), up to four separately bundled onshore export cables and two onshore substations (the MORL substation and the regional Transmission Owner (TO) substation). The OnTI SLVIA Study Area is shown in Figure 5.3-3.

Modified Onshore Export Cable Route Corridor

5.3.2.7 The Rochdale Envelope for the SLVIA assumes that the export cables will be installed in four separate 4 m wide trenches (individual trenches for each trefoil circuit) within a 60 m working width corridor in the 500 m wide modified onshore export cable route corridor, between the modified export cable landfall at Inverboyndie and the onshore substations location (approximately 33 km) (Figure 5.3-3).

5.3.2.8 Several installation methods may be used for the underground onshore export cable installation: cable plough, directional drilling (landfall and water crossings) and open trench. A description of these installation methods is provided in Chapter 2.2 (Project Description).

5.3.2.9 The Rochdale Envelope for the SLVIA assumes that the modified export cable landfall at Inverboyndie beach will be installed in four separate 4m wide beach open pit trenches (one for each subsea cable circuit, each circuit comprising trefoil arrangement) extended down to the low tide level (with the sides of the trench typically temporarily supported). The installation method used for the modified export cable landfall installation is likely to be open trenching, or horizontal directional drilling (HDD). A description of these installation methods is provided in Chapter 2.2 (Project Description).

Onshore Substations

5.3.2.10 The Rochdale Envelope for the SLVIA assumes that two onshore substations will be required to connect to the onshore grid network, consisting of the MORL onshore substation (MORL Substation) and Transmission Owner (TO) substation. These two substations will be co-located within a single compound located to the south-west of New Deer, Aberdeenshire, as shown in Figure 5.3-3. The Rochdale Envelope assumes that the onshore substations include the MORL and TO Substations within a single substation compound of approximately 305m x 270m (Figure 5.3-5), located indicatively within a wider 'substations area' that includes landscaping and screening, which is indicatively shown in Figure 5.3-29.

5.3.2.11 A substation layout plan showing the assumed dimensions and layout of the MORL onshore substation and TO substation is shown in Figure 5.3-5. The layout of the onshore substations has been modelled using several 'development envelopes' related to the height, width and depth of each part of the substation (shown in Figure 5.3-5). The envelopes are modelled at the maximum height of the largest structures or buildings within each area and therefore represent a worst-case scenario, showing the area in which the substations will be built. These envelopes are used as the basis for visual modelling in the photomontages and the assessment of effects. Colours are used solely to differentiate between the MORL substation and the TO substation and to differentiate between buildings and external electrical equipment. The colours shown are not indicative of the colour of the substation buildings, which will be agreed with Aberdeenshire Council at detailed planning stage to help reduce the visual impact of the onshore substations.

5.3.2.12 The MORL substation Rochdale Envelope broadly consists of the following:

- 2 x GIS Switchgear Buildings (11.5 m);
- 2 x Reactor Units (9 m);
- 4 x Auto Transformers (11.28 m);
- Pylons (7 m & 12.5 m); and
- Various Electrical Equipment (7 – 8 m).

5.3.2.13 The TO substation Rochdale Envelope broadly consists of the following:

- GIS Switchgear Building (12.65 m);
- Other Building (4.7 m);
- Fenced Enclosure containing Electrical Equipment (4 m); and
- Various Electrical Equipment (7 – 12.65 m).

5.3.2.14 Lighting of the substations will be required, but this is assumed to be passive lighting (passive infra-red) and that the onshore substations will not be permanently lit. Landscape and screening works are proposed within the onshore substation area and are described in full in Section 5.3.4 (Mitigation) and indicatively shown in Figure 5.3-29.

5.3.3 Baseline Information

Introduction

5.3.3.1 The SLVIA baseline covers both seascape/landscape character and visual amenity. The seascape/landscape baseline provides an understanding of the seascape/landscape in the area that may be affected – its constituent elements, its character, distinctiveness, condition and value, and the way this varies spatially. The visual baseline establishes the area in which the modified TI may be visible, the different groups of people who may experience views of the modified TI, the viewpoints where they will be affected and the nature of the views at those points.

5.3.3.2 The baseline describes aspects of the seascape/landscape and visual environment that may be significantly affected, as required by Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 and Schedule 3 of the Marine Works (Environmental Impact Assessment) Regulations 2007 (together the EIA Regulations). Establishing the baseline will, when reviewed alongside the description of the modified TI, form the basis for the identification and description of the effects of the modified TI.

5.3.3.3 The baseline seascape/landscape character assessment from the MORL ES (MORL, 2012) has been used to define the baseline conditions. A coastal character methodology was applied to identify Coastal Character Areas (CCAs) informed by, and at a scale comparable to, the existing SNH Landscape Character Assessments (LCAs) (SNH, 1997 and 1998).

5.3.3.4 The baseline description of the SL&V receptors that may be affected is primarily determined by the physical footprint of the modified TI and their Zone of Theoretical Visibility (ZTV) (Figure 5.3-15). An overview of the seascape/landscape baseline is described and a scope assessment identifies receptors that may experience significant effects, which require to be assessed in full. A detailed description of the baseline for each seascape/landscape and visual receptor that may be significantly affected is provided in the Impact Assessment in Section 5.3.4.

5.3.3.5 The baseline also describes current pressures that may cause change in the landscape in the future, in particular drawing on information for wind energy developments that are not yet present in the landscape, but are at other stages in the consenting process (as requested in consultations with Aberdeenshire Council). Operational and under construction wind energy developments are regarded as part of the baseline landscape character of the area. Any changes resulting from the modified TI are assessed within this context in the assessment of landscape and visual effects.

Consultations

5.3.3.6 A brief narrative of consultation undertaken for the SLVIA, including scoping responses, is provided in Table 5.3-1. Full scoping responses are provided in Chapter 1.3.

Table 5.3-1 Summary of Consultation Responses

Organisation	Consultation Response	MORL Approach
Scottish Natural Heritage (SNH) / Joint Nature Conservation Committee (JNCC) 23rd May 2014	OfTI • There was a comprehensive SLVIA provided in the ES supporting the Section 36 and marine licence applications for the Project. • SNH would welcome some further consideration of the offshore substations as part of the assessment for the modified TI. • This assessment can use the baseline character assessment in the MORL ES (MORL, 2012) to consider any additional, or different, SL&V effect from those previously assessed in respect of the proposed OSPs in combination with the (consented) wind turbines.	OfTI • Further consideration of OSPs provided in this ES. • Additional/different SL&V effects considered in respect of baseline character assessment from MORL ES (MORL, 2012).
Scottish Natural Heritage (SNH) 14th May 2014	OnTI • SNH considered that the impact (of the OnTI) would not raise any landscape concerns that would be of regional or national importance and therefore deferred the assessment of the landscape and visual impact of the project to Aberdeenshire Council. • Recommended giving strategic consideration to other cable works planned or proposed in the vicinity of the Moray coast as proposed in Chapter 2.28 in the National Planning Framework 3.	OnTI • Due to lack of detail about schedules and design parameters, it has not been possible to carry out an assessment of the likely cumulative effects of enhancing the high voltage transmission network identified in NPF 3 (Scottish Government, 2014).

Organisation	Consultation Response	MORL Approach
Aberdeenshire Council Consultation Meeting 16th May 2014 Scoping Response 21st May 2014	• A LVIA should be produced in accordance with GLVIA (3rd Edition). • Sensitive viewpoints or receptors in the area of the modified TI should be assessed. • The Culsh Monument, New Deer should be used as a more strategic viewpoint for the LVIA. • The EIA should contribute to the site design process, in terms of locating and designing the development to have minimal/no adverse effects on the landscape. • The LVIA should consider other planning applications with significant visual implications for the area, particularly wind energy projects. • The cumulative assessment can extend to around 6km from the proposed development site. • All elements of the modified TI should be designed to have minimal impact on the character of the area. • Onshore substation buildings should be placed as low as possible, with screening from sensitive local receptors to minimise potential adverse visual effects. • Quality design of buildings and landscape would assist assimilation of the onshore substations into the location. • Measures to establish a development with bespoke and positive aesthetics should be considered. • Elements of the development with adverse effects should be screened with earthworks and planting. • All earthworks should be designed to appear organic and naturalistic. • Screen planting should be based on the list of native plants appropriate to the Buchan area. • Existing woodland should be conserved and incorporated into the development. • Landscape proposals would be a major factor of mitigation across the development site. • The proposal should indicate the location of all proposed elements of landscape and related features. • Other habitat development (with biodiversity value) should be designed into the development proposal. • A landscape maintenance plan should address the long-term management of the landscape scheme.	• LVIA produced in accordance with GLVIA (3rd Edition). • Viewpoint assessment undertaken. • Culsh Monument included in assessment. • Landscape mitigation proposals are proposed as part of the design of the modified TI. • LVIA focuses on potentially significant cumulative effects • Onshore substation Study Area defined as 6 km radius area. • Landscape proposal for onshore substation includes woodland screening and landscaping to minimise potential adverse landscape and visual effects. • Woodland screen planting is based on native plants and woodland design appropriate to the area. • Landscape mitigation proposals include other habitat enhancement proposals including marshy grassland and hedgerow establishment. • Landscape maintenance plan will be produced to address long-term management of the landscape scheme.

Seascape/Landscape Baseline Overview

SLVIA Study Area and Offshore Substation Platforms (OSPs)

5.3.3.7 The SLVIA Study Area covers a 50 km radius area from the three consented wind farms, covering the Moray Firth, its adjacent coastline in Caithness, Morayshire and Aberdeenshire, and the southern edge of South Ronaldsay in the Orkney Islands.

5.3.3.8 The SLVIA Study Area includes the Caithness coast between Duncansby Head and Brora, and extends up to approximately 30 km inland and encompasses the Flat Peatlands and the Moorland Slopes and Hills landscape types of Caithness, which define the inland extent of visibility of the sea. The Caithness coastline is within National Seascape Unit 7 – East Caithness and Sutherland, and is defined mainly by Seascape Character Type 2: Rocky Coastline with Open Sea Views, with smaller sections of Type 1: Remote High Cliffs and Type 3: Deposition Coastline with Open Sea Views (Figure 5.3-6). The Telford and Stevenson wind farm sites are located approximately 22 km from Caithness, at their closest points.

5.3.3.9 The Study Area includes the North Aberdeenshire and Morayshire coast between Lossiemouth and Banff, located approximately 40 km from the MacColl site, at its closest point. This coastline is within the North Aberdeenshire / Morayshire Coast National Seascape Unit 5. This coastline is defined mainly by National Seascape Character Type 2: Rocky Coastline with Open Sea Views and Type 3: Deposition Coastline with Open Sea Views (Figure 5.3-6). The key characteristics of these national seascape units and seascape character types are described in full in Chapter 5.4 of the MORL ES (MORL, 2012).

5.3.3.10 Coastal Character Areas (CCAs) are defined within the SLVIA Study Area around the OSPs in Figure 5.3-6. The key characteristics and features of these CCAs are described in Chapter 5.4.3 of the MORL ES (MORL, 2012) and described further where relevant to the modified TI in this ES.

5.3.3.11 All National Seascape Units/Types and CCAs within Caithness are located at a minimum distance of 23.4 km from the indicative location of OSP 1. All National Seascape Units/Types and CCAs within Moray and Aberdeenshire are located at a minimum distance of 46.4 km from the indicative location of OSP 2.

Modified Offshore Export Cable

5.3.3.12 The Rochdale Envelope for the SLVIA assumes that the modified offshore export cables will be installed in up to four cable trenches in the sea bed, between the OSPs and the modified export cable landfall point at Inverboyndie. The coastal character of the Moray and Aberdeenshire Coastline near the modified offshore export cable route is illustrated in Figure 5.3-8. The coastline has been divided into 17 Coastal Character Areas (CCAs). Landscape Character Types (LCTs) are also defined in terrestrial areas along the coast, where the sea or coast provide a defining influence, and further inland where the sea and coast do not define the landscape characteristics.

5.3.3.13 The modified offshore export cable route corridor is principally located immediately offshore from National Seascape Unit 5: North Aberdeenshire / Moray Coast (Figure 5.3-8), which has the following key characteristics:

- North–facing generally 'straight' coastline with small indentations, few significant headlands and with open views to North Sea;
- Low cliffs / rocky coastline predominates;

- Farmland backs coast and this generally comprises a low lying gently rolling open plain with some Remnant heathland present in places; and
- Small and widely spaced settlements clustered in the main at base of cliffs or inlets, many of these are of historic interest and all have a strong relationship to the coast.

5.3.3.14 The modified offshore export cable route corridor is located immediately offshore from the Rocky Coastline with Open Sea Views National Seascape Type covering the North Aberdeenshire coast (Figure 5.3-8), which has the following key characteristics:

- Long straight stretches of coastline with cliffs rise to some 30 m height and often with a raised beach edge.
- Few significant headlands, although geological differences create an indented coast with bays and inlets, arches and caves;
- Harder volcanic rocks producing a more resistant coastline of promontories, low cliffs and rocky shoreline.
- Compact fishing villages are located at the base of cliffs in small bays while castles and cliff top forts occur on headland locations, highlighted against the simple sea.
- Settlements and built features appear to be spaced at even intervals and thus provide a visual rhythm of foci along the coast.
- Views over the North Sea are generally wide and open.
- Shipping is a common feature seen out to sea and some isolated industry occurs along the coast.
- While these are exposed seascapes, their agricultural hinterland, the presence of settlement and nearby roads and also views of shipping and occasional industry, limits the sense of wildness likely to be experienced.

5.3.3.15 The modified offshore export cable is located immediately offshore from the Boyndie Bay CCA (Figure 5.3-8), within which the modified export cable landfall is located, which has the following key characteristics:

Maritime Influences

- Broad, concave bay with a mainly north-east orientation.
- Smaller, local bays formed at Inverboyndie and Banff Bay, separated by craigs around Meave Point.
- Shipping is a common feature seen out to sea.
- Water based recreation and beach activities, e.g. surfing.
- Harbours ar Banff and Macduff with fishing and maritime vessels.
- Low level of shipping parallel to coast and some recreational sailing.
- Views across the bays towards headlands and out to sea to the distant horizon.

Character of Coastal Edge

- Rocky, undulating coastline with elevated views along the coast and across the open expanse of sea.
- Sea views framed in places by undulations in the landform and in bay areas.

- Coastline includes large number of indentations, stacks and cliffs, such as the Tumblers.
- Sandy beaches at Inverboyndie Beach and Banff Beach.

Character of Immediate Hinterland

- Topography rising to form coastal hills adjacent to the vertical cliffs which contains sandy beaches.
- Hinterland is heavily influenced by urban areas of Banff and Macduff on either side of Banff Bay and the River Deveron.
- The main A98 road runs parallel to coastline.
- Recreational use of sandy beaches at Inverboyndie and Banff Beach, with coastal footpaths, car park, play areas and visitor facilities including Banff Links Caravan Park.
- Inverboyndie beach is backed by golf links to the east - the blue roofed former club house is still present.

Wildness / isolated Coast

- Although it is exposed in places, built features including main road, communications / power lines and urban area limit the sense of wildness likely to be experienced.
- Some areas inaccessible due to vertical cliff faces.

Modified Onshore Export Cable Route Corridor (and Modified Export Cable Landfall)

5.3.3.16 The LVIA for the modified onshore export cable has been undertaken within the OnTI Study Area as shown in Figure 5.3-3, which extends between the North Aberdeenshire coast, Fyvie to the south, Averchirder to the west and Maud to the east. The OnTI Study Area defined encompasses the modified onshore export cable route corridor (including the export modified export cable landfall at Inverboyndie Beach) and the proposed onshore substations to the south-west of New Deer. The route of modified onshore export cable route corridor was influenced by known receptors and constraints, informed by a desk top study of Ordnance Survey data and a walkover study of the route in the field, together with landowner consultations along the route corridor.

Seascape Character

5.3.3.17 The modified onshore export cable landfall lies within the National Seascape Unit 5: North Aberdeenshire / Moray Coast, the Rocky Coastline with Open Sea Views National Seascape Type and the Boyndie Bay CCA, as described previously and shown in Figure 5.3-8.

Terrestrial Landscape Character

5.3.3.18 The existing terrestrial SNH character assessment for Banff and Buchan (SNH, 1997) covers the modified OnTI Study Area. The assessment divides the landscape into tracts that are mapped and referred to as landscape character types (LCTs). These have been subsequently subdivided into geographically specific landscape character areas (LCAs) which provide the baseline characterisation of the modified onshore export cable route corridor. Figure 5.3-10 identifies the landscape character areas within the OnTI Study Area, within which the onshore export cable will be located. The onshore modified export cable landfall falls within The Coast LCT, within the Cliffs of the North and South East Coast LCA. The remainder of the route passes through agricultural areas of Banff and Buchan, through the Western Coastal

Farmland LCA, before crossing the Deveron and Upper Ythan Valley LCA and then taking a route south-east through the Agricultural Heartlands LCA to the onshore substation area. The alignment of the onshore cable route through these LCAs is shown in Figure 5.3-10 and these LCAs are listed, along with a summary of their key characteristics in Table 5.3-2 below.

Table 5.3-2 Onshore Cable Route: Terrestrial Landscape Character

LCT	Landscape Character Area	Key Characteristics
The Coast	Cliffs of the North and South– East Coasts	Cliff edged headland, inlets occasional sandy bays and notable blow holes. Overall impression of open, large scale landscape, wide expanses of merging sea and sky. Vegetated slopes and frequent habitation, including ruined castles and mansion houses.
Coastal Farmland	Western Coastal Farmland	Large-scale landscape of coastal farmland, situated to the south of Portsoy, with shallow basins, broadly sweeping plains and infrequent rounded hills rising from the low ground to form gentle landmarks in the rolling terrain. The influence of the sea, which is glimpsed through the rolling landform, is a common element in determining the character.
River Valleys	Deveron and Upper Ythan Valley	Major river valley which is well settled, wooded and visually diverse. Incised through the surrounding agricultural plains, the Deveron and Upper Ythan rivers and their adjoining tributaries meander through predominantly shallow valleys, bounded by broad and rolling hill ridges to either side. Occasionally these valley sides become steeper as the River Deveron flows northwards where it joins the sea in Banff.
Agricultural Heartland	Agricultural Heartland	Agricultural land use over gently rolling landform. Open views over the surrounding, large scale landscape. Trees in shelterbelts, along ridges, around farms and in small coniferous blocks combine to provide some contrast and prevent a sense of bleakness. Field boundary types varied between fences and hedges to the south and east with some stone walls and consumption dykes to the north near Strichen.

Landscape Elements and Features

5.3.3.19 The land use within the modified onshore export cable route corridor varies somewhat between the four LCTs which characterise the route, but remains predominantly agricultural, with large arable and pastoral fields, relatively limited hedgerow cover and occasional semi-natural and plantation woodland. There are also areas of moss/wetter grassland and occasional surface water bodies in lower lying areas, but agricultural fields are extensively drained by a network of small burns around field boundaries.

5.3.3.20 The principal landscape elements within the modified onshore export cable route corridor are shown in Figures 5.3-18 – 5.3-22. Areas of woodland are identified as principal landscape elements that may be affected by the onshore cable route and are shown in these figures, including several areas of ancient woodland[1]. Landscape elements are identified within each LCA in Table 5.3-3.

[1] In Scotland, Ancient Woodland is defined as land that is currently wooded and has been continually wooded, at least since 1750.

Table 5.3-3 Onshore Cable Route: Landscape Elements

Landscape Element	Feature
Section 1: The Coast (Cliffs of the North and South East Coast LCA and Boyndie Bay CCA)	
Semi-natural ancient woodland:	None
Ancient woodland:	None
Other woodland:	C1 - Burn of Boyndie C2 - Black Hillocks Shelterbelt
Field boundaries:	Post and wire fences / consumption dykes
Farmland:	Predominantly Arable
Section 1 and 2: Coastal Farmland (Western Coastal Farmland LCA)	
Semi-natural ancient woodland:	None
Ancient woodland:	CF2 - Hills of Boyndie CF3 - Coach Brae CF4 - Hill of Alvah CF5 - Claret Brae
Other woodland:	CF1 - Cuttle Rig
Farmland:	Predominantly arable
Field boundaries:	Post and wire fences / consumption dykes / occasional scrub hedgerows
Section 2: River Valley (Deveron and Upper Ythan Valleys LCA)	
Semi-natural ancient woodland:	RV6 - Den of Inverichnie
Ancient woodland:	RV5 - Lower Wanford
Other woodland:	RV1 - Govel Hill RV2 - Berryton Cottage RV3 - Cormack's Hillock RV4 - Inverichnie
Farmland:	Predominantly arable, with some mixed farming / grazing.
Field boundaries:	Post and wire fences / consumption dykes / occasional scrub hedgerows and field boundary trees
Section 3: Agricultural Heartland (Agricultural Heartland LCA)	
Semi-natural ancient woodland:	None
Ancient woodland:	AH1 - Wood of Balchers
Other woodland:	AH2 - Mill of Balmaud AH3 - Yonderton
Farmland:	Predominantly arable
Field boundaries:	Post and wire fences / consumption dykes / occasional scrub hedgerows and field boundary trees
Section 4: Agricultural Heartland (Agricultural Heartland LCA)	
Semi-natural ancient woodland:	None
Ancient woodland:	None

Landscape Element	Feature
Other woodland:	AH4 - Slackadale AH5 - Hill of Cotburn AH6 - Cairnhill AH7 - Waterside
Farmland:	Predominantly arable
Field boundaries:	Post and wire fences / consumption dykes / occasional scrub hedgerows and field boundary trees
Section 5: Agricultural Heartland (Agricultural Heartland LCA)	
Semi-natural ancient woodland:	None
Ancient woodland:	None
Other woodland:	AH8 - Castlehill AH9 - Boghead AH10 - Howe of Teuchar AH11 - Bridge of Swanford
Farmland:	Predominantly arable
Field boundaries:	Post and wire fences / consumption dykes / occasional scrub hedgerows and field boundary trees

Landscape Designations

5.3.3.21 The majority of the modified onshore export cable route corridor is not subject to landscape designation.

5.3.3.22 The Deveron and Upper Ythan Valley LCA and the Cliffs of the North and South–East Coasts LCA of the modified OnTI Study Area, are defined by Aberdeenshire Council as Areas of Increased Sensitivity (AIS) in their Landscape Character Advice for Small Scale Development (LCASSD) (Aberdeenshire Council, 2012) (Figure 5.3-11). These LCAs are considered to be of increased landscape sensitivity due to their inherent characteristics and are coincident with what were historically identified as Areas of Landscape Significance (ALS) by Aberdeenshire Council. The Aberdeenshire Local Development Plan (Aberdeenshire Council, 2012) does not designate such areas and instead uses a landscape character approach to guide development (Policy 12 of the LDP).

5.3.3.23 The modified export cable landfall at Inverboyndie is located within the Cliffs of the North and South–East Coasts LCA, which is characterised by 'cliff-edged headlands, frequently fissured and bitten into by narrow inlets and, more rarely, hugging sheltered sandy bays such as those at Cruden and Sandend; although the overall impression is of an open, exposed, large-scale landscape, with wide expanses of sky and sea'. Specific relevant guidelines for this LCA in the LCASSD suggest that 'hedgerows and stone dykes should be maintained and reinstated' (LCASSD, Cliffs of the North and South East Coasts LCA section).

5.3.3.24 The modified onshore export cable landfall crosses the Deveron and Upper Ythan Valley LCA to the south of Bridge of Alvah, between Govel Hill, Inverichnie and Bridge of Denmill (Figure 5.3-11). The LCASSD advises that the Deveron and Upper Ythan Valley LCA is 'an area of increased landscape sensitivity due to the qualities of the River Deveron Valley, including; the deciduous trees; river side trees; beech hedging and views along the river'. This area is coincident with what was historically identified as an Area of Landscape Significance.

5.3.3.25 The modified onshore export cable route corridor passes to the west and south of Duff House GDL, which is located within the Deveron Valley, between Banff and Bridge of Alvah. Duff House GDL is a late 18th-century designed landscape of woods, walks, parks and ornamental architecture, valued for its scenic qualities and classical mansion, Duff House. Set on the west banks of the River Deveron, the designed landscape occupies a long and varied stretch of terrain ranging from the hills and the deep river gorge spanned by the Bridge of Alvah to the south, to the open flood plain of the river near its mouth at Banff to the north.

Onshore Substations

Terrestrial Landscape Character

5.3.3.26 The LVIA for the onshore substations' indicative location has been undertaken within a 6 km Study Area as shown in Figure 5.3-13. The definition of the Study Area for this assessment has been chosen based on project specific desk study, fieldwork and consultation. The onshore substations Study Area is principally characterised by the Agricultural Heartland LCT, which encompasses the full onshore substations Study Area. The majority of the central, northern and western parts of the Study Area characterised by the Agricultural Heartland LCA, with the south-eastern parts of the Study Area defined by the Northern Rolling Lowlands LCA and the Ythan Strath Farmland LCA.

5.3.3.27 The onshore substations are located within the Agricultural Heartlands LCA as identified in Aberdeenshire Council's Strategic Guidance SG Landscape 1: Landscape character and described in the Landscape Character Assessment of Banff and Buchan, Cobham Resource Consultants 1997, SNH Review No 37. Within Aberdeenshire the Agricultural Heartland landscape is extensive and covers several different geographical areas. Agricultural plains are the prominent characteristic and they tend to be influenced by the interior landscapes rather than the coast. Some diversity is created by elevation, landform and the incidence of shelterbelt woodlands and wooded estates.

5.3.3.28 The Banff and Buchan landscape assessment describes the area as follows:

"The gently rolling landform allows open views of the surrounding landscape, and on clear days the movement of clouds overhead forms patterns of light and shade across the broad plains. The frequent scattering of broad-leaved trees in shelterbelts along hill-ridges, around farms and, more occasionally, in small coniferous blocks, combine to enliven the landscape and prevent any feeling of bleakness in this vast agricultural plain. Field boundaries vary, including fence-lines, beech and thorn hedges to the south and east, and the occasional stone walls and consumption dykes to the north near Strichen. Farmsteads are frequent in this relatively well-settled landscape, as are small hamlets such as New Byth. Larger villages include Strichen, a fine example of a planned village, set in the sheltered North Ugie valley; New Deer, set on a ridge overlooking rolling farmland; and Cuminestown, the plan of which resembles the letter Z."

5.3.3.29 Scattered churches and community buildings provide features and gathering points within the landscape. These, as well as the larger settlements and the large numbers of farms and dwellings are connected by an extensive network of minor roads. Along with the geometrically laid out fields and angular plantings, these create a strong - patchwork type - pattern across the rolling landscape, which is emphasised by the variety of arable crops.

5.3.3.30 The settled landscape is crisscrossed by pole mounted transmission lines and the pylon mounted transmission line is a prominent feature in some locations. Views within the Agricultural Heartland landscape are confined in places to local areas with the rolling landform providing containment as well as vantage points where more distant views become available.

5.3.3.31 Although the land use of the onshore substation Study Area is predominantly agricultural, there is a pattern of scattered woodland shelterbelts, larger woodland blocks/plantations and semi-natural woodlands, particularly along the Deveron Valley to the west and the Braes of Gight to the south of the Study Area. The baseline woodland context of the area is illustrated in Figure 5.3-14. There is a frequent scattering of broad-leaved trees in shelterbelts along hill-ridges, around farms, and in small coniferous blocks, which combine to diversify the agricultural plain. There are few areas of extensive woodland in the area, with the most substantial being plantation woodlands, such as around the Howe of Teuchar and semi-natural woodlands within the Deveron Valley, such as the ancient woodlands of Gight, which represent some of the least disturbed native woodland in the Grampian lowlands. Comparatively more recent plantings are often associated with the estates, and include avenues, policies and shelterbelts. The existing woodland pattern evident in the landscape has informed the indicative landscape mitigation proposals for the onshore substations, described further in Section 5.3.4 and shown in Figures 5.3-28 and 5.3-29.

Landscape Elements and Features – Site Analysis

5.3.3.32 A site analysis of the substations area and surrounding local landscape has been undertaken and is illustrated in Figure 5.3-16. Key characteristics of the local landscape around the substations area are described as follows:

- Land use primarily arable farmland, interspersed with strong field boundaries of either coniferous planting, traditional drystone walls or post and wire fencing;
- Large scale electrical pylons and overhead lines traverse the substation area between Mains of Asleid and East Swanford;
- Field boundaries generally determined by hedgerows and post and wire fences with some drystone walls (consumption dykes) in varying conditions;
- Range of vegetation, including woodland shelterbelts and blocks of coniferous woodland, particularly along the Burn of Alseid and adjacent to minor road on the eastern boundary;
- Post and wire fences and drystone walls (consumption dykes) define fields within the site;
- Gently rolling landform of subtle undulations, occasionally dropping more notably into burns;
- The substation area is characterised by gently undulating landform with elevations generally between 100-110m AOD;
- To the south and west the land gently slopes away more steeply towards the Burn of Asleid, with the steepest incline to the south where the level falls to approximately 95m AOD;
- Areas of higher ground in the wider landscape can be found to the east, north-east, west and north-west of the site, on either side of the 'Little Water' river;
- Scattered detached houses and farmsteads with large steadings, with a cluster of dwellings around the Maryhill crossroads;

- North Millbrex Church present on distant skyline;
- Network of numerous watercourses and field drains, which drain the agricultural fields;
- Localised mosses and occasional surface water in areas of wetter, low-lying ground to the west/north-west e.g. Moss of Swanford;
- Numerous single turbines within the landscape. Three turbine wind farm on the Hill of Balquhindachy is most prominent in views from the site; and
- Network of B-roads and single track farm access lanes.

Landscape Designations

5.3.3.33 There are no landscape designations within the onshore substations Study Area, with the nearest being Hatton Castle Garden and Designed Landscape (GDL) located approximately 6.5 km to the west of the onshore substations and Fyvie Castle GDL located approximately 7 km to the south-west.

Visual Baseline Overview

SLVIA Study Area – Offshore Substation Platforms (OSPs)

5.3.3.34 There are a number of visual receptors, consisting of settlements, routes and features/attractions in the SLVIA Study Area that require consideration in the assessment of the modified TI, as views from them may be affected by the OSPs. These are described briefly below and shown in Figure 5.3-7.

Settlements

5.3.3.35 The SLVIA Study Area covers a large part of North East Caithness and the Morayshire and Aberdeenshire Coasts. Settlement along the Caithness coasts consists predominantly of scattered farms and crofts, with occasional villages such as Helmsdale, Dunbeath, Lybster and Keiss. Wick is the largest settlement in the Caithness part of the SLVIA Study Area; the town straddles the River Wick and extends along both sides of Wick Bay. In Caithness, Sarclet is the closest settlement to OSP 1 (23.7 km) and Wick is the closest large settlement to the indicative (worst-case) location of OSP 1.

5.3.3.36 In Moray / Aberdeenshire, the closest settlement to the indicative (worst-case) location of OSP 2 is Portknockie (46.6 km). The areas to the south of the Study Area covering the Morayshire and Aberdeenshire coasts contain a substantial amount of development, the main settlements include Lossiemouth, Buckie, Cullen and Banff, with smaller settlements at Portgordon, Findochty, Portknockie, Portsoy and Whitehills located within the sheltered bays along this coast.

Roads

5.3.3.37 There are numerous road corridors traversing the SLVIA Study Area, many of which are associated with urban development, while others provide access to the wider countryside. The main road corridors within the Caithness part of the Study Area are the A9(T), A99, A882, A836 and A897, with minor roads connecting the more remote parts of the Study Area including the B870, B874 and B876. The main road corridors within the Morayshire/Aberdeenshire part of the Study Area are the A99, A941 and A942.

5.3.3.38 The closest main road to OSP 1 is the A99, Helmsdale to John O' Groats, which is located approximately 25.2 km west of the three consented wind farm sites at its

closest point. The A9(T) is located approximately 34.2 km from OSP 1 at its closest point and the A882 is located 28 km from OSP 1. The A98 road corridor in Morayshire is located at a minimum distance of 47.9 km from OSP 2, with other road corridors in Morayshire located at greater distances.

Railways

5.3.3.39 The SLVIA Study Area includes one main railway line, running being Inverness to Wick and Thurso. The line follows the coast between Brora and Helmsdale before turning inland to a route along Strath of Kildonan outside the Study Area. The line re-enters the Study Area near Halkirk, where it branches north to Thurso and south east to Wick. The line is located over 33 km from OSP 1 at its closest point, but is generally located at longer distances.

Long distance Routes

5.3.3.40 National Cycle Route 1 (NCR1) traverses the northern part of the Study Area, shown in Figure 5.3-7, running along the north Caithness coast between John O' Groats and Thurso. The coastline and settlements of Morayshire are linked by a waymarked coastal walking trail, the Moray Coast trail, of approximately 50 miles between Findhorn and Cullen. The Moray Trail takes in landscapes from rugged cliffs, caves and sheltered coves to fishertown harbours and sweeping stretches of sandy beaches. The Moray Firth is one of 12 national tourist routes, designed to provide the travelling holidaymaker with an alternative to the main trunk roads and motorways. The route has been selected because it is attractive in its own right but also to offer a variety of things to see and do on the way to a main destination.

Attractions and Visitor Facilities

5.3.3.41 Tourism and recreation in the area are addressed in Chapter 5.5: Socio-economics. There are features and resources of interest to visitors in the Study Area; John O' Groats is popular with tourists because it is one end of the longest distance between two inhabited points on the British mainland. The most northerly point in the British mainland is located nearby at Dunnet Head. Some of the coastal villages and harbours provide attractive locations to stay for tourist visitors, including Keiss, Dunbeath and Helmsdale. The natural and historic environment of the Caithness coast provides extensive interest to visitors. The Caithness landscape, and particularly the coastline, is rich with the remains of human occupation from the pre-historic era to the present day, and there are numerous sites where this history is interpreted for visitors. The underlying geology, harsh climate and long history of human occupation have shaped the distinctive natural heritage. The landscape incorporates both common and rare habitats and species, and Caithness provides a stronghold for many once common breeding species of interest. The Moray coastline has a string of sandy beaches and accessible coastal settlements such as Buckie, Lossiemouth, Findochty, Portknockie and Cullen, have long been popular for family holidays. For the walker there are extensive coastal walks in the Study Area, taking in cliffs, arches and stacks as well as sand and dunes.

Viewpoints

5.3.3.42 The assessment of SL&V effects is informed by a series of 24 viewpoints, which were selected to cover locations with specific receptors of importance within the ZTV (Figure 5.3-7) for the three consented wind farms and OfTI, as assessed in the MORL ES (MORL, 2012) such as recognised viewpoints, designated landscapes, important routes and attractions. Viewpoints for the SLVIA were considered and agreed in consultation with The Highland Council, Moray Council, Aberdeenshire Council and

SNH as part of the MORL ES (MORL, 2012). Viewpoints that were agreed in 2012 pursuant to this section were agreed in terms of the three consented wind farms and eight OSPs that were part of the originally assessed OfTI. As the proposed two OSPs remain in the Eastern Development Area (EDA), the viewpoints agreed in 2012 are still relevant.

5.3.3.43 Table 5.3-4 lists the viewpoints and provides information on their location, the type of receptor that experiences the view and their distance from the nearest indicative (worst-case) OSP location. A description of the baseline conditions in these views is described in the MORL ES (MORL, 2012) (Section 5.4.7). The location of these viewpoints is shown in Figure 5.3-7 and the existing views towards the three consented wind farms from each viewpoint are shown in the MORL ES (MORL, 2012) Figures 8.4-13 to 8.4-36 (MORL ES Volume 7).

Table 5.3-4: Viewpoints - OSPs

ID	Name	Easting	Northing	Distance (km) from nearest OSP	Receptors
1	Duncansby Head	340528	973247	46.3 km (OSP1)	Walkers / birdwatchers
2	Keiss Pier	335055	960934	37.1 km (OSP1)	Residents / tourist visitors
3	Sortat	328903	963016	42.2 km (OSP1)	Residents
4	Wick Bay	336985	951027	27.8 km (OSP1)	Residents
5	Sarclet (Sarclet Haven Info Board)	334989	943334	23.7 km (OSP1)	Residents / visitors
6	Hill O' Many Stanes	329516	938430	26.1 km (OSP1)	Walkers / tourist visitors
7	Lybster (end of Main Street)	324843	935082	29.6 km (OSP1)	Residents
8	Latheron (A9)	319803	933152	34.2 km (OSP1)	Residents / motorists
9	Dunbeath (nr Heritage Centre)	315957	929567	37.8 km (OSP1)	Residents
10	Berriedale (A9)	313153	924611	40.8 km (OSP1)	Residents / motorists
11	Morven	300482	928539	53.3 km (OSP1)	Walkers
12	Navidale	303766	916161	51.6 km (OSP1)	Residents
13	Catchory	325836	957348	39.9 km (OSP1)	Residents
14	Minor Rd, south side of Stemster Hill	319802	940395	35.9 km (OSP1)	Motorists
15	Whaligoe Steps	332051	940296	24.5 km (OSP1)	Tourist visitors
16	Lossiemouth, Prospect Terrace (Info Point)	323397	870574	55.5km (OSP2)	Residents
17	Buckie, Cliff Terrace	343091	865825	60 km (OSP2)	Residents
18	Portnockie - Bow Fiddle Rock Info Point	349411	868741	46.5 km (OSP2)	Walkers
19	Cullen, Viaduct & cycle path	350995	867102	47.9 km (OSP2)	Residents / cyclists / walkers
20	Bin Hill	347989	864267	51.2 km (OSP2)	Walkers
21	Findlater Castle	354169	867086	47.5 km (OSP2)	Tourist visitors / walkers
22	Portsoy	359071	866382	48 km (OSP2)	Residents
23	Ferry Route (Kirkwall to Aberdeen) north	388911	931385	34.7 km (OSP2)	Ferry passengers
24	Ferry Route (Kirkwall to Aberdeen) south	382009	950868	35.8 km (OSP1)	Ferry passengers

Modified Offshore Export Cable

5.3.3.44 The modified offshore export cable will be installed in cable trenches between the OSPs within the three consented wind farms and the modified export cable landfall at Inverboyndie. Views of the modified offshore export cable installation, consisting of cable laying and support vessels, may be experienced by people in views from settlements, roads and recreational routes near the North Aberdeenshire / Moray coast, such as those illustrated in Figure 5.3-9. In particular, the modified offshore export cable installation may be experienced in views from the closest section of the coastline to the modified offshore export cable route, between Portsoy and Macduff, around Boyndie Bay and Boyne Bay. This area includes settlements at Banff, Macduff, Inverboyndie, Whitehills and Portsoy; and route corridors including the A98, B9139 and National Cycle Route 1. This closest section of Boyndie Bay also includes several recreational areas where groups of people may experience views of the modified offshore export cable installation, including Inverboyndie and Banff Beach, picnic sites at Knock Head, caravan sites at Banff Links, Whitehills and Portsoy.

5.3.3.45 Viewpoint locations along the Moray / North Aberdeenshire coastline are representative of views experienced by people along this coastline, including Buckie (Viewpoint 17), Portnockie (Viewpoint 18), Cullen (Viewpoint 19), Bin Hill (Viewpoint 20), Findlater Castle (Viewpoint 21), Portsoy (Viewpoint 22) as shown in Figure 5.3-9. A description of the baseline conditions in these views is described in Section 12.3.4 of the MORL ES (MORL, 2012). The existing views towards the three consented wind farms over the modified offshore export cable route from each viewpoint are shown in the MORL ES Figures 12.3.4-13 to 12.3.4-36 (MORL, 2012). An additional viewpoint has been included in this assessment of the modified TI at Inverboyndie Bay (Viewpoint 25). This viewpoint is located on the A98 layby near Banff which overlooks Inverboyndie Bay and illustrates the seascape setting of the closest parts of the offshore cable route to the modified export cable landfall. The existing view from this viewpoint is illustrated in Figure 5.3-17.

Modified Onshore Export Cable Route (and Modified Export Cable Landfall)

5.3.3.46 There are a number of settlements within the OnTI Study Area (Figure 5.3-12), ranging from the coastal town of Banff to villages such as New Deer and Cuminestown to scattered rural properties. These settlements are linked by a network of roads, including the main routes of the A98, A97 and A947. No railways are present in the OnTI Study Area.

5.3.3.47 National Cycle Route 1 (which is also part of the North Sea Cycle Route) runs through the search area several times, passing from Maud to Turiff, then up to Banff and across to Portsoy. There are no officially recognised Long Distance Routes (walking routes) in the search area, although a small section of The Formartine and Buchan Way (one of Scotland's Great Trails) runs less than 500m away from the south east corner of the area. There are also several regional footpath routes used by walkers, as well as cyclists.

5.3.3.48 A number of tourist and other visitor attractions are found within the onshore export cable search area, including beaches, Duff House and grounds (GDL) and historic landscape features, including a number of castles.

5.3.3.49 The principal visual receptors within 1km of the modified onshore export cable route corridor are shown in Figure 5.3.12 and at more detailed scale in Figures 5.3-23 to 5.3-27. Visual Receptors are identified within each LCA in Table 5.3-5 below.

Table 5.3-5 Onshore Cable Route: Visual Receptors

Type of Receptor	Visual Receptors
Section 1: The Coast (Cliffs of the North and South East Coast LCA and Boyndie Bay CCA)	
Main settlements/villages:	Banff, Inverboyndie, Whitehills
A and B Roads:	A98, B9038, B9139
Long Distance Routes/Paths:	NCN 1, Core Path - Banff Links, Core Path - Disused Railway
Recreation:	Inverboyndie Beach, Banff Links Caravan Park
Section 1 and 2: Coastal Farmland (Western Coastal Farmland LCA)	
Main settlements/villages:	None
A and B Roads:	A97, B9121
Long Distance Routes/Paths:	None
Recreation:	Limited, cycling/walking minor roads
Section 2: River Valley (Deveron and Upper Ythan Valley LCA)	
Main settlements/villages:	Kirktown of Alvah
A and B Roads:	None
Long Distance Routes/Paths:	NCN 1, Core Path – Montcoffer
Section 3: Agricultural Heartland (Agricultural Heartland LCA)	
Main settlements/villages:	Keilhill
A and B Roads:	A947
Long Distance Routes/Paths:	None
Recreation:	Limited, cycling/walking minor roads
Section 4: Agricultural Heartland (Agricultural Heartland LCA)	
Main settlements/villages:	Fintry, Cuminestown
A and B Roads:	B9105, B9170
Long Distance Routes/Paths:	NCN 1, Core Path – Idoch Water
Recreation:	Limited, cycling/walking minor roads
Section 5: Agricultural Heartland (Agricultural Heartland LCA)	
Main settlements/villages:	None
A and B Roads:	None
Long Distance Routes/Paths:	None
Recreation:	Limited, cycling/walking minor roads

Onshore Substations

5.3.3.50 The LVIA for the onshore substations has been undertaken within a 6 km Study Area based on the Zone of Theoretical Visibility (ZTV) (Figure 5.3-15), fieldwork and consultation. The theoretical visibility of the onshore substations is shown in the ZTV in Figure 5.3-15, which indicates the areas which have higher and lower visibility. The ZTV is based on the project envelope development model of the onshore

substations (Figure 5.3-5) on an OS 5 m terrain model and represents the bare earth, maximum theoretical visibility of the onshore substations in their indicative location within the onshore substations area, with no screening from surface features such as woodlands and buildings.

5.3.3.51 The ZTV of the onshore substations is relatively contained by the rolling landform of the area. Broadly it is contained between elevated ground around Auchmaliddie in the east (south of New Deer) to Muirtack/Upperton in the west; and between Cuminestown in the north and the Braes of Gight to the south. The principal area of higher visibility, within which the onshore substations will be most visible, is contained to the agricultural land immediately around the onshore substations between Burnside, Asleid, Millbrex and East Swanford. Areas of least visibility of the onshore substations are along the lower lying ground of Little Water, to the east/south-east/north-east. Large parts of the Study Area will have no visibility of the onshore substations, including the majority of the west of the Study Area, to the west of Deer's Hill; the north-west of the Study Area around Cuminestown; areas around New Deer to the north-east; and much of the lower lying ground of the southern part of the Study Area.

5.3.3.52 There are a number of small settlements located within the Study Area, ranging from the villages of New Deer and Cuminestown, to small hamlets such as Millbrex and Burnside, as well as numerous scattered rural properties and farmsteads. These are linked by an extensive network of minor roads, in addition to the A948, B9170 and B9005.

5.3.3.53 A section of the National Cycle Route 1 (which is also part of the North Sea Cycle) runs across the northern edge of the Study Area near Cuminestown, running from Auchnagatt to Maud. This route also forms part of The Formartine and Buchan Way (one of Scotland's Great Trails). There are few tourist and other visitor attractions of significance within the Study Area; those of note include the Gight Woods (Nature Reserve) 5 km to the south and the Culsh monument 6 km to the north-east of the onshore substations location. There are two Garden and Designed Landscapes (GDL) located just outwith the Study Area - Hatton Castle GDL is 6.5 km to the west and Fyvie Castle GDL is 7 km to the south-west.

5.3.3.54 Due to their location near the onshore substation area, there will be close range views of the onshore substations from the minor road passing the eastern edge of the substations area between Burnside and Hillhead of Alseid (Viewpoint 1 and 3); and from the minor road between Upper Mains of Alseid and North Millbrex (Viewpoint 2). The onshore substations will also be visible, albeit less so, when travelling along the minor road to the north between Burnside and Muirtack (Viewpoint 4); and the west between North Millbrex and Swanford (Viewpoint 5). More distant views of the onshore substation are possible from the minor road that connects Burnside to the B9170/Upperton (Viewpoint 6) and from the B9170 to the south of New Deer (Viewpoint 7).

5.3.3.55 There are numerous farmsteads scattered within the agricultural landscape that may have views of the onshore substations. The location of these residential properties and their principal view direction are indicated in the Site Analysis in Figure 5.3-16. There are several residential properties in the Burnside area which have south facing views towards the onshore substations, including Abbotshaugh, Cragganmore, Maryhill House, Maryhill, The Neuk, Upper Burnside, Burnside and Rosebank Cottage – although views are sometimes mitigated by intervening woodland or vegetation within the properties. East Swanford is located to the immediate north of the onshore substations, and has south facing views, but is partially screened due to its location in the Burn of Asleid and intervening woodland. To the east, Upper Mains of Asleid has a side elevation facing to the west, but is principally oriented to the south, with

shelterbelt screening to the north. Mains of Asleid has south facing views, which are contained by woodland to the south of the property and to the north-west they are partially enclosed by a woodland shelterbelt along the minor road. Burnside of Millbrex is located to the immediate south of the onshore substations. The principal view from the property is to the south and there is substantial woodland screening to the north along the Burn of Asleid. Several other properties within the area will have slightly more distant, or oblique views of the onshore substations – Smiddybank Farm, Swanford, Rowan Brae, Bridge Valley, Little Swanford, North Millbrex and Oakwood/North Mains of Asleid.

5.3.3.56 A viewpoint assessment of the onshore substations has been undertaken to inform and illustrate the assessment of effects on views. Table 5.3-6 below lists the viewpoints for the onshore substations and provides information on their location, the type of receptor that experiences the view and their distance from the onshore substations.

Table 5.3-6: Viewpoints – Onshore Substations

ID	Name	Easting	Northing	Distance	Receptors
1	Upper Mains of Asleid	383600	844428	282 m	Residents, Motorists
2	Burnside of Millbrex	383071	843952	336 m	Residents, Motorists
3	The Neuk	383121	845364	643 m	Residents, Motorists
4	Upper Burnside	382729	845614	957 m	Residents, Motorists
5	North Millbrex	382183	843638	1.13 km	Residents, Motorists
6	Upperton	384186	846009	1.70 km	Residents, Motorists
7	B9170 near New Deer	387929	845697	4.77 km	Residents, Motorists
8	Culsh Hill	388099	848099	6.0 km	Visitors (Culsh Monument / Cemetery)

5.3.3.57 A description of the baseline conditions in these views is described in the impact assessment in Section 5.3.4 so that they may be read together with the impact assessment. The locations of these viewpoints are shown in Figure 5.3-15. The existing view towards the onshore substations from each viewpoint are shown in the visualisations in Figures 5.3-30 to 5.3-37.

5.3.4 Impact Assessment

Summary of Effects and Mitigation

5.3.4.1 No significant effects have been identified on the seascape/landscape and visual receptors in relation to the OSPs or the modified offshore export cable route construction.

5.3.4.2 In relation to the Onshore Cable Route (and Landfall) construction **significant**, adverse, short-term and reversible, seascape/landscape effects are predicted to arise within localised areas of the cliff face and cliff top parts of the cliffs and North and South East Coast Landscape Character Area and Boyndie Bay Coastal Character Area. Elsewhere the landscape effects of the construction of the Onshore Cable Route would be **not significant**.

5.3.4.3 The visual effects of the construction of the Onshore Cable Route (and Landfall) may be **significant**, adverse, short-term and reversible in some views from Keilihll and Fintry. Views from other settlements would be **not significant**. There would also be 500

m – 2 km localised stretches of the A98, B9038, B9139, A97, B9121, A947, B9015 and the B9170 in the vicinity of the Onshore Cable Route Corridor where **significant**, adverse, short-term and reversible effects on views obtained by road users may arise during construction. The effect on views from localised stretches (500 m – 2 km) of long distance and local paths/cycle routes may also be **significant**, adverse, short-term and reversible in the vicinity of the Onshore Cable Route Corridor during construction. The effects during construction on other settlements and parts of the routes would be **not significant**.

5.3.4.4 During the construction of the onshore substations there may be **significant**, adverse, short-term and reversible landscape effects in the substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford in the Agricultural Heartlands Landscape Character Area. These landscape character effects would arise within approximately 1 km of the substations.

5.3.4.5 Within a similar area the visual effects of the onshore substations on residential and minor road visual receptors would also be **significant**, adverse, short-term and reversible during construction. This specifically includes views from properties in the vicinity of Upper Mains of Asleid, Burnside of Millbrex, North Millbrex, Smiddybank Farm, East Swanford, Blackpool, Bridge of Swanford, Upper Burnside and The Neuk and views from the minor roads immediately to the south, south-west, east and north of the sub-station sites.

5.3.4.6 Mitigation of the effects of the OnTI has included the following:

- Avoidance of effects on the landscape and visual resource through careful siting and routing of the components;
- Remediation of landscape and visual effects through reinstatement of landscape elements following construction;
- Reduction of landscape and visual effects through establishment of woodland and hedgerow planting around the onshore substations.

5.3.4.7 No significant effects have been identified on the seascape/landscape and visual receptors in relation to the operation of the OSPs and the modified offshore export cable route.

5.3.4.8 There will be no significant effects on the seascape/landscape and visual receptors in relation to the operation of the Onshore Cable Route (and landfall).

5.3.4.9 During its operation there may be a **significant**, adverse, long-term, reversible effect on the landscape character of the Agricultural Heartlands Landscape Character Area in the substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford in the Agricultural Heartlands Landscape Character Area. These landscape character effects would arise within approximately 1 km of the substations and beyond this effects on landscape character would be **not significant**.

5.3.4.10 Following a 15 year establishment period of the woodland and hedgerow planting these effects would become **not significant** except for the area of the site where the effect would remain significant.

5.3.4.11 During its operation in the initial period post construction there would be the potential for **significant**, adverse, long-term, reversible effects on views from properties in the vicinity of Upper Mains of Asleid, North Millbrex, Smiddybank Farm, East Swanford, Blackpool, Bridge of Swanford and Upper Burnside. The effect on views obtained by users of the minor roads immediately to the south, south-west and

east of the sub-station sites may also be **significant**, adverse, long-term and reversible. Beyond these areas the visual effects would be **not significant**.

5.3.4.12 Following 15 years of establishment of the woodland and hedgerow planting the effects of the operation of the onshore substations on the visual receptors would be **not significant** except for the effects on views from the residential properties in the vicinity of the Mains of Asleid, which may remain **significant**, adverse, long-term and reversible.

Table 5.3-7 Impact Assessment Summary

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Construction & Decommissioning				
Landscape/ seascape effect of OSPs	Seascape/ landscape character receptors	Short-term, reversible, neutral and **not significant**	Not required	Short-term, reversible, neutral and **not significant**
Visual effect of OSPs	Visual receptors	Short-term, reversible, neutral and **not significant**	Not required	Short-term, reversible, neutral and **not significant**
Landscape/ seascape effect of modified offshore export cable route	Seascape/ landscape character receptors Boyne Bay and Boyndie Bay Coastal Character Areas	Short-term, reversible, adverse and **not significant**	Not required	Short-term, reversible, adverse and **not significant**
Landscape/ seascape effect of modified offshore export cable route	Seascape/ landscape character receptors other than Boyne Bay and Boyndie Bay Coastal Character Areas	Short-term, reversible, neutral and **not significant**	Not required	Short-term, reversible, neutral and **not significant**
Visual effect of modified offshore export cable route	Visual receptors in the Boyne Bay and Boyndie Bay	Short-term, reversible, adverse and **not significant**	Not required	Short-term, reversible, adverse and **not significant**
Visual effect of modified offshore export cable route	Visual receptors other than those in the Boyne Bay and Boyndie Bay	Short-term, reversible, neutral and **not significant**	Not required	Short-term, reversible, adverse and **not significant**

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Effects of modified onshore cable route (and Landfall) on seascape/ landscape character and elements	The coast (Cliffs of North and South East Coast LCA and Boyndie Bay CCA) and the constituent landscape elements of beach, woodland, field boundaries (consumption dykes) and arable farmland	Significant, adverse	Route of onshore export cable route modified to avoid physical effects on characteristic woodlands and consumption dykes and/or use directional drilling to bore export cable under woodland. Reinstatement of consumption dykes and arable land following cable installation. Cable installation works would result in the partial loss or alteration of the cliff face but loss would not be permanent and restoration would be anticipated to occur within the medium term. Beach pit and any other excavations would be backfilled once the export cables are installed and to allow tides to wash over the excavations to consolidate the backfill.	**Not significant**, neutral, short-term, reversible effect on woodland. **Not significant**, neutral, short-term, reversible effects on beach, field boundaries (consumption dykes) and farmland. **Significant**, adverse, short-term reversible effects on localised areas (cliff face and cliff top) of the Cliffs and North and South East Coast LCA and Boyndie Bay CCA. **Not significant**, adverse, short-term reversible effects on character across all other parts of the Cliffs of North and South East Coast LCA and Boyndie Bay CCA.
Effects of modified onshore cable route (and landfall) on seascape/ landscape character and elements	Coastal Farmland (Western Coastal Farmland LCA) and the constituent landscape elements of Ancient Woodland, other woodland, field boundaries (consumption dykes and scrub hedgerows), arable farmland	Significant, adverse	Route of onshore export cable route modified to avoid physical effects on characteristic woodlands, consumption dykes and scrub hedgerows and/or use directional drilling to bore onshore cable under woodland. Reinstatement of consumption dykes, scrub hedgerows and arable land following cable installation.	**Not significant**, adverse, short-term, reversible.

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Effects of modified onshore cable route (and landfall) on seascape/ landscape character and elements	River Valley (Deveron and Upper Ythan Valleys LCA) and the constituent landscape elements of semi-natural Ancient Woodland, Ancient Woodland, other woodland, farmland, field boundaries (consumption dykes, scrub hedgerows, field boundary trees)	Significant adverse	Route of onshore export cable route modified to avoid physical effects on characteristic woodlands, consumption dykes, scrub hedgerows and field boundary trees and/or use directional drilling to bore onshore cable under woodland. Reinstatement of consumption dykes, scrub hedgerows, field boundary trees and arable land following cable installation.	**Not significant**, adverse, short- term reversible
Effects of modified onshore cable route (and landfall) on seascape/ landscape character and elements	Agricultural Heartland (Agricultural Heartland LCA) and the constituent landscape elements of Ancient Woodland, other woodland, arable farmland, field boundaries (consumption dykes, scrub hedgerows and field boundary trees)	Significant, adverse	Route of onshore export cable route modified to avoid physical effects on characteristic woodlands, consumption dykes, scrub hedgerows and field boundary trees and/or use directional drilling to bore onshore cable under woodland. Reinstatement of consumption dykes, scrub hedgerows, field boundary trees and arable land following cable installation.	**Not significant**, adverse, short term, reversible
Effects of modified onshore export cable (and landfall) on visual amenity	Residents of settlements of Banff, Kirktown of Alvah, Whitehills	Not significant	Not required	**Not significant**, short-term, reversible. Adverse Banff and Whitehills, neutral Kirktown of Alvah.
Effects of modified onshore export cable (and landfall) on visual amenity	Residents of settlements of Inverboyndie and Cuminestown	Significant adverse	Onshore export cable route to be sited within part of modified onshore export cable route corridor to reduce/prevent visibility from Inverboyndie and Cuminestown.	**Not significant**, adverse, short-term, reversible
Effects of modified onshore export cable (and landfall) on visual amenity	Residents of settlements of Keilhill and Fintry	Significant adverse	Onshore export cable route to be sited within part of modified onshore export cable route corridor to reduce/prevent visibility from settlements.	**Significant**, adverse, short-term, reversible

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Effects of modified onshore export cable (and landfall) on visual amenity	Motorists using A and B roads – A98, B9038, B9139, A97, B9121, A947, B9015 and B9170	**Significant** adverse in views from short sections of the routes of up to 1 km in length.	Route of modified onshore export cable realigned to avoid physical effect on woodland and/or use directional drilling to bore export cable under Burn of Boyndie. Reinstatement of consumption dykes and farmland following cable installation.	**Significant**, adverse, short-term, reversible visual effects from 500 m -2 km stretches of the routes. **Not significant** from the majority of the routes.
Effects of modified onshore export cable (and landfall) on visual amenity	Cyclists/walkers using long distance routes and local paths	**Significant** adverse in views from short sections of the routes of up to 1 km in length.	Route of modified onshore export cable realigned to avoid physical effect on woodland and/or use directional drilling to bore export cable under Burn of Boyndie. Backfill beach pit excavations and restore cliff face following cable installation. Reinstate consumption dykes and arable farmland following cable installation.	**Significant**, adverse, short-term, reversible visual effects from 500 m - 2 km stretches of the routes. **Not significant** from the majority of the routes.
Effects of modified onshore export cable (and landfall) on visual amenity	People taking part in other recreational activities – Inverboyndie beach users, Banff Links Caravan Park Visitors	**Significant** adverse	Route of modified onshore export cable realigned to reduce/prevent visibility from Caravan Park. Backfill beach pit excavations and restore cliff face following cable installation. Reinstate consumption dykes and arable farmland following cable installation.	**Significant**, adverse, short-term and reversible.
Effects of onshore substations on landscape character and elements	Agricultural Heartlands LCA	**Significant** in Area 1- substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford. **Not significant** in all other parts of the LCA	Careful siting of substations within the landscape context.	**Significant**, adverse, short-term, reversible in Area 1- substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford. **Not significant**, adverse/neutral, short-term, reversible in all other parts of the LCA

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Visual effect of onshore substations	Residential properties in the vicinity of the substation sites and users of minor roads	Significant, adverse	Careful siting of substations in relation to visual receptors and their key views.	**Significant**, adverse, short-term, reversible effect on views from properties in the vicinity of Upper Mains of Asleid, Burnside of Millbrex, North Millbrex, Smiddybank Farm, East Swanford, Blackpool, Bridge of Swanford, Upper Burnside and The Neuk. **Significant**, adverse, short-term, revsersible effects on sections of the minor roads to the south, south-west, east and north of the substation sites. Effects on residents of other properties and users of other roads **not significant**, adverse/neutral, short-term, reversible.
Operation				
Landscape/ seascape effect of OSPs	Seascape/ landscape character receptors	Long-term, reversible, neutral and **not significant**	Not required	Long-term, reversible, neutral and **not significant**
Visual effect of OSPs	Visual receptors	Long-term, reversible, neutral and **not significant**	Not required	Long-term, reversible, neutral and **not significant**
Landscape/ seascape effect of modified offshore export cable route	Seascape/ landscape character receptors	Long-term, reversible, neutral and **not significant**	Not required	Long-term, reversible, neutral and **not significant**
Visual effect of modified offshore export cable route	Visual receptors	Long-term, reversible, neutral and **not significant**	Not required	Long-term, reversible, neutral and **not significant**

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Effects of modified onshore cable route (and landfall) on seascape/ landscape character and elements	Landscape/ seascape character areas along the cable route and constituent landscape elements of beach, woodland, field boundaries (consumption dykes, scrub hedgerows and field boundary trees) and farm land	Not significant	Avoidance of woodland removal. Reinstatement of ground cover and other vegetation and establishment of this over initial period following construction. Sensitive siting of kiosks.	**Not significant**, adverse, long term and reversible
Effects of modified onshore export cable (and landfall) on visual amenity	Residents of settlements, motorists using A and B roads, walkers and cyclists using long distance cycle routes and paths	Not significant	Avoidance of woodland removal. Reinstatement of ground cover and other vegetation and establishment of this over initial period following construction. Sensitive siting of kiosks.	**Not significant**, adverse, long term and reversible
Effects of modified onshore substations on landscape character and elements	Agricultural Heartlands LCA	**Significant** in Area 1- substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford. **Not significant** in all other parts of the LCA	Careful siting of substations in relation to visual receptors and their key views. Establishment of extensive woodland planting around the site.	Prior to woodland and hedgerows 15year establishment -**Significant**, adverse, long-term, reversible in Area 1- substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford. **Not significant**, adverse/ neutral, long-term, reversible in all other parts of the LCA. Post woodland and hedgerows 15 year establishment – **Not significant**, adverse/neutral, long-term, reversible in all parts of the LCA except for the site itself.

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Visual effect of onshore substations	Views from properties in the vicinity of the substations sites. Views obtained by users of local minor roads.	**Significant,** adverse, long term, reversible effects on residents of properties in the vicinity of the substations sites. **Significant**, adverse, long-term, reversible effects on users of sections of the minor roads around the substation sites. Effects on residents of more distant properties and users of other roads **not significant**, adverse/ neutral, long-term, reversible.	Careful siting of substations in relation to visual receptors and their key views. Establishment of extensive woodland planting around the site.	Prior to woodland and hedgerows 15year establishment – **Significant**, adverse, long-term, reversible effect on views obtained by residents of the properties in the vicinity of Upper Mains of Asleid, North Millbrex, Smiddybank Farm, East Swanford, Blackpool, Bridge of Swanford and Upper Burnside. **Significant**, adverse, long-term, reversible effects on views obtained by users of the minor roads immediately to the south, south-west and east of the Onshore Substation sites. Effects on residents of other properties and users of roads not **significant**, adverse/ neutral, long-term, reversible. Post woodland and hedgerows 15year establishment – **Significant**, adverse, long-term, reversible effect on views from properties in the vicinity of Upper Mains of Asleid. Effects on residents of other properties and users of roads **not significant**, adverse long-term, reversible.

Introduction to Impact Assessment

5.3.4.13 The SLVIA considers the effect on the seascape and landscape character and the effect on visual amenity (views) of the modified TI based on the Rochdale Envelope parameters set out in Section 5.3.2.

5.3.4.14 The SLVIA methodology is described in full in Technical Appendix 5.3 A: SLVIA Methodology. The baseline SL&V receptors relating to the Offshore TI and Onshore TI is described in Section 5.3.3. The SLVIA is informed by photomontages, panoramic photographs and plan / map figures contained in Volume 4: Moray Offshore Wind Farm Modified TI SLVIA Figures.

5.3.4.15 The SLVIA covers the construction, operational phase and decommissioning of the OSPs, modified offshore export cable, onshore export cable (and modified export cable landfall) and onshore substations.

EIA Methodology

5.3.4.16 This section provides a summary of the methodology used to carry out the SLVIA, with the full methodology being described in Technical Appendix 5.3A: SLVIA Methodology. This methodology has been specifically devised by OPEN for SLVIA and it accords with the 'Guidelines for the Assessment of Landscape and Visual Impacts: Third Edition' (GLVIA3).

5.3.4.17 The objective of the assessment of the modified TI is to predict the significant effects on the SL&V resource. In accordance with the EIA Regulations, the LVIA effects are assessed to be either significant or not significant.

5.3.4.18 The significance of effects is assessed through a combination of two considerations – the sensitivity to change of the landscape or visual receptor and the magnitude of change that will result from the modified TI.

Sensitivity to Change

5.3.4.19 Sensitivity is an expression of the ability of a landscape or visual receptor to accommodate the modified TI. The sensitivity is determined through a combination of the value of the receptor, and the susceptibility to change of the receptor to the modified TI.

5.3.4.20 Levels of sensitivity - high, medium to high, medium, medium to low, low and negligible- are applied in order that the judgement used in the process of assessment is made clear. The criteria used to determine sensitivity differ for the effects on landscape receptors and visual receptors, as well as the cumulative effects on both. These criteria are explained in full in Technical Appendix 5.3 A.

Magnitude of Change

5.3.4.21 Magnitude of change is an expression of the extent of the effect on the landscape and visual receptors that will result from the introduction of the modified TI. The magnitude of change is assessed in terms of the size and scale of the effect and the geographical extent of the area influenced.

5.3.4.22 Levels of magnitude of change - high, medium to high, medium, medium to low and low - are applied in order that the judgement used in the process of assessment is made clear. The criteria used to determine magnitude of change differ for the effects on landscape receptors and visual receptors, as well as the cumulative effects on both. These criteria are explained in full in Technical Appendix 5.3 A.

Significance of Effect

5.3.4.23 In accordance with GLVIA3, OPEN's methodology requires the application of reasoned professional judgement. Although it is not reliant on the use of a matrix, the matrix in Table 5.3-7 has been included to illustrate how combinations of the ratings for sensitivity and magnitude of change can give rise to significant effects, as well as to give an understanding of the threshold at which significant effects may arise.

Table 5.3-7 Illustrative Matrix of Significant Effects

Magnitude Sensitivity	High	Medium-high	Medium	Medium-low	Low	Negligible
High	Significant	Significant	Significant	Significant or not significant	Not significant	Not significant
Medium-high	Significant	Significant	Significant or not significant	Significant or not significant	Not significant	Not significant
Medium	Significant	Significant or not significant	Significant or not significant	Not significant	Not significant	Not significant
Medium-low	Significant or not significant	Significant or not significant	Not significant	Not significant	Not significant	Not significant
Low	Significant or not significant	Not significant	Not significant	Not significant	Not significant	Not significant

5.3.4.24 Effects that are assessed within the dark grey boxes in the matrix are assessed to be significant in terms of the requirements of the EIA Regulations. Those effects that are assessed within the light grey boxes may be significant, or not significant, depending on the specific factors and effect that is assessed in respect of a particular landscape or visual receptor. In accordance with GLVIA3, experienced professional judgement is applied to the assessment of all effects and reasoned justification is presented in respect of the findings of each case. The effects of the modified TI are of variable duration, and are assessed as short-term or long-term, and either result in permanent or reversible effects.

Nature of the Effect

5.3.4.25 The nature of effect refers to whether the effects of the modified TI are positive, neutral or adverse. Effects are classified as positive, neutral or adverse according to the following definitions:

- Positive effects contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, positive attributes. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components;
- Neutral effects occur where the modified TI neither contributes to nor detracts from the SL&V resource or where the effects are so limited that the change is hardly noticeable. A change to the SL&V resource is not considered to be adverse simply because it constitutes an alteration to the existing situation; and
- Adverse effects are those that detract from or weaken the SL&V resource through the introduction of elements that contrast in a detrimental way with the existing characteristics of the SL&V resource, or through the removal of elements that are key in its positive characterisation.

Assessment of Cumulative Effects

5.3.4.26 The objective of the Cumulative Landscape and Visual Impact Assessment (CLVIA) is to describe, visually represent and assess the ways in which the Modified TI will have additional effects when considered together with other existing, consented or proposed developments and to identify related significant cumulative effects arising from the modified TI. The guiding principle in preparing the CLVIA is to focus on the likely significant effects and in particular those which are likely to influence the outcome of the consenting process, in accordance with the EIA Regulations. The cumulative effect of the modified TI is considered in Section 5.3.5.

Embedded Mitigation Measures

Onshore Export Cable

5.3.4.27 Embedded mitigation has been applied in the design and routing of the modified onshore export cable route to minimise the effects of construction on specific landscape features, particularly valued landscapes or features, including SSSIs, GDLs, ancient woodland and areas of surface water. Valued landscape features were identified using GIS datasets for valued natural heritage features, designations, OS Vectormap landscape features, aerial imagery and field survey.

5.3.4.28 A route design workshop was held to consider sections of the modified onshore export cable route corridor in detail and identify key physical landscape features and visual receptors that the modified onshore export cable route corridor should avoid, whilst being routed within areas of suitable land option. An optimised modified onshore export cable route corridor was selected to avoid, in particular, Duff House GDL and ancient woodlands within the Deveron Valley. The modified onshore export cable route corridor has been designed to cross the Deveron Valley to the south to avoid Duff House GDL and associated woodlands, taking a route across the valley with the least amount of woodland present. The modified onshore export cable route corridor has been sited and designed with a strong presumption against removing areas of ancient semi-natural woodland or plantations on ancient woodland sites.

5.3.4.29 The assessment of residual effects of the modified onshore export cable route corridor assumes that the modified onshore export cable would be routed around areas of woodland to avoid physical effects on characteristic woodlands within the modified onshore export cable route corridor. Directional drilling will also be used selectively to bore the export cable under sensitive rivers/burns with associated woodlands, to avoid physical effects on characteristic woodlands.

5.3.4.30 The modified onshore export cable route will also be sited to avoid, where possible, consumption dykes, scrub hedgerows and field boundary trees. In certain areas where the modified onshore export cable route will not be able to avoid physical disturbance to linear features such as consumption dykes and scrub hedgerows, these features will be reinstated following cable installation.

5.3.4.31 The construction of the cable route will give due consideration to the following standards, recommendations and guidelines:

- BS 5837: 2012. Trees in Relation to Design, Demolition and Construction; and
- NJUG Publication Volume 4 (2007). Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees.

Onshore Substations

Site Selection

5.3.4.32 A landscape and visual site selection review of potential sites for onshore substations near New Deer in Aberdeenshire was undertaken as part of initial EIA work to inform MORL's site selection process. The review included a comparison of the likely landscape and visual suitability of several potential onshore substation sites. The landscape and visual review concluded that aspects of the onshore substation area selected for the indicative substation location have potential to integrate the onshore substations within the landscape, including the large scale of the agricultural fields; the rolling landform which has the potential to provide some enclosure of the onshore substations within its gentle undulations; frequent shelterbelt woodlands, particularly along the Burn of Asleid, which have potential to provide screening and containment of the onshore substations; and the visual screening/main orientation of many of the closest residential properties.

Landscape Mitigation Proposal

5.3.4.33 The onshore substations have been sited according to specific guidance in the LCASSD for the Agricultural Heartlands LCA. A site analysis of the onshore substation area and surrounding local landscape has been undertaken and is illustrated in Figure 5.3-16 and described in the landscape baseline (Section 5.3.3). The site analysis identified several key characteristics of the local landscape around the onshore substation area that are likely to reduce the effect of the onshore substations. The agricultural landscape is interspersed with several woodland shelterbelts and blocks of coniferous woodland, particularly along the Burn of Asleid and adjacent to minor road on the eastern boundary of the onshore substation area, which will help to screen views and integrate the onshore substations in the landscape. The rolling landform rises slightly to the east/north-east of the onshore substation area, up to the 110 m contour, which help to contain views from the north and east. The indicative substations location is sited next to large scale electrical pylons and overhead lines, which influence the local landscape character of the onshore substation area and the wider skyline.

5.3.4.34 Native woodland planting is proposed within the substations area to further integrate the onshore substations within the agricultural landscape and replicate copses traditionally planted for shelter. The baseline woodland context was reviewed (Figure 5.3-14), which identified the existing pattern of woodland within the surrounding landscape, which includes shelterbelts, woodland blocks/plantations and riparian woodlands along rivers and burns. Several woodland design concepts were considered for the site based on these characteristic woodlands, as shown in Figure 5.3-28, including shelterbelt woodlands, riparian woodland, woodland blocks and a full woodland envelope.

5.3.4.35 The landscape proposal (Figure 5.3-29) draws on elements of these concepts and proposes native tree planting to enhance and connect areas of shelterbelt woodland to the west along the Burn of Asleid and to connect small stands of existing shelterbelts on field boundaries at the eastern edge of the substations area. Landscape mitigation proposals for the onshore substations are designed according to specific guidance in the LCASSD for the Agricultural Heartlands LCA, which recommend that new development can be integrated by planting native trees to replicate copses traditionally planted for shelter. Several main areas of native woodland are proposed in the landscape mitigation proposals:

- Northern side of overhead electrical line on slopes of Burn of Asleid to enhance areas of existing shelterbelt woodland along the Burn and provide screening in views from the north;
- Western side of the onshore substations along the Burn of Asleid to connect and enhance areas of existing shelterbelt woodland along the Burn and provide screening in views from the west;
- Southern and eastern sides of the onshore substations to form new characteristic shelterbelt woodlands around onshore substations and screen views from the south and east;

5.3.4.36 Further woodland shelterbelts are also proposed along the field boundaries to the north and south of the substations area to provide further screening and improve the integration of the onshore substations within the landscape. Woodland planting proposals will enhance the characteristic native woodland evident in the Agricultural Heartlands LCA and assist with improving the integration of the onshore substations within a natural envelope. Planting is proposed at high density, with both hardy native pioneer species, including Alder, Ash, Birch, Hazel and Poplar, together with slower growing species such as Oak and Beech and occasional Scots Pine, to provide some year-round screening and to replicate and expand woodland shelterbelts in the existing environment. Indicative visual representations of the woodland proposals at 15 years post construction, with an average tree height of 6 – 10m, are illustrated in the viewpoint figures (Figures 5.3-30 to 5.3-37) and these are used to inform the assessment of residual effects at 15 years post construction.

5.3.4.37 In addition to the main areas of woodland planting, mixed native deciduous hedgerow planting will be undertaken along the field boundaries of the substations areas to provide further screening in views from the local minor road network. Hedgerows also provide a habitat link to the larger woodland areas. Fields to the east and south of the substations area could be retained for agricultural use.

5.3.4.38 Areas of marshy grassland / moss are proposed to the west of the substations area at lower elevations along the Burn of Asleid, where the wetter ground conditions and appropriate land management may encourage wetter grassland habitats. Areas of moss and marshy grassland are present nearby at Moss of Swanford to the west along the Burn of Swanford/Burn of Asleid. Scattered riparian tree planting is proposed within these areas along the Burn of Asleid to enhance scattered existing riparian trees along the burn. A sustainable drainage system (SuDS) will be utilised at the site, with suitable methods to be subject to detailed design, but likely to include a retention system by providing storage within a SuDs pond/retention basin adjacent to the Burn of Asleid.

Impact Assessment – Modified OfTI

5.3.4.39 The Rochdale Envelope parameters considered in the OfTI SLVIA are described in Section 5.3.2. The OfTI SLVIA considers the effects of the construction, operation and decommissioning of the offshore substation platforms (OSPs) and offshore export cable on seascape/landscape character and visual amenity.

5.3.4.40 Marine Scotland's Offshore Transmission Works Scoping Response (MORL ES, Technical Appendix 1.3 B) confirmed (page 34) that '*landscape and visual interests can be scoped out of the EIA for the offshore cable works*' – as indicated in Section 5-3-8 (page 135) of the Offshore Transmission Infrastructure Scoping Report (MORL, 2011). A summary assessment of the SL&V effects of the modified offshore export cable was nevertheless provided in the MORL ES (MORL, 2012) in the interests of completeness and this approach is adopted for the assessment of the modified OfTI.

Effects of Offshore Substation Platforms (OSPs) on Seascape/Landscape Character

5.3.4.41 All National Seascape Units/Types and CCAs within Caithness are located at a minimum distance of 23.4 km from the assumed indicative location of OSP 1. All National Seascape Units/Types and CCAs within Moray and Aberdeenshire are located at a minimum distance of 46.4 km from the assumed indicative location of OSP 2.

Construction and Decommissioning

5.3.4.42 During construction and decommissioning the effects will be reversible and will arise from OSP installation vessels and construction equipment located at long distance from the coastline. During operation, the effects will result from the visibility of OSPs on the perception of the seascape/landscape character, but the OSPs are located at long distances offshore from all coastal character receptors and terrestrial landscape types, and will appear as a relatively small single object on the skyline at distance, amongst the three consented wind farms and oil and gas platforms.

5.3.4.43 During construction and decommissioning, the magnitude of change resulting from the OSPs on all seascape/landscape receptors identified in the baseline (Section 5.3.3) is assessed as being low-negligible and the effect of the OSPs on all seascape/landscape receptors is assessed as short-term, reversible, neutral and not significant.

Operation

5.3.4.44 During operation, the magnitude of change resulting from the OSPs on all seascape/landscape receptors identified in the baseline (Section 5.3.3) is assessed as being low-negligible and the effect of the OSPs on all seascape/landscape receptors is assessed as long-term, reversible, neutral and not significant.

Effects of Offshore Substation Platforms (OSPs) on Visual Amenity

5.3.4.45 The SLVIA within the MORL ES (MORL, 2012) assessed the effect of the addition of eight OSPs (MORL ES, Chapter 11.4) in the context of the three consented wind farm sites. The modified TI will include only two OSPs to replace the eight former OSPs assessed in the MORL ES (MORL, 2012) (not in addition). The two OSPs will be located within the three consented wind farm sites, with indicative locations assumed close to the site boundaries nearest Caithness (OSP 1) and Moray/Aberdeenshire (OSP 2), where they would theoretically be at their most visible and therefore represent a worst-case scenario in terms of SL&V effects (Figure 5.3-2). Indicative locations for these two OSPs are the same as the assumed locations for the two closest OSPs in the MORL ES (MORL, 2012) and have the same dimensions and colouring.

5.3.4.46 Further consideration of the effect of the OSPs as part of the assessment for the modified TI is provided to consider any reduced, different or additional visual impacts from those previously assessed in respect of the proposed OSPs in the context of the three consented wind farms.

Construction and Decommissioning

5.3.4.47 During construction and decommissioning, visual effects are likely to arise from the OSP installation vessels used for construction and decommissioning of the OSPs. Illustrative photographs of OSP installation vessels are shown in Figure 5.3-2 to indicate the types of vessel which may be visible during the OSP construction period.

5.3.4.48 The effect of the installation of OSPs on visual receptors will be short-term and reversible during the construction period, resulting from views of the installation vessels constructing the OSPs at sea and movements to and from port. The construction of the OSPs will result in a slight increase in occurrence of vessel sightings at sea during the construction period, however OSP installation vessels constructing the OSPs will be located at long distances, with a minimum distance from the nearest point in Caithness to OSP 1 of 23.4km, and a minimum distance from the nearest point in Moray/Aberdeenshire to OSP 2 of 46.4 km. The visual effect of installation vessels is diminished at such long distance offshore from visual receptors on the coastline and terrestrial parts of Caithness and Moray/Aberdeenshire.

5.3.4.49 Views of the OSP installation vessels may occur at shorter range during vessel movements to and from port, but vessels will be seen within a seascape in which large sea-faring vessels are a common feature in the baseline SL&V environment of the Moray Firth.

5.3.4.50 During construction and decommissioning, the magnitude of change resulting from the OSPs on all views experienced from visual receptors identified in the visual baseline (Section 5.3.3) is assessed as being low-negligible and the effect of the OSPs on all visual receptors is assessed as short-term, reversible, neutral and **not significant**.

Operation

5.3.4.51 During operation, visual effects will result from the two OSPs, viewed at long distances offshore in the context of the proposed three consented wind farm sites[2]. OSP 1 is located approximately 23.4 km from the nearest point of the Caithness/Sutherland coast and OSP 2 is located approximately 46.4 km from the nearest point of the Moray/Aberdeenshire coast.

5.3.4.52 The effect of the OSPs on all SL&V receptors during operation was assessed as **not significant** in the MORL ES (MORL, 2012) primarily because the OSPs would be viewed at long distances offshore, in the context of the three consented wind farm sites and existing oil rigs which appear similar.

5.3.4.53 The principal change to the effects assessed in the MORL ES (MORL, 2012) results from the omission of six OSPs from within the three consented wind farms, constituting a reduced effect principally because less OSPs will be viewed within the three consented wind farms than considered in the MORL ES (MORL, 2012).

5.3.4.54 OSP 1 is likely to be visible in views from the Caithness/Sutherland coastline, however OSP 2 is unlikely to be visible at all from this coastline. OSP 2 is likely to be visible (in periods of excellent visibility) from the Moray/Aberdeenshire coastlines, however OSP 1 is unlikely to be visible at all from this coastline. In each case, the more distant OSP is unlikely to be visible in views due to the intervening distance, earth curvature and relative infrequency of excellent visibility conditions. Each OSP will therefore appear as a relatively small single object from each coastline, on the skyline at distance, amongst the three consented wind farms. The appearance of the three consented wind farms will be simpler and less complex with a single OSP visible amongst the array of offshore wind turbines within the three consented wind farms.

[2] As per the MORL ES, the assessment does not consider the effect of adding the OSPs to the existing baseline on their own, without the three consented wind farm sites, as this would represent an unrealistic scenario.

5.3.4.55 Due to the long distance of the OSPs offshore from visual receptors within Caithness/Sutherland and Moray/Aberdeenshire, the effect of the OSPs during operation is substantially diminished by distance. The long distance of the OSPs offshore will also result in the visibility frequency being relatively low and the OSPs will only be visible in relatively infrequent periods with excellent visibility conditions.

5.3.4.56 During operation, the magnitude of change resulting from the OSPs on all views experienced from visual receptors identified in the visual baseline (Section 5.3.3) is assessed as being low-negligible and the effect of the OSPs on all visual receptors is assessed as long-term, reversible, neutral and **not significant**.

Effects of Modified Offshore Export Cable Route on Seascape/Landscape Character

5.3.4.57 All National Seascape Units/Types and CCAs within Caithness/Sutherland are located at a minimum distance of 37.5 km from the modified offshore export cable route corridor. The majority of the modified offshore export cable route corridor is also located at long distances from National Seascape Units/Types and CCAs within Moray/Aberdeenshire. The modified onshore export cable route corridor is in closer proximity to the Moray/Aberdeenshire coast near the modified export cable landfall at Inverboyndie Bay. In this area, the modified offshore export cable route corridor is located immediately offshore from the Rocky Coastline with Open Sea Views National Seascape Type and the Sandend Bay, Boyne Bay and Boyndie Bay CCAs.

Construction and Decommissioning

5.3.4.58 During construction and decommissioning the effects will be reversible and may arise from the visibility of cable laying vessels operating during the construction and decommissioning phases on the perceived character of the coast.

5.3.4.59 The majority of the modified offshore export cable route corridor is located at considerable distance offshore from the Moray and Aberdeenshire coast and at such long distances, visibility of the cable laying vessels is unlikely to result in any notable changes to the existing coastal character. Large sea–faring vessels are a common feature on the skyline in the baseline seascape character of the Moray Firth and vessels used for the construction and decommissioning of the modified offshore export cable will be similar to large vessels that are part of the baseline seascape character.

5.3.4.60 Cable laying vessels for the modified offshore export cable will only influence the perceived character of the coastline when operating in the closest areas of the modified offshore export cable route corridor to the coast, immediately offshore from Boyndie Bay and Boyne Bay. Cable laying vessel working days in these closest areas of the modified offshore export cable route corridor from the coast will be for a reversible and relatively short duration during the construction period.

5.3.4.61 The magnitude of change resulting from the construction and decommissioning of the modified offshore export cable on the Boyne Bay and Boyndie Bay CCAs is assessed as low. The effect resulting from the construction and decommissioning of the offshore export route on the Boyne Bay and Boyndie Bay CCAs is assessed as short–term, reversible, adverse and **not significant**.

5.3.4.62 The magnitude of change resulting from the construction and decommissioning of the modified offshore export cable on all other seascape/landscape receptors identified in the baseline (Section 5.3.3.3) is assessed as negligible. The effect resulting from the construction and decommissioning of the offshore export route on

all seascape/landscape receptors other than on the Boyne Bay and Boyndie Bay CCA is assessed as short–term, reversible, neutral and **not significant**.

Operation

5.3.4.63 The modified offshore export cable between Inverboyndie Bay and the converter OSPs will be installed in trenches in the sea bed and will not be a visible element of the modified TI during the operational period. The operational effects of the modified offshore export cable will be limited to occasional maintenance visits from appropriate sea–faring maintenance vessels, which will be similar to large sea faring vessels in the baseline seascape and visual environment.

5.3.4.64 The magnitude of change resulting from modified offshore export cable on all seascape/landscape receptors is assessed as negligible during the operational period. The effect resulting from the operation of the modified offshore export cable on all seascape/landscape receptors is assessed as long-term (during the operational life of the three consented wind farm sites), reversible, neutral and **not significant**.

Effects of Modified Offshore Export Cable on Visual Amenity

Construction and Decommissioning

5.3.4.65 The SL&V effect of the modified offshore export cable installation will be caused by cable laying vessels operating during the construction and decommissioning phases. Cable laying vessels for the modified offshore export cable will be visible between Inverboyndie Bay and the OSPs within the three consented wind farm sites. The majority of the modified offshore export cable route corridor is located at considerable distance offshore from the Moray and Aberdeenshire coast. Cable laying vessels will be visible within the modified offshore export cable route corridor for up to 240 cable laying vessel working days over a two year period. Movements to and from port will be dependent on the port location, which has not yet been selected, but the Rochdale Envelope for the modified offshore export cable is based on 40 vessel movements of the main installation to and from the construction port and site, together with construction support vessel movements.

5.3.4.66 Large sea–faring vessels are a common feature on the skyline in the baseline seascape and visual environment of the Moray Firth. Vessels used for the construction and decommissioning of the modified offshore export cable will be similar to large sea faring vessels that are frequently visible in the baseline seascape and visual environment. Movements of cable laying vessels in Inverboyndie Bay during installation of the offshore export route modified export cable landfall will be more visible to receptors onshore, but will be viewed for a short duration.

5.3.4.67 The magnitude of change resulting from the construction and decommissioning of the modified offshore export cable on visual receptors within the Boyne Bay and Boyndie Bay areas is assessed as medium-low. The effect resulting from the construction and decommissioning of the offshore export route on views experienced from visual receptors in the Boyne Bay and Boyndie Bay areas is assessed as short–term, reversible, adverse and **not significant**.

5.3.4.68 The magnitude of change resulting from the construction and decommissioning of the modified offshore export cable on all other visual receptors identified in the visual baseline (Section 5.3.3.4) is assessed as low to negligible. The effect resulting from the construction and decommissioning of the modified offshore export cable on views experienced from all other visual receptors identified in the visual baseline is assessed as short–term, reversible, neutral and **not significant**.

Operation

5.3.4.69 The modified offshore export cable between Inverboyndie Bay and the converter OSPs will be installed in trenches in the sea bed and will not be a visible element of the modified TI during the operational period. The operational effects of the modified offshore export cable will be limited to occasional maintenance visits from appropriate sea–faring maintenance vessels, which will be similar to large sea faring vessels in the baseline seascape and visual environment.

5.3.4.70 The magnitude of change resulting from modified offshore export cable on all views experienced from visual receptors is assessed as negligible during the operational period. The effect resulting from the operation of modified offshore export cable on all visual receptors is assessed as long-term (during the operational life of the three consented wind farm sites), reversible, neutral and **not significant**.

Impact Assessment – Modified OnTI

5.3.4.71 The Rochdale Envelope considered in the modified OnTI SLVIA is described in Section 5.3.2. The modified OnTI SLVIA considers the effects of the construction, operation and decommissioning of the onshore export cable (including modified export cable landfall) and onshore substations on seascape/landscape character and visual amenity.

Effects of Modified Onshore Export Cable Route (and Landfall) on Seascape/Landscape Character and Elements

Construction

5.3.4.72 The effect of the construction of the onshore export cable on seascape/landscape character and elements is assessed in Tables 5.3-8 – 5.3-11 relating to each section of the modified onshore export cable route corridor. Sections of the route are mapped in detail according to each LCA along the modified onshore export cable route corridor (Figures 5.3-18 to 5.3-22). The main landscape elements within each LCA section are identified and an assessment of their sensitivity and the potential effect of the onshore export cable construction, before mitigation. Appropriate mitigation measures are identified and the residual effect on each landscape element and the overall character of each LCA is assessed assuming adoption of mitigation measures.

5.3.4.73 The Rochdale Envelope for the SLVIA assumes that the modified export cable landfall at Inverboyndie beach will be installed in four separate 4 m wide beach pit trenches (one for each subsea cable, split into trefoil arrangement) extended down to the low tide level (with the sides of the pit typically temporarily supported). The installation methods that will be used for the modified export cable landfall installation will be open trenching and horizontal directional drilling (HDD). A description of these installation methods is provided in Chapter 2.2 (Project Description). Illustrative photographs of this type of modified export cable landfall construction are shown in Figure 5.3-4.

Section 1: The Coast (Cliffs of the North and South East Coast LCA)

Table 5.3-8 Modified Onshore Export Cable Route Assessment: Landscape Character & Elements (Section 1)

Landscape Element	Sensitivity to change	Potential Effect on Landscape Element/Character	Mitigation Measures	Residual Magnitude of Change	Significance of Residual Effect[3]
Section 1: The Coast (Cliffs of the North and South East Coast LCA and Boyndie Bay CCA)					
Beach:					
Inverboyndie Beach	Medium-low (beach is relatively easy to restore)	Medium or high magnitude and potentially **significant** due to physical effect resulting from disturbance to beach resulting from modified export cable landfall installation.	Beach pit and any other excavations would be backfilled once the export cables are installed and allow tides to wash over the excavations to consolidate the backfill.	Medium	**Not significant**, adverse, short-term, reversible.
Woodland:					
C1 - Burn of Boyndie C2 - Black Hillocks Shelterbelt	Medium-high	High magnitude and potentially **significant** due to physical effect resulting from loss of characteristic deciduous riparian woodland.	Modified onshore export cable route to avoid physical effect on woodland and/or use directional drilling to bore export cable under woodland wherever possible.	Negligible	**Not significant**, neutral, short-term, reversible.
Field Boundaries:					
Consumption dykes	Medium-high	High magnitude and potentially **significant** due to physical effect resulting from loss of characteristic consumption dyke features.	Modified onshore export cable route to avoid consumption dykes and/or reinstate following cable installation.	Low	**Not significant**, adverse, short-term, reversible
Farmland:					
Arable farmland	Low	Medium-high magnitude and potentially **significant** due to physical effect resulting from loss of characteristic arable farmland.	Reinstate arable farmland following cable installation.	Medium	**Not significant**, adverse, short-term, reversible

[3] In tables 5.3.8 – 5.3.11, residual magnitude of change and significance of effect assume mitigation measures have been adopted.

Landscape Character:					
Cliffs of the North and South East Coast LCA	High	High magnitude and potentially **significant** due to effects resulting from loss of characteristic deciduous woodlands, consumption dykes and arable land.	Modified onshore export cable route to avoid physical effects on characteristic woodlands and consumption dykes and/or use directional drilling to bore export cable under woodland. Reinstate consumption dykes and arable land following cable installation. Cable installation would result in the partial loss or alteration of the cliff face but loss would not be permanent and restoration would be anticipated to occur within the medium term.	Medium-high within the immediate locale of the cliff face and cliff top, medium across the beach and medium to low across the adjacent farmland.	**Significant**, adverse, short-term, reversible effects over a localised area including the cliff face and cliff top, lasting for the short-term duration of the construction works. The remaining areas will undergo **not significant** effects.
Boyndie Bay CCA	High	Medium or high magnitude and potentially **significant** due to physical effect resulting from disturbance to Inverboyndie Beach resulting from modified export cable landfall installation and alteration to the cliff edge resulting from excavation for modified onshore export cable route.	Beach pit and any other excavations would be backfilled once the export cables are installed and allow tides to wash over the excavations to consolidate the backfill. Cable installation would result in the partial loss or alteration of the cliff face but loss would not be permanent and restoration would be anticipated to occur within the medium term.	Medium-high within the immediate locale of the cliff face and cliff top, medium across the beach and medium to low across the adjacent farmland.	**Significant**, adverse, short-term, reversible effects over a localised area including the cliff face and cliff top, lasting for the short-term duration of the construction works. The remaining areas will undergo **not significant** effects.

Section 1 and 2: Coastal Farmland (Western Coastal Farmland LCA)

Table 5.3-9 Modified Onshore Export Cable Route Assessment: Landscape Character & Elements (Sections 1 & 2)

Landscape Element	Sensitivity to change	Potential Effect	Mitigation Measures	Residual Magnitude of Change	Significance of Residual Effect
Section 1 and 2: Coastal Farmland (Western Coastal Farmland LCA)					
Ancient Woodland:					
CF2 - Hills of Boyndie CF3 - Coach Brae CF4 - Hill of Alvah CF5 - Claret Brae	High	High magnitude and potentially **significant** due to physical effect resulting from loss of ancient woodland.	Modified onshore export cable route to avoid physical effect on woodland or use directional drilling to bore export cable under woodland.	Negligible	**Not significant**, adverse, short-term, reversible.
Woodland:					
CF1 - Cuttle Rig	Medium	High magnitude and potentially **significant** due to physical effect resulting from loss of characteristic deciduous scrub woodland.	Modified onshore export cable route to avoid physical effect on woodland.	Negligible	**Not significant**, adverse, short-term, reversible.
Field Boundaries:					
Consumption dykes	Medium-high	High magnitude and potentially **significant** due to physical effect resulting from loss of characteristic consumption dyke features.	Modified onshore export cable route to avoid consumption dykes and/or reinstate following cable installation.	Low	**Not significant**, adverse, short-term, reversible
Scrub hedgerows	Medium-low	High magnitude and potentially **significant** due to physical effect resulting from loss of characteristic scrub hedgerows.	Modified onshore export cable route to avoid scrub hedgerow and/or reinstate following cable installation.	Low	**Not significant**, adverse, short-term, reversible
Farmland:					
Arable farmland	Low	Medium-high magnitude and potentially **significant** due to physical effect resulting from loss of characteristic arable farmland.	Reinstate arable farmland following cable installation.	Medium	**Not significant**, adverse, short-term, reversible
Landscape Character:					
Western Coastal Farmland LCA	Medium	High magnitude and potentially **significant** due to effects resulting from loss of characteristic ancient woodlands, scrub hedgerows, consumption dykes and arable land.	Modified onshore export cable route to avoid physical effects on characteristic woodlands, consumption dykes and scrub hedgerows and/or use directional drilling to bore export cable under woodland. Reinstate consumption dykes, scrub hedgerows and arable land following cable installation.	Low	**Not significant**, adverse, short-term, reversible

Section 2: River Valley (Deveron and Upper Ythan Valleys LCA)

Table 5.3-10 Modified Onshore Export Cable Route Assessment: Landscape Character & Elements (Section 2)

Landscape Element	Sensitivity to change	Potential Effect	Mitigation Measures	Residual Magnitude of Change	Significance of Residual Effect
Section 2: River Valley (Deveron and Upper Ythan Valleys LCA)					
Semi-natural Ancient Woodland:					
RV6 - Den of Inverichnie	High	High magnitude and potentially **significant** due to physical effect resulting from loss of semi-natural ancient woodland.	Modified onshore export cable route to avoid physical effect on woodland or use directional drilling to bore export cable under woodland.	Negligible	**Not significant**, adverse, short-term, reversible.
Ancient Woodland:					
RV5 - Lower Wanford	High	High magnitude and potentially **significant** due to physical effect resulting from loss of ancient woodland.	Modified onshore export cable route to avoid physical effect on woodland or use directional drilling to bore export cable under woodland.	Negligible	**Not significant**, adverse, short-term, reversible.
Woodland:					
RV1 - Govel Hill RV2 - Berryton Cottage RV3 - Cormack's Hillock RV4 - Inverichnie	Medium-high	High magnitude and potentially **significant** due to physical effect resulting from loss of woodland.	Modified onshore export cable route to avoid physical effect on woodland or use directional drilling to bore export cable under woodland.	Negligible	**Not significant**, adverse, short-term, reversible.
Farmland:					
Arable / Mixed Agriculture	Low	Medium-high magnitude and potentially **significant** due to physical effect resulting from loss of characteristic arable farmland.	Reinstate arable farmland following cable installation.	Medium	**Not significant**, adverse, short-term, reversible
Field Boundaries:					
Consumption dykes	Medium-high	High magnitude and potentially **significant** due to physical effect resulting from loss of characteristic consumption dyke features.	Modified onshore export cable route to avoid consumption dykes and/or reinstate following cable installation.	Low	**Not significant**, adverse, short-term, reversible
Scrub hedgerows	Medium-low	High magnitude and potentially **significant** due to physical effect resulting from loss of characteristic scrub hedgerows.	Modified onshore export cable route to avoid scrub hedgerow and/or reinstate following cable installation.	Low	**Not significant**, adverse, short-term, reversible
Field boundary trees	Medium-high	High magnitude and potentially **significant** due to physical effect resulting from loss of characteristic field boundary trees.	Modified onshore export cable route to avoid field boundary trees and/or reinstate following cable installation.	Low	**Not significant**, adverse, short-term, reversible

Landscape Character:					
Deveron and Upper Ythan Valleys LCA	High	High magnitude and potentially **significant** due to effects resulting from loss of characteristic ancient woodlands, scrub hedgerows, field boundary trees, consumption dykes and arable land.	Modified onshore export cable route to avoid physical effects on characteristic woodlands, consumption dykes scrub hedgerows and field boundary trees and/or use directional drilling to bore export cable under woodland. Reinstate consumption dykes, scrub hedgerows, field boundary trees and arable land following cable installation.	Low	**Not significant**, adverse, short-term, reversible

Sections 3, 4 and 5: Agricultural Heartland (Agricultural Heartland LCA)

Table 5.3-11 Modified Onshore Export Cable Route Assessment: Landscape Character & Elements (Sections 3, 4 & 5)

Landscape Element	Sensitivity to change	Potential Effect	Mitigation Measures	Residual Magnitude of Change	Significance of Residual Effect
Sections 3, 4 & 5: Agricultural Heartland (Agricultural Heartland LCA)					
Ancient Woodland:					
AH1 - Wood of Balchers	Low[4]	Physical effect unlikely to be significant as Wood of Balchers is a plantation forest with commercial felling activities.	Not required	Low	**Not significant**, adverse, short-term, reversible.
Woodland:					
AH2 - Mill of Balmaud AH3 - Yonderton AH4 - Slackadale AH5 - Hill of Cotburn AH6 - Cairnhill AH7 - Waterside AH8 - Castlehill AH9 - Boghead AH10 - Howe of Teuchar AH11 - Bridge of Swanford	Medium - high	High magnitude and potentially **significant** due to physical effect resulting from loss of woodland.	Modified onshore export cable route to avoid physical effect on woodland or use directional drilling to bore export cable under woodland wherever possible.	Negligible	**Not significant**, adverse, short-term, reversible.
Farmland:					
Arable Farmland	Low	Medium-high magnitude and potentially **significant** due to physical effect resulting from loss of characteristic arable farmland.	Reinstate arable farmland following cable installation.	Medium	**Not significant**, adverse, short-term, reversible
Field boundaries:					
Consumption dykes	Medium-high	High magnitude and potentially **significant** due to physical effect resulting from loss of characteristic consumption dyke features.	Modified onshore export cable route to avoid consumption dykes and/or reinstate following cable installation.	Low	**Not significant**, adverse, short-term, reversible
Scrub hedgerows	Medium-low	High magnitude and potentially **significant** due to physical effect resulting from loss of characteristic scrub hedgerows.	Modified onshore export cable route to avoid scrub hedgerow and/or reinstate following cable installation.	Low	**Not significant**, adverse, short-term, reversible
Field boundary trees	Medium-high	High magnitude and potentially **significant** due to physical effect resulting from loss of characteristic field boundary trees.	Modified onshore export cable route to avoid field boundary trees and/or reinstate following cable installation.	Low	**Not significant**, adverse, short-term, reversible

[4] Wood of Balchers is a Forestry Commission commercial plantation

Landscape Character:					
Agricultural Heartlands LCA	Medium	High magnitude and potentially **significant** effect within cable route corridor.	Modified onshore export cable route to avoid physical effects on consumption dykes scrub hedgerows and field boundary trees. Reinstate consumption dykes, scrub hedgerows, field boundary trees and arable farmland following cable installation.	Low	**Not significant**, adverse, short-term, revsersible.

Summary of Cable Route Construction Effects on Landscape/Seascape Character

5.3.4.74 The Cliffs of the North and South-East Coast LCA and Boyndie Bay CCA in which the modified export cable landfall and Section 1 of the modified onshore export cable route corridor are located have a high sensitivity to change. This increased sensitivity is primarily due to distinctive and cohesive coastal landforms, which define its character, and the frequency of settlement and recreational use of these coastal landscapes. The sensitivity of the physical landscape of Inverboyndie Beach is assessed as medium to low as the beach is relatively easy to restore. The main effects of the modified export cable landfall will result from the disturbance to Inverboyndie Beach resulting from modified export cable landfall installation and the presence of machinery on and around the beach. The beach pit and any other excavations would be backfilled once the export cables are installed and tides will wash over the excavations to consolidate the backfill. The magnitude of change resulting from the modified export cable landfall is assessed as medium and the effect as **not significant**, adverse, short-term and reversible.

5.3.4.75 The modified onshore export cable route will result in the partial loss or alteration of the cliff face at the hinterland area of Inverboyndie Beach, during cable installation works, but loss would not be permanent and restoration would be anticipated to occur within the medium term. The magnitude of change on the immediate coastal character in this area is assessed as medium-high, within the immediate locale of the cliff face and cliff top and medium to low across the adjacent farmland. **Significant**, adverse, short-term, reversible effects will arise over a localised area lasting for the short-term duration of the construction works.

5.3.4.76 All other LCAs within the modified OnTI Study Area will not experience **significant** effects on landscape character, providing that suitable mitigation measures are employed to avoid physical effects on the principal landscape features within these LCAs. In particular, the modified onshore export cable route will be sited or installed to avoid physical effects on areas of woodland and ancient woodland. The modified onshore export cable route will also be sited or installed to avoid physical effects on consumption dykes, scrub hedgerows and hedgerow trees where possible, and/or these features will be reinstated following cable installation. Arable farmland will be reinstated following cable installation.

Operation

5.3.4.77 During the operational stage, there will be no further loss or alteration to the physical elements of the landscape as a result of the modified onshore export cable route. The onshore export cable will be buried up to 1.5 m deep on land therefore during operation there will be no physical effects as a result of the onshore export cable elements on any landscape elements.

5.3.4.78 In this context, the magnitude of change resulting from the operation of the modified onshore export cable will be negligible and the effect of the modified onshore export cable during operation will be not **significant**.

Decommissioning

5.3.4.79 During decommissioning, it is anticipated that the onshore export cable will be left in-situ and will result in no effect on physical landscape elements and landscape character. Where cables have been inserted into pre-installed ducts, it may prove possible to extract the cables relatively easily, if required, during the decommissioning phase with very limited effect on landscape receptors. The magnitude of change on landscape elements and LCAs will be negligible and the effect of the onshore export cable during decommissioning will be **not significant**.

Effects of Modified Onshore Export Cable Route (and Landfall) on Visual Amenity

Construction

5.3.4.80 The effect of the construction of the onshore export cable on visual amenity is assessed in Tables 5.3.12 – 5.3.14 relating to each section of the modified onshore export cable route corridor. Sections of the route are mapped in detail according to each LCA along the modified onshore export cable route corridor (Figures 5.3-18 to 5.3-22). The main visual effects within each LCA section are identified within a 1 km buffer of the modified onshore export cable route corridor and an assessment of their sensitivity and the potential effect of the onshore export cable construction, before mitigation. Appropriate mitigation measures are identified and the residual effect on each visual receptor is assessed assuming adoption of mitigation measures.

Section 1: The Coast (Cliffs of the North and South East Coast LCA)

Table 5.3-12 Modified Onshore Export Cable Route Assessment: Visual Receptors (Section 1)

Visual Receptor	Sensitivity to change	Potential Effect on Visual Amenity	Mitigation Measures	Residual Magnitude of Change	Significance of Residual Effect[5]
Section 1: The Coast (Cliffs of the North and South East Coast LCA and Boyndie Bay CCA)					
Residents of main settlements/villages:					
Banff	High	Low magnitude and **not significant** due to intervening distance (800 m minimum) and limited visibility of modified onshore export cable route from majority of Banff.	Not required	Low / negligible	**Not significant**, adverse, short-term, reversible
Inverboyndie	High	Potentially high magnitude and **significant** due to views of cable installation from residences in Inverboyndie at close proximity.	Onshore export cable route to be sited within part of modified onshore export cable route corridor to reduce/prevent visibility from Inverboyndie.	Low	**Not significant**, adverse, short-term, reversible
Whitehills	High	Low magnitude and **not significant** due to intervening distance (550 m minimum) and limited visibility of modified onshore export cable route from majority of Whitehills.	Not required	Low / negligible	**Not significant**, adverse, short-term, reversible
Motorists using A and B Roads:					
A98	Medium	Potentially high magnitude and **significant** due to views of cable installation from A98 from short section of road between Banff, Mill of Boyndie and Ladybrae Farm, and potential loss of deciduous woodland in views over Burn of Boyndie.	Modified onshore export cable route to avoid physical effect on woodland and/or use directional drilling to bore export cable under Burn of Boyndie.	Medium-high over 500 m section of the road passing Burn of Boyndie / Black Hillocks. Low-negligible from majority of the road.	**Significant**, adverse, short-term, reversible over 500 m section of the road. **Not significant** from majority of the road.
B9038	Medium	Potentially high magnitude and **significant** due to views of cable installation from 1 km section of B9038 between Kirkhill and Mill of Boyndie.	Reinstate consumption dykes and arable farmland following cable installation.	High over 1 km section of the road between Kirkhill and Mill of Boyndie. Low-negligible from majority of the road.	**Significant**, adverse, short-term, reversible over 1 km section. **Not significant** from majority of the road.

[5] In tables 5.3.12 – 5.3.15, residual magnitude of change and significance of effect assume mitigation measures have been adopted.

Visual Receptor	Sensitivity to change	Potential Effect on Visual Amenity	Mitigation Measures	Residual Magnitude of Change	Significance of Residual Effect[5]
B9139	Medium	Potentially high magnitude and **significant** due to views of cable installation from 500 m section of B9139 near B9038 junction.	Reinstate consumption dykes and arable farmland following cable installation.	High over 500 m section of the road between near B9038 junction. Low-negligible from majority of the road.	**Significant**, adverse, short-term, reversible over 500 m section. **Not significant** from majority of the road.
Cyclists/walkers using long distance routes and local paths:					
NCN 1 / Core Path - section on road between Kirkhill and Inverboyndie	High	Potentially high magnitude and **significant** due to views of cable installation from 1 km section of NCN 1 between Kirkhill and Inverboyndie.	Reinstate consumption dykes and arable farmland following cable installation.	High over 1 km section of the road between Kirkhill and Inverboyndie . Low-negligible from majority of the route.	**Significant**, adverse, short-term, reversible over 1 km section. **Not significant** from majority of the route.
NCN 1 / Core Path - section off road between Red Well and Banff Links Caravan Park	High	Potentially high magnitude and **significant** due to effect from 1 km section **of route along the coast with views of** modified export cable landfall installation on Inverboyndie Beach and alteration to the cliff edge resulting from excavation for modified onshore export cable route, from NCN 1 along the coast between Red Well and **Banff Links Caravan Park** at close proximity to the route.	Beach pit and any other excavations would be backfilled once the export cables are installed and allow tides to wash over the excavations to consolidate the backfill. Cable installation would result in the partial loss or alteration of the cliff face but loss would not be permanent and restoration would be anticipated to occur within the medium term.	High over 1 km section of the route along coast between Red Well and Banff Links. Low-negligible from majority of the route.	**Significant**, adverse, short-term, reversible over 1 km section. **Not significant** from majority of the route.
Core Path - Disused Railway	High	Potentially high magnitude and **significant** due to views of cable installation from 500 m section of core path near Mill of Boyndie.	Modified onshore export cable route to avoid physical effect on woodland and/or use directional drilling to bore export cable under Burn of Boyndie.	Medium	**Significant**, adverse, short-term, reversible over 500 m section. **Not significant** from majority of the route.

People taking part in other recreational activities:					
Inverboyndie Beach Users	High	Potentially high magnitude and **significant** due to views of modified export cable landfall installation on Inverboyndie Beach and alteration to the cliff edge resulting from excavation for modified onshore export cable route, at close proximity.	Beach pit and any other excavations would be backfilled once the export cables are installed and allow tides to wash over the excavations to consolidate the backfill. Cable installation would result in the partial loss or alteration of the cliff face but loss would not be permanent and restoration would be anticipated to occur within the medium term.	High	**Significant**, adverse, short-term, reversible
Banff Links Caravan Park Visitors	High	Potentially high magnitude and **significant** due to views of modified export cable landfall installation on Inverboyndie Beach and alteration to the cliff edge resulting from excavation for modified onshore export cable route, at close proximity.	Onshore export cable route to be sited within part of modified onshore export cable route corridor to reduce/prevent visibility from Caravan Park. Beach pit and any other excavations would be backfilled once the export cables are installed and allow tides to wash over the excavations to consolidate the backfill. Cable installation would result in the partial loss or alteration of the cliff face but loss would not be permanent and restoration would be anticipated to occur within the medium term.	High	**Significant**, adverse, short-term, reversible

Section 1 and 2: Coastal Farmland (Western Coastal Farmland LCA)

Table 5.3-13 Modified Onshore Export Cable Route Assessment: Visual Receptors (Section 1 & 2)

Visual Receptor	Sensitivity to change	Potential Effect on Visual Amenity	Mitigation Measures	Residual Magnitude of Change	Significance of Residual Effect
Section 1 and 2: Coastal Farmland (Western Coastal Farmland LCA)					
Motorists using A and B Roads:					
A97	Medium	Potentially high magnitude and **significant** due to views of cable installation from 1 km section of A97 between Hill of Tipperty and Crow Wood.	Reinstate consumption dykes and arable farmland following cable installation.	Medium-high over 1 km section of the road. Low-negligible from majority of the road.	**Significant**, adverse, short-term, reversible over 1 km section of the road. **Not significant** from majority of the road.
B9121	Medium	Potentially high magnitude and **significant** due to intermittent views of cable installation from 2km section of B9121 between Mid Culbeuchy and A97 junction at close proximity to the road.	Reinstate consumption dykes and arable farmland following cable installation.	Medium-high over 2 km section of the road. Low-negligible from majority of the road.	**Significant**, adverse, short-term, reversible over 2 km section of the road. **Not significant** from majority of the road.

Section 2: River Valley (Deveron and Upper Ythan Valleys LCA)

Table 5.3-14 Modified Onshore Export Cable Route Assessment: Visual Receptors (Section 2)

Visual Receptor	Sensitivity to change	Potential Effect on Visual Amenity	Mitigation Measures	Residual Magnitude of Change	Significance of Residual Effect
Section 2: River Valley (Deveron and Upper Ythan Valleys LCA)					
Residents of main settlements/villages:					
Kirktown of Alvah	High	Low/negligible due to intervening landform / woodland screening.	Not required	Low/ negligible	**Not significant**, neutral, short-term, reversible
Cyclists/walkers using long distance routes and local paths:					
NCN 1 / Core Path	High	Potentially high magnitude and **significant** due to views of cable installation from 2 km section of NCN 1 / Core Path between Lower Wanford and Keilhill.	Reinstate consumption dykes and arable farmland following cable installation.	High over 2 km section of the route between Lower Wanford and Keilhill. Low-negligible from majority of the route.	**Significant**, adverse, short-term, reversible over 2 km section. **Not significant** from majority of the route.

Sections 3, 4 and 5: Agricultural Heartland (Agricultural Heartland LCA)

Table 5.3-14 Modified Onshore Export Cable Route Assessment: Visual Receptors (Section 3, 4 & 5)

Visual Receptor	Sensitivity to change	Potential Effect on Visual Amenity	Mitigation Measures	Residual Magnitude of Change	Significance of Residual Effect
Section 3, 4 and 5: Agricultural Heartland (Agricultural Heartland LCA)					
Residents of main settlements/villages:					
Keilhill	High	Potentially high magnitude and **significant** due to views of cable installation from residences in Keilhill at close proximity.	Onshore export cable route to be sited within part of modified onshore export cable route corridor to reduce visibility from Keilhill.	Medium	**Significant**, adverse, short-term, reversible
Fintry	High	Potentially high magnitude and **significant** due to views of cable installation from residences in Fintry at close proximity.	Onshore export cable route to be sited within part of modified onshore export cable route corridor to reduce visibility from Fintry.	Medium	**Significant**, adverse, short-term, reversible
Cuminestown	High	Potentially medium magnitude and **significant** due to views of cable installation from residences in Cuminestown at distances over 300 m.	Onshore export cable route to be sited within part of modified onshore export cable route corridor to reduce visibility from Cuminestown.	Low	**Not significant**, adverse, short-term, reversible
Motorists using A and B Roads:					
A947	Medium	Potentially high magnitude and **significant** due to views of cable installation from 2 km section of A947 between Bogside and Montbletton	Reinstate consumption dykes and arable farmland following cable installation.	Medium-high over 2 km section of the road. Low-negligible from majority of the road.	**Significant**, adverse, short-term, reversible over 2 km section of the road. **Not significant** from majority of the road.
B9105	Medium	Potentially high magnitude and **significant** due to views of cable installation from 2 km section of B9105 near Craigston Castle and Fintry	Reinstate consumption dykes and arable farmland following cable installation.	Medium-high over 2 km section of the road. Low-negligible from majority of the road.	**Significant**, adverse, short-term, reversible over 2 km section of the road. **Not significant** from majority of the road.
B9170	Medium	Potentially high magnitude and **significant** due to views of cable installation from 1.5 km section of B9170 between Cuminestown and Castle of Auchry.	Reinstate consumption dykes and arable farmland following cable installation.	Medium-high over 1.5 km section of the road. Low-negligible from majority of the road.	**Significant**, adverse, short-term, reversible over 1.5 km section of the road. **Not significant** from majority of the road.
Cyclists/walkers using long distance routes and local paths:					
NCN 1 / Core Path – Idoch Water	High	Potentially high magnitude and **significant** due to views of cable installation from 1.5 km section of route between Cuminestown and Castle of Auchry.	Reinstate consumption dykes and arable farmland following cable installation.	Medium-high over 1.5 km section of the road. Low-negligible from majority of the road.	**Significant**, adverse, short-term, reversible over 1.5 km section of the route. **Not significant** from majority of the route.

Summary of Cable Route Construction Effects on Visual Amenity

5.3.4.81 The coastal areas of Boyndie Bay in which the modified export cable landfall and Section 1 of the modified onshore export cable route corridor are located, have a higher concentration of visual receptors than the remaining predominantly agricultural sections of the modified onshore export cable route corridor. In this coastal area, the main visual effects of the modified export cable landfall will result from views of modified export cable landfall installation on Inverboyndie Beach and alteration to the cliff edge resulting from excavation for modified onshore export cable route, and the presence of machinery on the beach, which will include drill rigs and cable barges and which will appear large in scale.

5.3.4.82 The magnitude of change to views resulting from the modified export cable landfall and modified onshore export cable route installation is assessed as high on cyclists/walkers using short sections of NCN 1 and the core path alongside Inverboyndie Beach and for recreational users of Inverboyndie Beach and Banff Links Caravan Park. The visual effect of the modified export cable landfall and modified onshore export cable route installation is assessed as **significant** and adverse on these receptors, but of short-term duration and reversible. The beach pit and any other excavations would be backfilled once the export cables are installed and tides will wash over the excavations to consolidate the backfill. The modified onshore export cable route will result in the partial loss or alteration of the cliff face at the hinterland area of Inverboyndie Beach, during cable installation, but loss would not be permanent and restoration would be anticipated to occur within the medium term.

5.3.4.83 The visual effect of the modified export cable landfall and modified onshore export cable route installation is assessed as **not significant** on residents of Banff, Inverboyndie and Whitehills. **Significant** adverse but short-term and reversible visual effects will be experienced by residents of Keilhill and Fintry, due to the proximity of the modified onshore export cable route in views from these small villages in the agricultural heartlands.

5.3.4.84 **Significant** adverse but short-term and reversible visual effects will be experienced by motorists on short sections of several roads that pass through the modified onshore export cable route corridor, including the A97, A98, A947, B9038, B9105, B9121, B9139 and B9170. In all cases, the **significant** effects on views arising from the modified onshore export cable route installation will occur over short sections of these routes, typically from short localised sections of the roads which approach and pass through the 500 m modified onshore export cable route corridor, where there may be fleeting views of the cable installation at close range, and often on either side of the public road. The effect of the onshore export cable installation will be **not significant** from extensive sections of these A and B roads within the OnTI Study Area which generally will not allow motorists visibility of the modified onshore export cable route due to intervening landform and woodland screening in the landscape.

Operation

5.3.4.85 During the operational stage, the onshore export cable will be buried up to 1 m deep therefore during operation therefore there will be no further alteration to views as a result of the modified onshore export cable. In this context, the magnitude of change on views experienced from all visual receptors resulting from the operation of the modified onshore export cable will be negligible and the effect of the modified onshore export cable during operation will be not significant, **neutral, long term and reversible**.

Decommissioning

5.3.4.86 During decommissioning, it is anticipated that the onshore export cable will be left in-situ and will result in no effect on views and visual amenity. Where cables have been inserted into pre-installed ducts, it may prove possible to extract the cables relatively easily, if required, during the decommissioning phase with very limited effect on visual amenity. The magnitude of change on views and visual receptors will be negligible and the effect of the onshore export cable during decommissioning will be **not significant**, neutral, short-term and reversible.

Effect of Onshore Substations on Landscape Character and Elements

Agricultural Heartlands LCA

5.3.4.87 The onshore substation area is located in the Agricultural Heartlands LCA. The baseline conditions for this LCA are described in the landscape baseline in Section 5.3.3. The Agricultural Heartland unit typifies the characteristic agricultural heartland of Banff & Buchan, in which the land use is predominantly large scale, agricultural land of arable and pasture. The rolling landform allows some open views of the surrounding landscape, but also provides enclosure. There are occasionally longer distance views to the upland skyline of Bennachie to the south. There is a frequent scattering of broad-leaved trees in shelterbelts along hill-ridges, around farms and, occasionally in small coniferous blocks, in this large scale agricultural plain. Field boundaries vary, including fence-lines, hedges and the occasional stone dyke. Farmsteads are frequent in this relatively well-settled landscape, as are small hamlets and larger villages such as New Deer and Cuminestown. Wind turbines associated with large scale farmsteads are only occasionally evident in the part of the LCA in the onshore substation Study Area, consisting of a single wind turbine at Cairnhill and a three turbine cluster at Hill of Balquhindachy, together with several small scale farm turbines (>30m). Further wind turbines are visible and characteristic in the wider Agricultural Heartlands landscape, generally consisting of between 1 – 3 turbines of 75-80m in height. Viewpoints 1 – 8 are all located within the Agricultural Heartlands and the existing views shown from them, in Figures 5.3-30 to 5.3-37 are indicative of the character of this LCA within the onshore substation Study Area.

Sensitivity to Change

5.3.4.88 The sensitivity of the Agricultural Heartland LCA to change resulting from the onshore substations is assessed in Table 5.3-15.

Table 5.3-15 Agricultural Heartlands LCA – Sensitivity to Change (Onshore Substations)

Agricultural Heartland LCA – Sensitivity to Change	
Value:	Medium
• Agricultural Heartlands LCA is not subject to any scenic landscape designation. • The innate character of the landscape has been subject to modification mainly through intensive farming, which influences the scenic and perceptual quality. • The Agricultural Heartlands cover an extensive area within Aberdeenshire and are not rare in the region, being representative of a wide area of intensive farmland. • The LCA is well settled with frequent farmsteads, but is not notably valued for recreation, although there is some local recreational use. • There are valued views of the upland skyline formed by Bennachie and its adjacent uplands to the south.	
Susceptibility to change:	Medium
Factors which increase susceptibility to change	
• Landscape change on rolling landform could be visually prominent, where there are open views of the landscape, and influence the character of the LCA. • The LCA is well settled, with frequent farmsteads and small hamlets, but few larger village and settlements. • Electrical infrastructure and buildings within the onshore substations are likely to appear largely in conjunction with agricultural landscape patterns and features, in a rural landscape context. • The scale of the potential substations is large compared to existing development influences within this rural area.	
Factors which decrease susceptibility to change	
• Appropriately sited and designed development may appear to be accommodated within the broad, large scale rolling landform and may be contained by subtle undulations in landform. • Woodland shelterbelts increase enclosure in the landscape and reduce the likelihood to experience change as a result of the onshore substations. • Additional screening of the onshore substations through woodland planting would enhance key characteristic of the LCA. • Onshore substations are likely to appear in conjunction with large scale farm buildings, linear elements such as field boundaries and tracks, and existing electrical infrastructure such as the main 275kV electrical line/pylons. • The LCA has relatively few visual receptors that experience the landscape character, with very limited recreational activity and few main road routes. • Landscape change caused by onshore substations may have some associations with the existing wind energy generation characteristics of this landscape unit.	
Sensitivity to change:	Medium

Magnitude of Change

5.3.4.89 The magnitude of change resulting from the onshore substations on the Agricultural Heartland LCA is assessed in Table 5.3-16.

Table 5.3-16 Agricultural Heartlands LCA – Magnitude of Change (Onshore Substations)

Agricultural Heartland LCA – Magnitude of Change	
Geographic Extent:	Local
The visibility of the Development from the Agricultural Heartlands LCA is illustrated in the ZTV in Figure 5.3-15. Geographically, the area of the LCT that may experience change as a result of visibility of the onshore substations is contained to the agricultural land immediately around the onshore substations between Burnside, Asleid, Millbrex and Swanford; extending to elevated ground around Auchmaliddie in the east (south of New Deer) to Muirtack/Upperton in the west; and between Cuminestown in the north and the Braes of Gight to the south, generally within 6km. Broadly, the western parts of the LCT within the Study Area, to the west of Deer Hill, will experience limited or no change. The scale or size of the change on the character of this LCA varies and is assessed within the following areas of the LCA: Area 1 – Substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford Area 2 – Little Water, low-lying area to the east Area 3 – Cairnbanno to New Deer to the north-east Area 4 – Allathan to Balthangie to the north Area 5 – Cuminestown, Howe of Teuchar to Fyvie to the west Area 6 – Northern Rolling Lowlands (Balquhindachy to Braes of Gight) Area 7 – Ythan Strath Farmland	
Magnitude of change (construction/decommissioning)	
Area 1 - Substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford	Medium to high
• The construction of the onshore substations results in a moderate to large scale change to the local character due to the construction compound and reversible buildings, vehicles, machinery, cranes and the stockpiling of materials that will be needed during construction. • The construction processes will result in changes in ground conditions/profiles and the addition of the fenced buildings and electrical infrastructure. • As they are constructed the built form and electrical infrastructure will appear on the open skyline. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area. • The physical effect on the arable farmland within the substations area is contained to a limited footprint occupied by the substations, access tracks and site infrastructure. • The indicative substations location avoids the higher ground (110m) to the east of the substations area, which forms a more identifiable part of the skyline, instead being sited on the slightly lying western part of the landform around the 105m contour. • The undulating agricultural land and woodland blocks, particularly within the Burn of Asleid, provide some containment of the substations in the landscape.	
Area 2 - Cairnbanno to Auchmaliddie to the north-east	**Medium to low**
• The construction of the onshore substations results in a small to moderate scale change on this area due to construction of onshore substations appearing on the open skyline to the west, but at distance and with a reduced influence on the character of this area.	
Area 3 - Allathan to Balthangie to the north	**Low**
• The construction of the onshore substations results in a small scale change on this area due to the lower visibility of the construction of the onshore substations, due to intervening landform screening and increased distance resulting in a reduced influence on the character of this area.	

Agricultural Heartland LCA – Magnitude of Change	
Area 4 - Northern Rolling Lowlands (Balquhindachy to Braes of Gight)	**Low**
• The construction of the onshore substations results in a small scale change on this area due to the lower visibility of the construction of the onshore substations, due to intervening landform screening, the position of the substations below the skyline and increased distance resulting in a reduced influence on the character of this area.	
Area 5 - Ythan Strath Farmland	**Low**
• The construction of the onshore substations results in a small scale change on this area due to the lower visibility of the construction of the onshore substations, due to intervening landform screening, the position of the substations below the skyline and increased distance resulting in a reduced influence on the character of this area.	
Area 6 - Little Water, low-lying area to the east	**Negligible (no visibility)**
Area 7 - Cuminestown, Howe of Teuchar to Fyvie to the west	**Negligible (no visibility)**
Area 8 - New Deer, Clush to Knaven	**Negligible (no visibility)**
Magnitude of change (operation):	
Area 1 - Substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford	Medium to high
• The operation of the onshore substations results in a moderate to large scale change to the local character due to the presence of large scale electrical buildings and infrastructure, which will increase the developed character of the local landscape through the introduction of large buildings and electrical infrastructure. • The principal change to the local character will result from the contrast of the electrical infrastructure and buildings within the onshore substations within the predominantly agricultural setting and the scale/complexity of built forms compared to existing development influences within the area. • The operation of the onshore substations will result in further changes to ground conditions/profiles, the addition of fences, access roads and a very slight increase in vehicular movement in the local area. • Woodland and hedgerows will have been planted as part of the landscape mitigation scheme, but will have limited effect as components of the landscape until they are at least 5 years old.	
Area 2 - Cairnbanno to Auchmaliddie to the north-east	**Medium to low**
• The operation of the onshore substations results in a small to moderate scale change on this area due to the onshore substation buildings and electrical infrastructure appearing on the open skyline to the west, but at distance and with a reduced influence on the character of this area.	
Area 3 - Allathan to Balthangie to the north	**Low**
• The operation of the onshore substations results in a small scale change on this area due to the lower visibility of the onshore substation buildings and electrical infrastructure, due to intervening landform screening and increased distance resulting in a reduced influence on the character of this area.	
Area 4 - Northern Rolling Lowlands (Balquhindachy to Braes of Gight)	**Low**
• The operation of the onshore substations results in a small scale change on this area due to the lower visibility of the onshore substation buildings and electrical infrastructure, due to intervening landform screening, the position of the substations below the skyline and increased distance resulting in a reduced influence on the character of this area.	
Area 5 - Ythan Strath Farmland	**Low**
• The operation of the onshore substations results in a small scale change on this area due to the lower visibility of the onshore substation buildings and electrical infrastructure, due to intervening landform screening, the position of the substations below the skyline and increased distance resulting in a reduced influence on the character of this area.	
Area 6 - Little Water, low-lying area to the east	**Negligible (no visibility)**
Area 7 - Cuminestown, Howe of Teuchar to Fyvie to the west	**Negligible (no visibility)**
Area 8 - New Deer, Clush to Knaven	**Negligible (no visibility)**

Agricultural Heartland LCA – Magnitude of Change	
Magnitude of change (operation – 15 years post construction):	
Area 1 - Substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford	Medium (high within the site only)
• The operation of the onshore substations results in a moderate to large scale change to the local character due to the presence of large scale electrical buildings and infrastructure, which will increase the developed character of the local landscape through the introduction of large buildings and electrical infrastructure. • The principal change to the local character will results from the contrast of the electrical infrastructure and buildings within the onshore substations within the predominantly agricultural setting and the scale/complexity of built forms compared to existing development influences within the area. • The operation of the onshore substations, post a 15 year planting establishment period, will include maturing native woodland shelterbelts around the onshore substations, which will visually contain and screen much of the onshore substation buildings and electrical infrastructure. • Native woodland and hedgerows around the onshore substations would enhance these key characteristics of the LCA, increasing deciduous woodland cover and connecting areas of existing shelterbelt woodland.	
Area 2 - Cairnbanno to Auchmaliddie to the north-east	Low
• The operation of the onshore substations results in a small scale change on this area due to the onshore substation buildings and electrical infrastructure appearing on the open skyline to the west, but at distance and with a reduced influence on the character of this area.	
Area 3 - Allathan to Balthangie to the north	**Low**
• The operation of the onshore substations results in a small scale change on this area due to the lower visibility of the onshore substation buildings and electrical infrastructure, due to intervening landform screening and increased distance resulting in a reduced influence on the character of this area.	
Area 4 - Northern Rolling Lowlands (Balquhindachy to Braes of Gight)	**Low**
• The operation of the onshore substations results in a small scale change on this area due to the lower visibility of the onshore substation buildings and electrical infrastructure, due to intervening landform screening, the position of the substations below the skyline and increased distance resulting in a reduced influence on the character of this area.	
Area 5 - Ythan Strath Farmland	**Low**
• The operation of the onshore substations results in a small scale change on this area due to the lower visibility of the onshore substation buildings and electrical infrastructure, due to intervening landform screening, the position of the substations below the skyline and increased distance resulting in a reduced influence on the character of this area.	
Area 6 - Little Water, low-lying area to the east	**Negligible (no visibility)**
Area 7 - Cuminestown, Howe of Teuchar to Fyvie to the west	**Negligible (no visibility)**
Area 8 - New Deer, Clush to Knaven	**Negligible (no visibility)**

Significance of Effect

5.3.4.90 The significance of effect on the Agricultural Heartlands LCA is summarised in Table 5.3-17.

Table 5.3-17 Agricultural Heartlands LCA – Significance of Effect (Onshore Substations)

Agricultural Heartland LCA – Significance of Effect	
Significance of Effect (construction/decommissioning):	
Area 1 - Substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford	**Significant**, adverse, short-term, reversible
Area 2 - Cairnbanno to Auchmaliddie to the north-east Area 3 - Allathan to Balthangie to the north Area 4 - Northern Rolling Lowlands (Balquhindachy to Braes of Gight) Area 5 - Ythan Strath Farmland	**Not significant,** adverse, short-term, reversible
Area 6 - Little Water, low-lying area to the east Area 7 - Cuminestown, Howe of Teuchar to Fyvie to the west Area 8 - New Deer, Clush to Knaven	**Not significant**, neutral, short-term, reversible
Significance of Effect (operation):	
Area 1 - Substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford	**Significant**, adverse, long-term, reversible
Area 2 - Cairnbanno to Auchmaliddie to the north-east Area 3 - Allathan to Balthangie to the north Area 4 - Northern Rolling Lowlands (Balquhindachy to Braes of Gight) Area 5 - Ythan Strath Farmland	**Not significant,** adverse, long-term, reversible
Area 6 - Little Water, low-lying area to the east Area 7 - Cuminestown, Howe of Teuchar to Fyvie to the west Area 8 - New Deer, Clush to Knaven	**Not significant**, neutral, long-term, reversible
Significance of Effect (operation – 15 years post construction):	
Area 1 - Substations area and surrounds between Burnside, Asleid, Boghead, Millbrex and Swanford	**Significant**, adverse, long-term, reversible within the site. Not significant, adverse, long-term, reversible.
Area 2 - Cairnbanno to Auchmaliddie to the north-east Area 3 - Allathan to Balthangie to the north Area 4 - Northern Rolling Lowlands (Balquhindachy to Braes of Gight) Area 5 - Ythan Strath Farmland Area 6 - Little Water, low-lying area to the east Area 7 - Cuminestown, Howe of Teuchar to Fyvie to the west Area 8 - New Deer, Clush to Knaven	**Not significant,** neutral, long-term, reversible

Effects of Onshore Substations on Visual Amenity

5.3.4.91 The effects of the onshore substations on visual amenity are assessed through a viewpoint assessment from eight representative viewpoints in the onshore substations Study Area. These viewpoints are primarily representative of the residential receptors and minor road network in the locality, with few other receptors in the local area. The sensitivity of each viewpoint is assessed based on the value of the view and the

susceptibility to change of people experiencing the view. The magnitude of change is assessed based on the geographic extent and scale or size of the change resulting from the onshore substations. The magnitude and significance of effect for each viewpoint is assessed during construction/decommissioning, during operation and during operation 15 years post construction when the woodland planting proposals will be approaching maturity. The effects of the onshore substations on viewpoints are assessed in Tables 5.3.18 – 5.3.25.

Viewpoint 1 Upper Mains of Asleid - Figure 5.3-30

Table 5.3-18 Viewpoint 1: Upper Mains of Asleid

Viewpoint 1: Upper Mains of Asleid	
Baseline conditions	
Grid reference: 383600 844428	Elevation: 103 m
View direction: 282	Distance: 282m
Viewpoint location: The viewpoint is located on the minor road which lies to the east of the site, between the settlements of Burnside and Burnend. It is representative of the view experienced by residents of the properties in the vicinity of Upper Mains of Asleid and by motorists travelling north towards Burnside along the minor road.	
Existing view: • Rural landscape. • Land use primarily arable farmland. • Field boundaries generally determined by post and wire fences, as well as some consumption dykes. • Range of vegetation, including woodland shelterbelts and blocks of coniferous woodland, particularly adjacent to the Burn of Alseid and along the skyline. • Gently rolling landform of subtle undulations, with elevations generally between 100-110m AOD, although dropping more steeply into the Burn of Asleid to approximately 95m AOD. • Areas of higher ground in the wider landscape visible in the distance, particularly to the west of the site, containing views. • Scattered detached houses and farmsteads (including large agricultural buildings at North Milbrex and East Swanford). • Large scale electrical pylons and overhead lines traverse the substation area between Mains of Asleid and East Swanford. • Network of minor roads and single track farm access lanes.	
Sensitivity to change	
Value:	Medium to low
• The view is not a formally recognised viewpoint, nor does it overlook a designated landscape, so is not afforded particular protection through planning policy. • The view has some local interest due to the panoramic vista over the wide landscape. • The viewpoint is located on a minor road adjacent to the properties at Upper Mains of Asleid so is easily accessible, although will not be experienced by large numbers of people. • The view has some scenic qualities and interest relating to the patterns and features visible in the landscape, such as shelterbelts, woodland blocks and post and wire field boundaries, as well as the rural/agricultural character that is indicative of the Agricultural Heartlands. • The character of the landscape visible is not rare and such views are available across large parts of rural Aberdeenshire. • The large scale electrical pylons and overhead lines which traverse the view influence its scenic qualities.	
Susceptibility to change:	Residents – High, Road users – medium
Factors which increase susceptibility:	

Viewpoint 1: Upper Mains of Asleid	
• The view will be experienced by residents in the vicinity of Upper Mains, although none of these properties have their main aspects towards the onshore substations they would have visibility from parts of the properties and external areas. • Views to the east are confined by a belt of woodland so that the only open views from this part of the minor route are towards the west. • The view is generally rural in character with some development characteristics.	
Factors which decrease susceptibility:	
• The view will be experienced for a short duration by road users, whose main attention may not be focused on their wider surroundings and will experience the site transiently at moderate speeds. • Upper Mains of Asleid is afforded screening to the west and north by existing shelterbelt woodland. • The view has some existing development characteristics and displays characteristics of a human influenced landscape.	
Sensitivity to change:	Residents – High to medium, Road users- medium-low
Magnitude of change (construction/decommissioning)	
Duration:	Short
Geographic extent:	Short distance
• Onshore substations are visible at close range - approx. 200m-500m for approximately 1km of the minor road. • Range, direction and extent of visibility akin to residential properties as above.	
Size or scale of change:	Large
• The construction of the onshore substations results in a large scale change in the view due to the construction compound and temporary buildings, vehicles, machinery, cranes and the stockpiling of materials that will be needed during construction. • The access to the site and its use will extend the notable construction area to the east of the Onshore Substation Area to where it connects with the minor road. • The construction processes will result in changes in ground conditions/profiles and the addition of the fenced buildings and electrical infrastructure. • Task and vehicle lighting may be used in the hours of darkness – but only during approved working hours. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • As they are constructed the built form and electrical infrastructure will obscure visibility of the rolling landscape beyond. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area. • Some separation of substations from minor road by open fields, maintaining the agricultural foreground.	
Magnitude of change:	High over short duration
Magnitude of change (operation)	
Duration:	Long term
Geographic extent:	Short distance
• Onshore substations are visible at close range – approx. 200m-500m for approximately 1km of the minor road. • Range, direction and extent of visibility akin to residential properties as above.	
Size or scale of change:	Large

Viewpoint 1: Upper Mains of Asleid	
• The operation of the onshore substations will result in changes in ground conditions/profiles and the addition of the fenced buildings and electrical infrastructure across approximately 34 degrees of the field of view from this location. • Woodland and hedgerows will have been planted but will have little effect as components of the landscape until they are at least 5 years old. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • The buildings and electrical infrastructure will obscure visibility of the rolling landscape beyond. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area. • Some separation of substations from minor road by open fields, maintaining the agricultural foreground.	
Magnitude of change:	High over long duration
Magnitude of change (operation - 15 years post construction)	
Geographic extent:	Short distance
• Onshore substations are visible at close range – approx. 200m-500m for approximately 1km of the minor road. • Range, direction and extent of visibility akin to residential properties as above.	
Size or scale of change:	Large
• The operation of the onshore substations, post a 15 year planting establishment period, will result in views of only the upper parts of buildings and electrical infrastructure being visible above close range hedgerows and the native woodland that is to be planted around the substation site, • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • The buildings and electrical infrastructure and planting will obscure visibility of the rolling landscape beyond. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area – however, these will be much less noticeable, particularly when the trees/hedges are in leaf. • The native woodland is characteristic of this landscape within the wider area and so will not contrast with the general landscape character.	
Magnitude of change:	Medium
Significance of effect	
Construction/decommissioning:	**Significant,** adverse, short-term, reversible
Operation:	**Significant,** adverse, long-term, reversible
15 years post construction:	Residents – **Significant,** adverse, long term, reversible, Road users – **not significant,** adverse, long term, reversible

Viewpoint 2 Burnside of Milbrex - Figure 5.3-31

Table 5.3-19 Viewpoint 2: Burnside of Milbrex

Viewpoint 2: Burnside of Milbrex	
Baseline conditions	
Grid reference: 383071 843952	Elevation: 102 m
View direction: 0 degrees	Distance: 337 m
Viewpoint location: This viewpoint is located at the junction between Burnside of Milbrex access and the minor road running along the onshore substation areas southern boundary. It is representative of the view experienced by motorists travelling east along the minor road, residents coming and going from Burnside of Millbrex and also shows how the property at Burnside of Milbrex relates to the area.	
• Existing view: • Rural landscape. • Land use primarily arable farmland and grazing land. • Field boundaries generally determined by post and wire fences. • Range of vegetation, including woodland shelterbelts and blocks of coniferous woodland, particularly adjacent to the Burn of Alseid, which lies just out of view in the middle ground valley. • Occasional scrubby/riparian trees along Burn of Asleid. • Gently rolling landform of subtle undulations contains views, with elevations generally between 100-110m AOD. View overlooks the Burn of Asleid's valley, where the elevation drops to approximately 95m AOD. • Access route to Burnside of Millbrex with farmhouse and steading beyond. • Swanford visible on the distant skyline. • Large scale electrical pylons and overhead lines traverse the substation area and are visible across the skyline in much of the view.	
Sensitivity to change	
Value:	Medium-low
• The view is not a formally recognised viewpoint, nor does it overlook a designated landscape, so is not afforded particular protection through planning policy. • Some local interest in the view for its open outlook towards Slacks of Cairnbanno and views of the Burn of Asleid when driving eastwards along the minor road. • The viewpoint is located on a minor road adjacent to the property at Burnside of Milbrex so is easily accessible, although will not be experienced by large numbers of people. • The fields are large and hedgerows have been removed so that the landscape has lost some of its defined pattern. • The constrained extent of the view and lack of hedgerows limits its scenic qualities. • The landscape of the view is not rare or remarkable in any way and it is representative of the rural/agricultural character that is indicative of the wide-spread Agricultural Heartlands. • The large scale electrical pylons and overhead lines which traverse the view influence its scenic qualities.	
Susceptibility to change:	Residents of farm – medium, Road users- medium-low
Factors which increase susceptibility:	
• The view will be experienced by residents of Burnside of Millbrex as they approach and move around outside their property. Views from the farmhouse are obscured by intervening trees and buildings. • The view is generally rural in character with some development characteristics.	
Factors which decrease susceptibility:	

Viewpoint 2: Burnside of Milbrex	
• The view will be experienced for a short duration by road users, whose main attention may not be focused on their wider surroundings and will experience the site transiently at moderate speeds. • Burnside of Milbrex is afforded screening to the north and east by existing shelterbelt woodland around the farm buildings along the Burn of Asleid. • The view has some existing development characteristics and displays characteristics of a human influenced landscape.	
Sensitivity to change:	Residents – medium, Road users - medium-low
Magnitude of change (construction/decommissioning)	
Duration:	Short term
Geographic extent:	Short distance
• Onshore substations are visible at close range - approx. 300m-500m intermittently for approximately 1km of the minor road. • Closer range views available from access track to Burnside of Millbrex.	
Size or scale of change:	Large
• The construction of the onshore substations results in a large scale change in the view due to the construction compound and temporary buildings, vehicles, machinery, cranes and the stockpiling of materials that will be needed during construction. • The construction processes will result in changes in ground conditions/profiles and the addition of the fenced buildings and electrical infrastructure. • Task and vehicle lighting may be used in the hours of darkness – but only during approved working hours. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • As they are constructed the built form and electrical infrastructure will appear on the open skyline. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area. • The open agricultural foreground and burn corridor provide a separation between the substations and the minor road and farm access.	
Magnitude of change:	High
Magnitude of change (operation)	
Duration:	Long term
Geographic extent:	Short distance
• Onshore substations are visible at close range - approx. 300m-500m intermittently for approximately 1km of the minor road. • Closer range views available from access track to Burnside of Millbrex.	
Size or scale of change:	Large

Viewpoint 2: Burnside of Milbrex	
• The operation of the onshore substations will result in changes in ground conditions/profiles and the addition of the fenced buildings and electrical infrastructure across approximately 34 degrees of the field of view from this location. • Woodland and hedgerows will have been planted but will have little effect as components of the landscape until they are at least 5 years old. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • The buildings and electrical infrastructure will be seen on the skyline. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area. • The open agricultural foreground and burn corridor provide a separation between the substations and the minor road and farm access.	
Magnitude of change:	High
Magnitude of change (operation – 15 years post construction)	
Duration:	Long term
Geographic extent:	Short distance
• Onshore substations are visible at close range - approx. 300m-500m intermittently for approximately 1km of the minor road. • Closer range views available from access track to Burnside of Millbrex.	
Size or scale of change:	Large
• The operation of the onshore substations, post a 15 year planting establishment period, will result in views of only the upper parts of buildings and electrical infrastructure being visible on the skyline above the native woodland that is to be planted around the substation site, • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area – however, these will be much less noticeable, particularly when the trees/hedges are in leaf. • The native woodland is characteristic of this landscape within the wider area and so will not contrast with the general landscape character.	
Magnitude of change:	Medium
Significance of effect	
Construction/decommissioning:	**Significant,** adverse, short-term, reversible
Operation:	**Significant,** adverse, long-term, reversible
Operation 15 years post construction	**Not significant,** adverse, long-term, reversible

Viewpoint 3 The Neuk Figure 5.3-32

Table 5.3-20 Viewpoint 3: The Neuk

Viewpoint 3: The Neuk	
Baseline conditions	
Grid reference: 383121 845364	Elevation: 107 m
View direction: 180 degrees	Distance: 644 m
Viewpoint location: This viewpoint is located on the minor road which runs to the east of the site, between Burnside and Burnend. It is representative of the view that may be experienced by residents of The Neuk and by motorists travelling south towards Burnend along the minor road. Boundary planting around the western and southern sides of The Neuk property is likely to obscure visibility in this direction following construction.	
Existing view: • Rural landscape. • Land use primarily arable farmland. • Field boundaries generally determined by post and wire fences. • Woodland shelterbelts characteristic along field boundaries adjacent to the minor road and alongside the Burn of Alseid. • Gently rolling landform of subtle undulations contains views, with elevations generally between 105-110m AOD, although dropping more steeply into the Burn of Asleid to approximately 100m AOD. • Scattered detached houses and farmsteads in the wider view. • Large scale electrical pylons and overhead lines traverse the view on the skyline. • Turbines at Haddo and Gordonstown Hill visible to the west of the site. • Large scale open fields.	
Sensitivity to change	
Value:	Low
• The view is not a formally recognised viewpoint, nor does it overlook a designated landscape, so is not afforded particular protection through planning policy. • Some local informal recognition is given to the view for its open outlook towards the south. • The viewpoint is located on a minor road so is easily accessible, although will not be experienced by large numbers of people and there are no available stopping points. • The view represents some of the patterns and features which are characteristic of the landscape, such as woodland blocks and post and wire field boundaries, as well as the rural/agricultural character that is indicative of the Agricultural Heartlands. Long-distance views over the rolling farmland are visible to the south-west. • The large scale electrical pylons, overhead lines and numerous wind turbines which interrupt the skyline further influence its scenic qualities. • The pattern of the landscape and its scenic quality have been reduced through the removal of hedgerows and the planting of non-native shelterbelts alongside the road. • High ground location affords panoramic views over the landscape.	
Susceptibility to change:	Residents of houses – medium, Road users- medium-low
Factors which increase susceptibility:	
• Views from The Neuk likely to be obscured by garden boundary planting. • The view is generally rural in character with some development characteristics.	
Factors which decrease susceptibility:	

Viewpoint 3: The Neuk	
• The view will be experienced for a short duration by road users, whose main attention may not be focused on their wider surroundings and will experience the site transiently at moderate speeds. • The view has some existing development characteristics and displays characteristics of a human influenced landscape. • The Neuk is afforded screening to the south by existing shelterbelt woodland. • The development will be part of wide panoramic views available from this location.	
Sensitivity to change:	Medium to low
Magnitude of change (construction/decommissioning)	
Duration:	Short term
Geographic extent:	Short distance
• Views of the onshore substations intermittently from approx. 300m of minor road and potentially the residential property of The Neuk at a range of greater than 600m.	
Size or scale of change:	Moderate
• The construction of the onshore substations results in a moderate scale change in the view due to the construction compound and temporary buildings, vehicles, machinery, cranes and the stockpiling of materials that will be needed during construction. • The access to the site and its use will extend the construction area to the east of the Onshore Substation Area to where it connects with the minor road, although this will be partially obscured due to intervening vegetation. • The construction processes will result in the addition of the fenced buildings and electrical infrastructure. • Task and vehicle lighting may be used in the hours of darkness – but only during approved working hours. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • As they are constructed the built form and electrical infrastructure will be apparent on the skyline. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area. • Some separation of substations from minor road by open fields, maintaining the agricultural foreground.	
Magnitude of change:	High
Magnitude of change (operation)	
Duration:	Long term
Geographic extent:	Short distance
• Views of the onshore substations intermittently from approx. 300m of minor road and potentially the residential property of The Neuk at a range of greater than 600m.	
Size or scale of change:	Moderate

Viewpoint 3: The Neuk	
• The operation of the onshore substations will result in the addition of the fenced buildings and electrical infrastructure across approximately 19 degrees of the field of view from this location. • Woodland and hedgerows will have been planted but will have little effect as components of the landscape until they are at least 5 years old. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • The buildings and electrical infrastructure will be seen on the skyline but some lower parts are obscured by intervening landform. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area. • The open agricultural foreground and burn corridor provide a separation between the substations and the minor road and property.	
Magnitude of change:	Medium
Magnitude of change (operation – 15 years post construction)	
Duration:	Long term
Geographic extent:	Short distance
• Views of the onshore substations intermittently from approx. 300m of minor road and potentially the residential property of The Neuk at a range of greater than 600m.	
Size or scale of change:	Small
• The operation of the onshore substations, post a 15 year planting establishment period, will result in views of only the upper parts of buildings and electrical infrastructure being visible on the skyline above the native woodland that is to be planted around the substation site. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area – however, these will be much less noticeable, particularly when the trees/hedges are in leaf. • The native woodland is characteristic of this landscape within the wider area and so will not contrast with the general landscape character.	
Magnitude of change:	Low
Significance of effect	
Construction/decommissioning:	**Significant,** adverse, short-term, reversible
Operation:	**Not significant,** adverse, long-term, reversible
Operation 15 years post construction	**Not significant,** adverse, long-term, reversible

Viewpoint 4 Upper Burnside - Figure 5.3-33

Table 5.3-21 Viewpoint 4: Upper Burnside

Viewpoint 4: Upper Burnside	
Baseline conditions	
Grid reference: 382729 845614	Elevation: 112 m
View direction: 162	Distance: 957 m
Viewpoint location: This viewpoint is located on the minor road which runs to the north of the site and is representative of the views experienced by residents living at Upper Burnside, Burnside, Rosebank Cottage, Maryhill House, Cragganmore and Maryhill, although some of the views are obscured by intervening vegetation. Broomfield Cottage and Little Swanford would gain slightly more distant but elevated views.	
Existing view: • Rural character. • Land use primarily arable farmland. • Strong pattern of post and wire fence field boundaries with some limited remnant hedgerows. • Range of vegetation, including woodland shelterbelts and blocks of coniferous woodland, particularly adjacent to the Burn of Alseid and along the skyline and associated with properties. • Gently rolling landform of subtle undulations contains views, with elevations generally between 100-110m AOD, although dropping more steeply into the Burn of Asleid to approximately 95m AOD. • Areas of higher ground in the wider landscape visible to the south-east of the site and form distant skyline. • Scattered detached houses and farmsteads (East Swanford and Burnside). • Large and small scale electrical pylons and overhead lines traverse the substation area between Mains of Asleid and East Swanford, dominating the skyline. • Three turbine wind turbine cluster on the Hill of Balquhindachy to the south-east of the site is notable on the skyline.	
Sensitivity to change	
Value:	Medium-low
• The view is not a formally recognised viewpoint, nor does it overlook a designated landscape, so is not afforded particular protection through planning policy. • Local interest in view due to its open outlook towards the south. • The viewpoint is located on a minor road adjacent to numerous properties around Burnside, therefore, easily accessible and will be experienced by limited numbers of people within the local area. • The view has some scenic qualities and interest relating to the patterns and features visible in the landscape, such as shelterbelts, woodland blocks and open patchwork of field; with the elevated landform of Balquhindachy Hill framing views to the south-east. • The removal of hedgerow boundaries has reduced the defined pattern of fields and scenic quality of the agricultural landscape. • The large and small scale electrical pylons, overhead lines and wind turbines which interrupt the skyline and influence its scenic qualities.	
Susceptibility to change:	High to medium
Factors which increase susceptibility:	
• The view may be experienced by residents in the Burnside area. Views from many likely to be obscured by garden boundary planting. • The view is generally rural in character with some development characteristics.	
Factors which decrease susceptibility:	

Viewpoint 4: Upper Burnside	
• The view will be experienced for a short duration by road users, whose main attention may not be focused on their wider surroundings and will experience the site transiently at moderate speeds. • Shelterbelts and woodland along the Burn of Asleid as well as vegetation around properties provide screening towards the site. • The view has some existing development characteristics and displays characteristics of a human influenced landscape. • The development will be part of wide panoramic views available from this location.	
Sensitivity to change:	High to medium
Magnitude of change (construction/decommissioning)	
Duration:	Short term
Geographic extent:	Medium distance
Views such as these from approximately 1km of the minor roads around Burnside.	
Size or scale of change:	Moderate
• The construction of the onshore substations results in a moderate scale change in the view due to the construction compound and temporary buildings, vehicles, machinery, cranes and the stockpiling of materials that will be needed during construction. • The access to the site and its use will extend the construction area to the east of the Onshore Substation Area to where it connects with the minor road, although this may be partially obscured due to intervening vegetation/landform. • The construction processes will result in the addition of the fenced buildings and electrical infrastructure, which would be apparent to the east of and between the intervening woodland/shelterbelts. • Task and vehicle lighting may be used in the hours of darkness – but only during approved working hours. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area. • Some separation of substations from minor road by open fields, maintaining the agricultural fore and middle ground of views.	
Magnitude of change:	Medium
Magnitude of change (operation)	
Duration:	Long term
Geographic extent:	Medium distance
Views such as these from approximately 1km of the minor roads around Burnside.	
Size or scale of change:	Small

Viewpoint 4: Upper Burnside	
• Approximate distance to the onshore substations is approximately 950m from the properties and minor road. • The operation of the onshore substations will result in theoretical visibility of the addition of the fenced buildings and electrical infrastructure across approximately 15 degrees of the field of view from this location. However, existing woodland and shelterbelts markedly restrict this visibility even in the winter months. • Woodland and hedgerows will have been planted but will have little effect as components of the landscape until they are at least 5 years old. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • The buildings and electrical infrastructure will be seen on the skyline but some lower parts are obscured by intervening landform. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area. • The open agricultural foreground and burn corridor provide a separation between the substations and the minor road and properties.	
Magnitude of change:	Low
Magnitude of change (operation – 15 years post construction)	
Duration:	Long term
Geographic extent:	Medium distance
Views such as these from approximately 1km of the minor roads around Burnside.	
Size or scale of change:	Small
• The operation of the onshore substations, post a 15 year planting establishment period, will result in views of only the upper parts of buildings and electrical infrastructure being visible on the skyline above the existing and proposed native woodland that is to be planted around the substation site. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • Where visible the largely obscured built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area – however, these will be much less noticeable, particularly when the trees/hedges are in leaf. • The native woodland is characteristic of this landscape within the wider area and so will not contrast with the general landscape character.	
Magnitude of change:	Low
Significance of effect	
Construction/decommissioning:	**Significant,** adverse, short-term, reversible
Operation:	**Not significant,** adverse, long-term, reversible
Operation 15 years post construction	**Not significant,** adverse, long-term, reversible

Viewpoint 5 North Millbrex - Figure 5.3-34

Table 5.3-22 Viewpoint 5: North Millbrex

Viewpoint 5: North Millbrex	
Baseline conditions	
Grid reference: 382183 843638	Elevation: 116 m
View direction: 47	Distance: 1127 m
Viewpoint location: This viewpoint is taken from the T-junction in minor road at North Milbrex. It is representative of the views experienced by residents at the small cluster of properties at North Milbrex as well as minor road users travelling east. Views from the minor route and properties to the north around Blackpool may also be similar.	
Existing view: • Rural landscape. • Land uses primarily arable farmland and pasture. • Field boundaries generally determined by post and wire fences with some hedgerows and dry stone walls (consumption dykes) in varying conditions. • Range of vegetation, with patterns of woodland shelterbelts and blocks of coniferous woodland particularly noticeable, especially adjacent to the Burn of Alseid and along the skyline. • Gently rolling landform of subtle undulations contains views, with elevations generally between 100-120m AOD, then rising to form a strong horizontal skyline backdrop at approximately 130m AOD around the Slacks of Carinbanno. • Scattered detached houses and farmsteads spread across the landscape (including large agricultural buildings at Abbotshaugh and Burnside of Milbrex). • Large scale electrical pylons and overhead lines traverse the landscape in a line becoming progressively more distant in the left of the view, whilst smaller scale pylons are seen on the right up to the skyline between land to the north of North Milbrex and Middlemuir hill. • Network of minor roads and single track farm access lanes. The fenced route of the minor road to the east is a feature of this view.	
Sensitivity to change	
Value:	Medium
• The view is not a formally recognised viewpoint, nor does it overlook a designated landscape, so is not afforded particular protection through planning policy. • The viewpoint is located on a minor road adjacent to properties at North Milbrex so is easily accessible, although will not be experienced by large numbers of people. • Local interest in this view arises due to its slightly elevated location providing for moderately distant views towards Slacks of Cairnbanno by the local residents whose properties overlook it and by road users who are confronted with the view when they round the corner. • The view has some scenic qualities and interest relating to the patterns and features visible in the landscape, such as shelterbelts, woodland blocks and various field boundaries; as well as the rural/agricultural character that is indicative of the Agricultural Heartlands. However, the removal of hedgerow field boundaries has had a detrimental effect on the scenic qualities of the agricultural landscape. • The large scale electrical pylons and overhead lines which interrupt of the skyline to the east influence the scenic quality of the view. • The landscape of the view is not rare or remarkable and is typical of the agricultural landscape across Aberdeenshire.	
Susceptibility to change:	High to medium
Factors which increase susceptibility:	
• The view may be experienced by residents at North Millbrex and properties around Blackpool. • The view is generally rural in character with some development characteristics.	
Factors which decrease susceptibility:	

Viewpoint 5: North Millbrex	
• The view will be experienced for a short duration by road users, whose main attention may not be focused on their wider surroundings and will experience views towards the site transiently at moderate speeds. • Shelterbelts and woodland along the Burn of Asleid as well as some vegetation/buildings around properties provide some screening towards the site. • The view has some existing development characteristics and displays characteristics of a human influenced landscape. • The development will be part of wide panoramic views available from this location.	
Sensitivity to change:	High to medium
Magnitude of change (construction/decommissioning)	
Duration:	Short term
Geographic extent:	Medium distance
Views such as these available for approximately 1.2km of minor road around North Millbrex and properties in the vicinity of North Millbrex and Blackpool.	
Size or scale of change:	Moderate
• The construction of the onshore substations results in a moderate scale change in the view due to the construction compound and temporary buildings, vehicles, machinery, cranes and the stockpiling of materials that will be needed during construction. • The construction processes will result in the addition of the fenced buildings and electrical infrastructure, which would be apparent between the intervening woodland/shelterbelts. • Task and vehicle lighting may be used in the hours of darkness – but only during approved working hours. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area. • Some separation of substations from minor road by open fields, maintaining the agricultural fore and middle ground of views.	
Magnitude of change:	Medium
Magnitude of change (operation)	
Duration:	Long term
Geographic extent:	Medium distance
Views such as these available for approximately 1.2km of minor road around North Millbrex and properties in the vicinity of North Millbrex and Blackpool.	
Size or scale of change:	Moderate to small

Viewpoint 5: North Millbrex	
• Approximate distance to the onshore substations is 1.1 km from the properties and minor roads. • The operation of the onshore substations will result in theoretical visibility of the addition of the fenced buildings and electrical infrastructure across approximately 13 degrees of the field of view from this location. However, existing woodland and shelterbelts restrict this visibility even in the winter months. • Woodland and hedgerows will have been planted but will have little effect as components of the landscape until they are at least 5 years old. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • Due to the elevation of the viewpoint, receptors will be able to look down on the substations and the buildings and electrical infrastructure will be seen below the skyline, back-clothed by the more distant rolling landscape. • The built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area. • The open agricultural foreground and burn corridor provide a separation between the substations and the minor roads and properties.	
Magnitude of change:	Medium to low
Magnitude of change (operation – 15 years post construction)	
Duration:	Long term
Geographic extent:	Medium distance
Views such as these available for approximately 1.2km of minor road around North Millbrex and properties in the vicinity of North Millbrex and Blackpool.	
Size or scale of change:	Small
• The operation of the onshore substations, post a 15 year planting establishment period, will result in views of only the upper parts of buildings and electrical infrastructure being visible below the skyline but above the existing and proposed native woodland that is to be planted around the substation site. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • Where visible the largely obscured built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area – however, these will be much less noticeable, particularly when the trees/hedges are in leaf. • The native woodland is characteristic of this landscape within the wider area and so will not contrast with the general landscape character.	
Magnitude of change:	Low
Significance of effect	
Construction/decommissioning:	**Significant,** adverse, short-term, reversible
Operation:	**Significant,** adverse, long-term, reversible
Operation 15 years post construction	**Not significant,** adverse, long-term, reversible

Viewpoint 6 Upperton Figure - 5.3-35

Table 5.3-23 Viewpoint 6: Upperton

Viewpoint 6: Upperton	
Baseline conditions	
Grid reference: 384186 846009	Elevation: 103 m
View direction: 216	Distance: 1699 m
Viewpoint location: This viewpoint is located on the minor road from Slacks of Cairnbanno to Burnside. The viewpoint is taken from the edge of a ridge so represents some of the first views towards the site experienced by a road users when travelling from New Deer to Burnside. It is also representative of properties in the vicinity and the minor road to the south of Upper Cairnbanno from where there would be similar views.	
Existing view: • Rural landscape. • Land use primarily arable farmland, with some pastoral land. • Field boundaries generally determined by post and wire fences and scrubby hedgerows. • Range of vegetation, including woodland shelterbelts and blocks of coniferous woodland diversify the agricultural character of the view. • Gently rolling landform of subtle undulations, with areas of higher ground visible to the north-west, containing views. • Skyline formed by land near the overhead transmission line. • Scattered detached houses, farmsteads and outbuildings (Bridge Cottage, Abbotshaugh, Netherton of Greens, The Neuk, Cragganmore, Mill of Greens and Maryhill). • Large agricultural sheds at Abbotshaugh particularly noticeable. • Distinctive outline of North Millbrex Church present on distant skyline. • Large scale electrical pylons and overhead lines traverse the landscape and cross the skyline near the centre of the view. • Occasional single turbines visible on the skyline, including those on the Hill of Balquhindachy and at Skelmonae. • Network of minor roads and single-track, farm access lanes.	

Viewpoint 6: Upperton	
Sensitivity to change	
Value:	Medium
• The view is not a formally recognised viewpoint, nor does it overlook a designated landscape, so is not afforded particular protection through planning policy. • The viewpoint is located on the minor road leading from New Deer to Burnside, adjacent to the property at Upperton, so is easily accessible and will be experienced by limited numbers of people within the local area. There are no formal stopping points along the road to encourage road users to stop in this location. • Interest is provided in the view by its far-reaching, panoramic views towards the south-west available to residential receptors and road users who are confronted with the view when they descend down the hill. • The view has some scenic qualities and interest relating to the patterns and features visible in the landscape, such as shelterbelts, woodland blocks and various field boundaries, as well as the rural/agricultural character that is indicative of the Agricultural Heartlands. • The scenic qualities of the view are influenced by the large scale electrical pylons and overhead lines which interrupt the skyline and the large agricultural sheds at Abbotshaugh. Removal of hedgerows has also reduced the pattern and quality of the agricultural landscape. • The landscape is not rare or remarkable and is typical of large parts of rural Aberdeenshire.	
Susceptibility to change:	Residents - high to medium, minor road users- medium to low
Factors which increase susceptibility:	
• The view may be experienced by residents around Upperton and from the slightly more distant properties of and to the south of Upper Cairnbanno. • The view is generally rural in character with some development characteristics.	
Factors which decrease susceptibility:	
• The view will be experienced for a short duration by road users, whose main attention may not be focused on their wider surroundings and will experience views towards the site transiently at moderate speeds. • Shelterbelts and woodland along the Burn of Asleid and the minor road between Burnside and Burnend as well as some vegetation/buildings around properties may provide some screening towards the site. • The view has some large scale existing development characteristics and displays characteristics of a human influenced landscape. • The development will be part of wide panoramic views available from this location.	
Sensitivity to change:	Residents – High to medium, minor road users – medium to low
Magnitude of change (construction/decommissioning)	
Duration:	Short term
Geographic extent:	Medium to long distance
Views such as these available for approximately 2km of minor road east of Upperton and south of Upper Cairnbanno. Properties along these sections of the minor roads may also have such views.	
Size or scale of change:	Small to moderate

Viewpoint 6: Upperton	
• The construction of the onshore substations results in a small to moderate scale change in the view due to the construction compound and temporary buildings, vehicles, machinery, cranes and the stockpiling of materials that will be needed during construction. • The construction processes will result in the addition of the fenced buildings and electrical infrastructure, which would be apparent between the intervening woodland/shelterbelts on the skyline. • Task and vehicle lighting may be used in the hours of darkness – but only during approved working hours. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • The built forms will increase the development components within the landscape by the introduction of further large buildings and increasing the density and incidence of electrical infrastructure in this area. • Separation of substations from minor roads and properties by open fields, maintaining the agricultural fore and middle ground of views.	
Magnitude of change:	Medium to low
Magnitude of change (operation)	
Duration:	Long term
Geographic extent:	Medium to long distance
Views such as these available for approximately 2km of minor road east of Upperton and south of Upper Cairnbanno. Properties along these sections of the minor roads may also have such views.	
Size or scale of change:	Small
• Approximate distance to the onshore substations is more than 1.7 km from the properties and minor roads. • The operation of the onshore substations will result in theoretical visibility of the addition of the fenced buildings and electrical infrastructure across approximately 9 degrees of the field of view from this location. • Woodland and hedgerows will have been planted but will have little effect as components of the landscape until they are at least 5 years old. • Lighting of the substations will be visible at times, but this is assumed to be passive lighting (passive infra-red) and the onshore substations will not be permanently lit. • The proposed buildings and electrical infrastructure will be seen on the skyline, however the lower parts of some structures will be partially hidden by the intervening landform. • The built forms will increase the development components within the landscape by the introduction of further large buildings and increasing the density and incidence of electrical infrastructure in this area. • The open agricultural foreground and the valley of the Little Water provide a separation between the substations and the minor roads and properties.	
Magnitude of change:	Low
Magnitude of change (operation – 15 years post construction)	
Duration:	Long term
Geographic extent:	medium to long distance
Views such as these available for approximately 2km of minor road east of Upperton and south of Upper Cairnbanno. Properties along these sections of the minor roads may also have such views.	

Viewpoint 6: Upperton	
Size or scale of change:	Small
• The operation of the onshore substations, post a 15 year planting establishment period, will result in views of only the upper parts of buildings and electrical infrastructure being visible above the skyline and the proposed native woodland that is to be planted around the substation site. • Security lighting will be indistinguishable from other rural sources of light. • Where visible the largely obscured built forms will increase the development components within the landscape by the introduction of uncharacteristically large buildings and increasing the density and incidence of electrical infrastructure in this area – however, these will be much less noticeable, particularly when the trees/hedges are in leaf. • The native woodland is characteristic of this landscape within the wider area and so will not contrast with the general landscape character.	
Magnitude of change:	Low
Significance of effect	
Construction/decommissioning:	**Not significant,** adverse, short-term, reversible
Operation:	**Not significant,** adverse, long-term, reversible
Operation 15 years post construction	**Not significant,** adverse, long-term, reversible

Viewpoint 7 B9170 near New Deer - Figure 5.3-36

Table 5.3-24 Viewpoint 7: B9170 near New Deer

Viewpoint 7: B9170 near New Deer	
Baseline conditions	
Grid reference: 387929 845697	Elevation: 121 m
View direction: 250	Distance: 4767 m
Viewpoint location: This viewpoint is located on the B9170 road south-west of New Deer. It is taken looking west, just before the junction with the minor road which leads to Cairnbanno. This viewpoint is representative of the views experienced by motorists travelling along the B9170 from New Deer to South Balquhindachy. Views of the Bennachie uplands to the south are identified as valued views in the Aberdeenshire LDP. There is also a number of properties in the vicinity.	
Existing view: • Rural landscape. • Land uses primarily arable farmland, grazing land and pastures. • Field boundaries generally determined by post and wire fences and scrubby hedgerows. • Range of vegetation, including woodland shelterbelts and blocks of coniferous woodland, which diversify the woodland setting and add to the complexity of this view. • Gently rolling landform of subtle undulations, with the Bennachie range visible to the south-west of the site, containing views. • Scattered detached houses, farmsteads and outbuildings. • Areas of rough grassland/scrub in the viewpoint foreground. • Large scale electrical pylons and overhead lines traverse the landscape. Smaller pole mounted transmission lines are also visible adjacent to the road network • Occasional single wind turbines visible. • Network of B-roads, minor roads and single track farm access lanes. The B9170 is a key characteristic of this view.	
Sensitivity to change	
Value:	Medium-high

Viewpoint 7: B9170 near New Deer	
• Views of the Bennachie Uplands from the B9170 New Deer to Methlick Road are recognised as valued views in the Aberdeenshire LDP so are afforded protection through planning policy. This viewpoint is representative of these views. • In addition local interest is provided by its far-reaching and panoramic views available to road users and local residents. • The view is located on the B9170 road leading from New Deer to South Balquhindachy, so is easily accessible and will be experienced by moderate numbers of people within the local area. • The particular scenic qualities of the view relate to landscape patterns and features visible in the landscape (such as shelterbelts, woodland blocks and dispersed farmsteads) and the framed views towards the south-west and Bennachie Uplands, defined within the hill slopes lying either side of the B9170. • The scenic qualities of the view are influenced by large and small scale pylon and pole mounted transmission lines which are seen across the view and skyline.	
Susceptibility to change:	Medium to low
Factors which increase susceptibility:	
• The view may be experienced by residents around Myre of Bedlam. • The view is generally rural in character with some development characteristics.	
Factors which decrease susceptibility:	
• The view will be experienced for a short duration by road users, whose main attention may not be focused on their wider surroundings and will experience views towards the site transiently at moderate speeds. • There are few stopping points along the road so views will be experienced transiently. • Shelterbelts and woodland as well as some vegetation/buildings around properties break up the agricultural landscape and may provide some limited screening towards the site which is at some distance from this location. • The view has some large scale existing development characteristics and displays characteristics of a human influenced landscape. • The development will be part of wide panoramic views available from this location.	
Sensitivity to change:	Medium
Magnitude of change (construction/decommissioning)	
Duration:	Short term
Geographic extent:	Long distance
The proposed onshore substations would be theoretically visible from approximately 2km of minor road in the vicinity of the viewpoint and a small number of residences in the surrounding countryside.	
Size or scale of change:	Small
• The incidence of machinery and cranes may be visible on the site which is located below the skyline. • As the buildings and electrical infrastructure are constructed the movement, changes in landcover and activity of the construction process may draw attention to this new development. • At this range the detail of the proposals will be difficult to distinguish due to their location against a land backdrop.	
Magnitude of change:	Low
Magnitude of change (operation)	
Duration:	Long term
Geographic extent:	long distance
The proposed onshore substations would be theoretically visible from approximately 2km of minor road in the vicinity of the viewpoint and a small number of residences in the surrounding countryside.	
Size or scale of change:	Small

Viewpoint 7: B9170 near New Deer	
• Approximate distance to the onshore substations is more than 4.7 km from the properties and minor roads. • The operation of the onshore substations will result in theoretical visibility of the addition of the fenced buildings and electrical infrastructure across approximately 4 degrees of the field of view from this location. • Woodland and hedgerows will have been planted but will have little effect as components of the landscape until they are at least 5 years old. • Security lighting will be indistinguishable from other rural sources of light. • The proposed buildings and electrical infrastructure will be seen below the skyline, and the lower parts of some structures will be partially hidden by the intervening landform. At this range the detail of the proposed onshore substations will be difficult to discern, partly due to their backdrop of the landscape beyond. • The built forms will marginally increase the development components within the landscape by the introduction of further large buildings and increasing the density and incidence of electrical infrastructure in a small part of the view. The part of the view affected has existing pylons. • The open agricultural fore and middle ground provide a strong separation between the substations and the minor roads and properties.	
Magnitude of change:	Low
Magnitude of change (operation – 15 years post construction)	
Duration:	Long term
Geographic extent:	Long distance
The proposed onshore substations would be theoretically visible from approximately 2km of minor road in the vicinity of the viewpoint and a small number of residences in the surrounding countryside.	
Size or scale of change:	Small
• The operation of the onshore substations, post a 15 year planting establishment period, will result in views of only the upper parts of buildings and electrical infrastructure being visible above the proposed native woodland that is to be planted around the substation site. • Security lighting will be indistinguishable from other rural sources of light. • Where visible the largely obscured built forms will increase the development components within the landscape by the introduction of large buildings and increasing the density and incidence of electrical infrastructure in this area – however, these will be much less noticeable, particularly when the trees/hedges are in leaf. Such visibility will occur over only a very small vertical and horizontal extent of the view. • The native woodland is characteristic of this landscape within the wider area and so will not contrast with the general landscape character.	
Magnitude of change:	Low
Significance of effect	
Construction/decommissioning:	**Not significant,** adverse, short-term, reversible
Operation:	**Not significant,** adverse, long-term, reversible
Operation 15 years post construction	**Not significant,** adverse, long-term, reversible

Viewpoint 8 Culsh Hill (near Culsh Monument) - Figure 5.3-37

Table 5.3-25 Viewpoint 8: Culsh Hill (near Culsh Monument)

Viewpoint 8: Culsh Hill (near Culsh Monument)	
Baseline conditions	
Grid reference: 388099 848099	Elevation: 142 m
View direction: 232 degrees	Distance: 5998 m
Viewpoint location: This viewpoint is taken from Culsh Hill, near to the Hill of Culsh Monument (also known as the Dingwall Fordyce Monument). The monument was designed by James Matthews and erected in 1877 in honour of William Dingwall Fordyce M.P (1836-1875). The 24m high granite structure encompasses a Gibbs style steeple and spiral staircase, and was designated as a Category B building by Historic Scotland in 1971. Although there is no public access within the monument, it is an important local landmark. As views from the Monument to the site are obstructed by shelterbelt planting, this viewpoint has been taken from the road to the south-west of the cemetery, on Culsh Hill. This viewpoint is therefore representative of the route visitors to the monument and Commonwealth war graves at the cemetery may take.	
Existing view: • Land uses primarily arable farmland and grazing land. • Field boundaries generally determined by post and wire fences and some limited hedgerows. Fields are large and open • Range of vegetation, including woodland shelterbelts and blocks of coniferous woodland. • Gently rolling landform of subtle undulations in the local proximity, with far-reaching views to the distinctive Bennachie range beyond. • Settlement of New Deer visible with its two distinctive spires, as well as detached houses, large-scale farmsteads and outbuildings scattered throughout the landscape. • Large scale electrical pylons and overhead lines visible on the skyline. Smaller scale pylons are also visible, clustered particularly around New Deer's road network. • Occasional single turbines scattered across the wider landscape.	
Sensitivity to change	
Value:	Medium-high
• This viewpoint is located near to the Culsh Monument, which is identified on OS maps as a panoramic view. This monument is visually identifiable as a local landmark, and is well-known at a local level as having a particular panoramic view. • The panorama from the Culsh Monument is to the east and views to the south of the monument are screened by woodland in the immediate setting. • The viewpoint has been sited on the nearby public road, near the entrance to the cemetery, so is not afforded protection through planning policy, but has informal recognition for its panoramic views westwards towards the Bennachie Uplands. • The viewpoint is easily accessible and will be experienced by moderate numbers of people within the local area, including visitors to the Hill of Culsh Monument and Cemetery. • The particular character of the view relates to landscape patterns and features visible in the landscape (such as shelterbelts and woodland blocks); an elevated perspective over features in New Deer and an appreciation of the wider setting of the settlement within the landscape; and the views towards the Bennachie Uplands. • Several large scale electrical pylons and wind turbines interrupt the skyline but are far enough away from the viewpoint to not influence its scenic qualities.	
Susceptibility to change:	Low
Factors which increase susceptibility:	
• Location from where broad, panoramic views over a rural landscape are expected from this elevated location.	
Factors which decrease susceptibility:	

Viewpoint 8: Culsh Hill (near Culsh Monument)	
• No visibility of the proposed onshore substations.	
Sensitivity to change:	Medium
Magnitude of change (construction/decommissioning)	
Duration:	Short term
Geographic extent:	long distance
No change in views from this viewpoint or the area around it.	
Size or scale of change:	No change
• No change	
Magnitude of change:	No change
Magnitude of change (operation)	
Duration:	Long term
Geographic extent:	long distance
No change in views from this viewpoint or the area around it.	
Size or scale of change:	No change
• No change	
Magnitude of change:	No change
Magnitude of change (operation – 15 years post construction)	
Duration:	Long term
Geographic extent:	long distance
No change in views from this viewpoint or the area around it.	
Size or scale of change:	No change
• No change	
Magnitude of change:	No change
Significance of effect	
Construction/decommissioning:	No change
Operation:	No change
Operation 15 years post construction	No change

5.3.5 Cumulative Impact Assessment

Assessment of Cumulative Effects

Introduction

5.3.5.1 The objective of the Cumulative Impact Assessment (CIA) is to describe, visually represent and assess the ways in which the modified TI will have additional effects on SL&V receptors when considered together with other existing, consented or proposed and reasonably foreseeable developments and to identify related significant cumulative effects arising from the modified TI. The guiding principle in preparing the CIA of SL&V receptors is to focus on the likely significant effects and in particular those which are likely to influence the outcome of the consenting process, in accordance with the EIA Regulations.

5.3.5.2 The 'main' SLVIA (Section 5.3.4) assesses the effect of the modified TI in addition to developments already present in the landscape. This scenario involves the assessment of the addition of the modified TI to the existing baseline, which includes operational wind energy developments.

5.3.5.3 A whole project assessment has been undertaken to assess the likely significant cumulative effects of the modified TI in conjunction with the three wind farms as consented (i.e. 186 turbines as opposed to the 339 turbines assessed in the MORL ES (MORL, 2012).

5.3.5.4 An assessment of the likely significant cumulative effects of the whole project (as described above) with consented projects and the Western Development Area (WDA) has also been undertaken, including the following developments:

- Beatrice Offshore Windfarm Limited (BOWL) (including the offshore generation station and associated TI) as consented (i.e. 140 turbines as opposed to the 277 assessed in the BOWL ES (BOWL, 2012);
- WDA; and
- Other consented onshore wind energy developments within the OnTI Study Area (identified in Figure 5.3.38).

5.3.5.5 Consideration of onshore wind energy developments was specifically requested in Aberdeenshire Council's scoping response (Table 5.3-1). Based on consultation with Aberdeenshire Council, this CIA therefore focuses on the potential cumulative effect of the modified TI with onshore wind energy developments as the main 'relevant projects' in the assessment of the modified OnTI.

5.3.5.6 An application stage assessment of the likely significant cumulative effects of the whole project with unconsented planning applications has also been undertaken, which includes application stage onshore wind energy developments in the modified OnTI study area (identified in Figure 5.3-38).

5.3.5.7 A total cumulative assessment of the likely significant cumulative effects for the whole project with all other relevant projects has also been undertaken.

5.3.5.8 The cumulative effect assessed is the additional effect of the modified TI with the other project(s) or development(s).

5.3.5.9 An updated national development focusing on enhancing the high voltage transmission network is identified in National Planning Framework 3 (Scottish

Government, 2014), to facilitate increased renewable electricity generation across Scotland. Due to lack of detail (such as schedules and design parameters), it has not been possible to carry out an assessment of the likely cumulative effects of these anticipated future developments or some other anticipated proposals located in the Moray Firth, such as the Scottish-Hydro Electric Transmission Limited (SHE-T) cable, shipping and navigation and oil and gas activities.

Cumulative Impact Assessment (CIA)

5.3.5.10 An assessment has been undertaken as part of the CIA to determine the potentially significant cumulative effects that may arise as a result of the addition of the modified TI and to assess areas or aspects of the modified TI with limited or no interactions with other proposed developments, where cumulative effects will not be significant.

5.3.5.11 The effects of the OSPs on SL&V receptors were assessed in the context of the three consented wind farm sites in the main assessment in Section 5.3.4 of this chapter. The assessment did not consider the effect of adding the OSPs to the existing baseline on their own, without the three consented wind farm sites, as this would represent an unrealistic scenario. The construction/decommissioning and operation of the OSPs will result in no additional cumulative effects on SL&V receptors in the whole project assessment, as their effect in combination with the three consented wind farms is assessed in Section 5.3.4 of this Chapter.

5.3.5.12 The cumulative effects of the OSPs in relation to consented projects, the WDA and application stage projects were assessed in the MORL ES (MORL, 2012) in regards of eight OSPs. Due to the reduction in the number of OSPs proposed, the cumulative effect of the modified OSPs on SL&V receptors in relation to the three consented projects, the WDA, BOWL and application stage projects will reduce in magnitude for the modified OfTI and the cumulative effect of the OSPs is assessed as being not significant on SL&V receptors.

Modified Offshore Export Cable Route Corridor

5.3.5.13 The residual significance level of the construction/decommissioning and operation of the modified offshore export cable was assessed as not significant on all SL&V receptors in Section 5.3.4 of this ES. The cumulative effect of the modified offshore export cable on SL&V receptors in relation to the three consented wind farms, consented projects, the WDA and application stage projects is assessed as low in magnitude and not significant. This is due to the long distance of the three consented wind farms from receptors in Moray/Aberdeenshire, the long distance of the offshore export cable route corridor from receptors in Caithness/Sutherland, and because large sea-faring vessels used to install the modified offshore export cable are a common feature of the baseline seascape character of the Moray Firth. The additional effect of the construction of the modified offshore export cable is not significant in relation to the other projects.

5.3.5.14 During the operational period the modified offshore export cable will be installed in trenches in the sea bed and will not be a visible element of the modified TI during operation. The construction/decommissioning and operation of the modified offshore export cable will result in a negligible magnitude of change and not significant cumulative effects on all SL&V receptors, in relation to the three consented wind farms, consented projects, the WDA and application stage projects, with the exception of those outlined in the inshore area near the modified export cable landfall, which are considered below.

Modified Onshore Export Cable Route Corridor (and Landfall)

5.3.5.15 Potential cumulative effects during construction/decommissioning may also arise as a result of the construction of the modified onshore export cable landfall, occurring concurrently with the construction of the three consented wind farms, other consented projects, the WDA and application stage projects, in views from coastal areas of Boyndie Bay.

5.3.5.16 The residual significance levels of the construction/decommissioning and operation of these aspects of the modified TI are assessed separately in Section 5.3.4 of this chapter. Additional cumulative effects may arise as a result of the interactions of these aspects of the modified TI with the three consented wind farms, other consented projects, the WDA and application stage projects, influencing the coastal character of the Boyndie Bay CCA and the Cliffs of the North and South East Coast LCA and views from recreational areas around Inverboyndie Beach. The magnitude of these additional cumulative effects are assessed as low and not significant, primarily due to the long distance between the construction of the three consented wind farms, other consented projects, the WDA, application stage projects and the modified onshore export cable (and construction activities in the location of the cable landfall). Other factors include the temporary nature and relative ease of restoring cable landfall excavations as part of the export cables installation and because large sea-faring vessels used for the modified offshore export cable installation are a common feature of the baseline seascape character of the Moray Firth.

5.3.5.17 The residual significance level of the construction/decommissioning and operation of the modified onshore export cable was assessed as not significant on terrestrial landscape character (Western Coastland Farmland, Deveron and Upper Ythan Valley and Agricultural Heartlands LCAs) in Section 5.3.4 of this chapter. During the operational period the modified onshore export cable will be installed in trenches below ground and will not form an element of landscape character. During construction/decommissioning, there will be very limited/no interaction between the terrestrial landscape character areas within which the onshore export cable route is located and the three consented wind farms, BOWL or the WDA which are located at long distance offshore in the Moray Firth, beyond intervening terrestrial and coastal areas. The construction/decommissioning of the modified onshore export cable will result in a negligible magnitude of change and not significant cumulative effects on these terrestrial landscape character areas. Potential cumulative effects of the onshore export cable route during construction are likely to be confined to the coastal areas in Boyndie Bay around the modified export cable landfall, which are described above in relation to the cable landfall area.

5.3.5.18 During the operational period the modified onshore export cable will be concealed in trenches below ground and will not be a visible element of the modified TI. There are no cumulative effects predicted as a result of the modified onshore export cable during operation on visual receptors.

5.3.5.19 The visual effects of the construction/decommissioning of the modified onshore export cable route were assessed as likely to be significant in views from the hamlets of Keilhill and Fintry. There would also be 500 m – 2 km localised stretches of several A and B road routes in the vicinity of the modified onshore export route corridor where temporary significant effects on views experienced by road users may arise during the construction period. During construction/decommissioning, there will be very limited or no interaction between these settlements and roads in terrestrial areas in the vicinity of the modified onshore export cable route and the three consented wind farms, BOWL or the WDA which are located at a long distance offshore in the

Moray Firth, beyond intervening terrestrial and coastal areas. The construction/decommissioning of the modified onshore export cable, together with other projects assessed will result in negligible and not significant cumulative effects on these visual receptors. Potential cumulative visual effects of the onshore export cable route during construction are likely to be confined to the coastal areas in Boyndie Bay around the modified export cable landfall, which are described above in relation to the cable landfall area.

5.3.5.20 Potential cumulative effects during construction may also arise temporarily as a result of the construction of the modified onshore export cable occurring concurrently and in close proximity to the construction of consented and application stage wind energy developments (Figure 5.3-38). There is potential for cumulative construction stage effects on landscape character and visual amenity to occur locally in combination with several wind energy development proposals that are located either within or in close proximity to the modified offshore export cable route corridor, including South Colleonard, Backhill of Yonderton, Slackadale and Castle of Auchry (consented) and Balchers Wood, Knock Thunder Farm, Cairnhill Extension (application stage). The nature of such cumulative construction effects on landscape character and visual amenity is uncertain due to the lack of information about the construction methods for these wind energy developments and uncertainty of the timing of their construction programmes. Any cumulative effects on landscape character and visual amenity arising as a result of the construction of the modified onshore export cable and these wind energy developments are likely to be localised, short-term and not significant.

Onshore Substations

5.3.5.21 There will be no significant cumulative effects arising on landscape and visual receptors in the onshore substations Study Area as a result of the modified OnTI with the three consented wind farms, the WDA and BOWL, due to the geographic separation between the onshore substations and these projects, which results in no interactions between these components of the modified Project and other developments in the area.

5.3.5.22 The cumulative effects on SL&V receptors arising as a result of the construction/decommissioning and operation of the onshore substations with consented and application stage wind energy developments (Figure 5.3-38) are assessed as low and not significant. There are no consented or application stage wind energy projects within the vicinity of the onshore substations. The closest consented wind energy development is Oldwhat Mains single wind turbine located 7.1 km to the north, outwith the onshore substation Study Area. The closest application stage wind energy development is Wardford Farm single wind turbine located 5.5 km to the south of the onshore substation area (Figure 5.3-38). There will therefore be no significant cumulative effects arising on landscape and visual receptors in the onshore substation Study Area as a result of the operation of the onshore substations with consented and application stage wind energy developments.

5.3.6 References

Aberdeenshire Council, 2012, Aberdeenshire Local Plan;

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DTI, 2005, Guidance on the Assessment of the Impact of Offshore Wind farms: Seascape and Visual Impact Report;

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SNH, 2006, Visual Representation of Wind farms Good Practice Guidance;

SNH, 2014, Siting and Designing Wind Farms in the Landscape (Version 2);

SNH, 2008, Guidance on Landscape / Seascape Capacity for Aquaculture; and
SNH, 2012, Assessing the Cumulative Effects of Onshore Wind Energy Developments.

5 Human Environment

5.2 Shipping and Navigation

5.2.1 Baseline Information

Introduction

5.2.1.1 This section summarises baseline vessel activity and navigational features in the vicinity of the proposed MORL Offshore Substation Platforms (OSPs) and modified offshore export cable corridor which form the modified offshore Transmission Infrastructure (modified OfTI) to the landfall on the north east coast of Scotland.

5.2.1.2 In carrying out the assessment, recreational sailing data, maritime incidents, fishing sightings/surveillance data and shipping survey data in the area was used to identify the baseline navigational activity. Furthermore, consultation with relevant statutory and non-statutory bodies was undertaken.

Consultations

5.2.1.3 Consultation on navigational issues has been carried out with stakeholders during the MORL ES and for this modified Transmission Infrastructure (modified TI) ES. This section summarises the key comments from stakeholders on the modified OfTI.

5.2.1.4 A summary of previous responses, relevant to the modified TI, are presented in Table 5.2-1. Full scoping consultations are provided in Chapter 1.3.

5.2.1.5 A summary of responses related to the modified OfTI is presented in Table 5.2-1.

Table 5.2-1 Summary of Modified Transmission Infrastructure Responses

Organisation	Consultation Response	MORL Approach
Marine and Coastguard Agency (MCA)	No objection in principle to the revised route, provided it is risk assessed to the extent required by the original proposal, noting its proximity to the Port of Macduff and associated traffic.	An assessment for the modified cable route is provided. The proximity to the port of Macduff is noted. A BPI study will be carried out to determine burial depth requirements adjacent to the area where vessels are anchoring.
Marine Scotland	The navigable depth must not be altered by more than 5% of stated chart datum unless otherwise agreed, in writing, with MS, MCA and NLB. A Navigational Risk Assessment will be required for any location likely to infringe on the 5% threshold.	Once the finalised route is determined, then the risk assessment of the finalised route will inform the navigable depths. The intention is to bury the cable. The results of the assessment will be presented and discussed with both the MCA and NLB.
Northern Lighthouse Board (NLB)	A Method Statement should form part of the application, and this should include details of any offshore sub-station structures, cable laying and landfall works. A Navigational Risk Assessment will also be required as part of the application, to ensure that hazards posed to the marine user are minimised.	A risk assessment has been carried out of the corridor to identify the key hazards and impacts. Results are presented within the Environmental Statement.

Organisation	Consultation Response	MORL Approach
Cruising Association (CA)	It is most important that the cable landing when in depths less than 10m presents a smooth bottom and that any cable protection or covering presents no hazard. Cables and their protections should be well bedded and have no 'humps' or change of level over them. They should be unlikely to be disturbed by swell.	Finalised cable route and associated risk assessment pre construction will consider the impacts and mitigations in event of the cable not being buried.
Royal Yachting Association (RYA)	During the construction phase, recreational sailors will best be alerted by notices at neighbouring harbours and marinas. Portsoy is an important recreational harbour, which is particularly busy at the time of the Traditional Boat Festival when events take place in neighbouring waters.	Noted and key users will be notified of activities via Notices to Mariners which will be distributed to local Ports and Harbours. Consideration will be given to any local events during the planning of the cable laying/installation operations.
Banff Harbour	Be aware that small fishing boats operate from Cullen and Findochty harbours. Local fishing associations should be consulted. Vessels ranging from yachts to larger ships anchor offshore (outwith the harbour areas) and provision/consultation should be carried out to ensure that there is no adverse effect.	Local fishing organisations are being consulted with. Anchoring areas are been identified though analysis of survey data. A Burial Protection Risk Assessment will be performed to ensure that there are no adverse effects and that the cable is buried to an appropriate depth to minimise risk.

Baseline Characteristics

5.2.1.6 The main data sources used for the desktop study are listed below:

- AIS data for Moray Firth Round 3 Zone from summer (July 2013) and winter (December 2013);
- Fishing surveillance satellite data (2009) and over flight data (2005-09);
- Maritime incident data from the Maritime Accident Investigation Branch (MAIB) (2001-2010) and Royal National Lifeboat Institute (RNLI) 2001-10;
- UK Admiralty Charts; and
- Admiralty Sailing Directions, North Coast of Scotland Pilot (NP 52).

5.2.1.7 The shipping and navigation baseline presents an assessment of the existing navigational features and shipping activity recorded in proximity to the modified OfTI. The baseline data for each of the main navigational users is presented in the following sections.

Desktop Studies

Study Area

5.2.1.8 The study areas include the modified cable area and a wider area including a 5 nm buffer area indicative potential route to show context with regards to navigational features.

Navigational Features

5.2.1.9 Figure 5.2-1 presents a chart of the navigational features relative to the three consented wind farm sites, Telford, Stevenson and MacColl, and the modified offshore export cable route. It is noted that there will be a maximum of two AC OSPs, with possible locations anywhere within the three consented sites.

5.2.1.10 There are two anchorages within the study area; one in Cullen Bay and one servicing Banff and Macduff. The Admiralty Sailing Directions 2009, North Coast of Scotland Pilot (NP52) notes that anchoring is available in the outer part of Cullen Bay. Of the Banff / Macduff anchorage it states that anchoring is available off the entrance to Banff Bay and smaller vessels can anchor further inshore.

5.2.1.11 There are two military practice areas intersecting the area of the modified OfTI. A note on the Admiralty Charts states that, 'No restrictions are placed on the right to transit the firing practise areas at any time. The firing practise areas are operated using a clear range procedure; exercises and firing only take place when the areas are considered to be clear of all shipping.' The main ports in the vicinity of the modified export cable route corridor are Macduff, Banff, Portknockie and Buckie.

Shipping Surveys

5.2.1.12 A shipping analysis was performed using 56 days of Automatic Identification System (AIS) data from July and December 2013 to account for seasonal variations. Analysis was undertaken in a study area covering approximately 5 nm around the offshore export cable route corridor. The study area also covers the two possible locations of the OSPs.

5.2.1.13 Overviews of the shipping data recorded during July and December 2013 are presented in Figure 5.2-2 and Figure 5.2-3 respectively.

5.2.1.14 An average of 18 unique vessels per day passed through the study area during summer. The landfall end of the offshore export cable route corridor was intersected by a coastal shipping route between the inner Moray Firth ports and other ports in the UK and mainland Europe. This route was located 2-8 nm north of the coast and mainly comprised cargo and tanker vessels. Smaller recreational vessels were also seen to pass closer to the coast. Fishing activity was noted over the central part of the corridor.

5.2.1.15 An average of 16 unique vessels per day passed through the study area during winter. As in summer, routes between the inner Moray Firth ports and other ports in the UK and mainland Europe were seen to intersect the landfall end of the offshore export cable route corridor. There was less fishing activity noted in winter than in summer and no recreational vessels were recorded during this period. There was notable "other" vessel activity recorded over the central part of the modified OfTI corridor. This was due to a vessel performing a survey and its associated guard vessel, as well as offshore support vessels visiting offshore sites in the area.

5.2.1.16 The vessels at anchor near the coast within the study area during the 56 days of AIS data are presented in Figure 5.2-4.

5.2.1.17 Nine vessels anchored in or near to the Banff / Macduff anchorage over the 2 month survey period. These were two large and three medium sized shuttle tankers and four offshore support vessels. Two small container ships and an offshore supply ship were anchored approximately 2 nm east of the southern boundary of the designated anchorage, near the far south east corner of the study area.

5.2.1.18 Anchoring was also recorded west of the offshore export cable route corridor near Cullen and Portsoy from small container ships, offshore support vessels and a research vessel.

5.2.1.19 Two vessels were seen to be at anchor further offshore during winter; a large Russian military tanker and a tug. These vessels are presented in Figure 5.2-5.

5.2.1.20 There were two vessels anchored approximately 2 nm south of the boundary of the three consented wind farm sites. Details of the 18 vessels that anchored within the study area are given in Table 5.2-2.

Table 5.2-2 Details of Anchored Vessels

Vessel Name	Type	Length (m)	Dead Weight Tonnage (DWT)	Mean Distance to Corridor (nm)
ABERDEEN	Tanker	221	87,055	3.4
ALBA NA MARA	Research Vessel	27	1,499	5.9
ANNELEEN KNUTSEN	Tanker	187	35,144	1.0
BETTY KNUTSEN	Tanker	187	35,309	0.5
CALVIN	Standby Safety Vessel	40	1,499	1.3
ELISABETH KNUTSEN	Tanker	265	124,788	1.7
FAR GRIMSHADER	Cargo	80	3,325	5.1
FS AQUARIUS	Cargo	10	3,100	3.9
GIJON KNUTSEN	Tanker	183	35,144	2.3
NAVION BRITANNIA	Tanker	260	118,500	1.2
NIKOLAY CHIKER	Tug	99	7,542	1.2
OSIPOV	Military Tanker	160	UNSPEC*	1.4
RITSKE	Cargo	80	1,688	3.9
SAMSKIP AKRAFELL	Cargo	100	5,565	3.7
SKANDI ACHIEVER	Offshore Supply Ship	106	4,000	0.9
VOS PRECIOUS	Offshore Supply Ship	73	3,250	5.4
VOS TRAPPER	Standby Safety Vessel	50	425	0.4
WORLD DIAMOND	Offshore Supply Ship	80	1,499	1.6

*DWT information was not available for the Osipov, however from its length and type it was estimated to be in the 15,000-40,000 DWT range

5.2.1.21 The largest vessel recorded at anchor within the study area was the shuttle tanker Elisabeth Knutsen with a length of 265 m and a DWT of 124,788. This vessel was at anchor within 2 nm of the export cable corridor for approximately three weeks during winter. The approximated anchor size of a vessel of this tonnage is between 15,000-18,000 kg; however anchor sizes can vary depending on the type of anchor and vessel type.

Fishing Activity

5.2.1.22 The fishing vessel tracks recorded in the AIS survey for July and December 2013 are colour coded by gear type and are presented in Figure 5.2-6.

5.2.1.23 A total of 59 unique fishing vessels were recorded during summer and 33 in winter. Significant demersal trawling activity was recorded over the central part of the offshore export cable route corridor during summer, from approximately 6 nm north of the coast to 6 nm south of the boundary of the three consented wind farm sites. Vessels associated with this activity were also recorded entering and leaving Macduff harbour. Dredging and trawling activity was also noted within the boundary of the three consented wind farm sites. Approximately 60% of vessels in the study area were actively fishing, as opposed to steaming on passage between ports and fishing grounds.

5.2.1.24 The overflight data from 2005 to 2009 showing vessel gear type is presented in Figure 5.2-7.

5.2.1.25 The majority of fishing vessels in the overflight sightings data were demersal trawlers. These demersal trawlers were mainly sighted in similar positions to the activity noted within the AIS fishing vessel tracks. Demersal trawlers, scallop dredgers and potter / whelkers were also sighted within the boundary of the three consented wind farms.

5.2.1.26 Satellite surveillance data from 2009 showing vessel gear type is presented in Figure 5.2-8.

5.2.1.27 Significant fishing activity was noted over the central part of the offshore export cable route corridor and within the boundary of the three consented wind farms in similar positions to those seen in the AIS data. Gear type information was only available for a small subset of the satellite positions. Scallop dredging activity was noted within the three consented wind farms. It is noted that at the time of the survey the AIS carriage requirements for fishing vessels was for vessels >18 m in length.

Recreational Vessel Activity

5.2.1.28 This section reviews the recreational vessel activity within the Moray Firth based on information from the RYA Coastal Atlas and the AIS data from July and December 2013.

5.2.1.29 The recreational vessel tracks from the AIS data are presented in Figure 5.2-9.

5.2.1.30 The majority of the recreational activity identified on AIS was from vessels intersecting the offshore export cable route corridor within 5 nm of the coast in the southern part of the study area. A small number of recreational vessels were also seen intersecting the offshore export cable route corridor further offshore and within the boundary of the three consented wind farms.

5.2.1.31 Draught information was not available for the majority of recreational vessels in the data. However, as the longest recreational vessel recorded was 17 m in length and

as the vast majority of recreational vessels recorded were sailing vessels, it can be conservatively assumed that they all had draughts of less than 5 m. With the exception of vessels entering or leaving ports, recreational vessels within the study area tended to avoid the areas near shore with charted depths of less than 5 m. It is noted that a significant number of recreational vessels do not have AIS fitted and that the data provides a source of validation of where routes exist. The RYA Atlas is used to identify the main recreational vessel routes in the area, the Atlas is based on consultation with local clubs / users. The RYA Coastal Atlas for the study area is presented in Figure 5.2-10.

5.2.1.32 Three medium use cruising routes associated with the ports of Macduff and Banff crossed the offshore export cable route corridor near the coast. One medium use cruising route crossed the offshore export cable route corridor further offshore and intersected the area of the three consented wind farms. The RYA Coastal Atlas describes medium use routes as 'popular routes on which some recreational craft will be seen at most times during summer daylight hours'. A sailing area in Spey Bay west of the offshore export cable route corridor extends approximately 1 nm into the study area.

Maritime Incidents

5.2.1.33 This section presents data on past vessel incidents within the study area over the ten year period 2001 to 2010.

5.2.1.34 The MAIB incident data from 2003 to 2012 is presented in Figure 5.2-11

5.2.1.35 Two incidents were recorded within the study area in the MAIB data. A machinery failure in 2008 was recorded approximately 3.5 nm south of the three consented wind farms and a grounding, also in 2008, occurred near the modified offshore export cable route corridor landfall point. Three incidents were recorded in the area of the three consented wind farms, two involving accidents to people (2003 and 2005) and one hazardous incident (2005).

5.2.1.36 The RNLI incident data from 2001 to 2010 is presented in Figure 5.2-12

5.2.1.37 A total of 13 incidents were recorded in the RNLI data as occurring within the study area between 2001 and 2010. Twelve of these incidents occurred within 4 nm of the coast. The remaining incident, a machinery failure in 2008, occurred 3.5 nm south of the three consented wind farms. This incident was also recorded in the MAIB data. No incidents were recorded within the boundary of the three consented wind farms in the RNLI data.

Legislative and Planning Framework

Primary Guidance

5.2.1.38 The primary guidance used during this assessment was the Maritime and Coastguard Agency (MCA)Marine Guidance Notice 371 (MGN 371 M+F) - Offshore Renewable Energy Installations (OREIs): Guidance on UK Navigational Practice, Safety and Emergency Response Issues (2008).

5.2.1.39 MGN 371 highlights issues that need to be taken into consideration when assessing the impact on navigational safety from offshore renewable energy developments, proposed for United Kingdom (UK) internal waters, territorial sea or Renewable Energy Zone.

5.2.1.40 There are 5 annexes containing recommendations (1-4) and regulatory extract (5) as follows:

- Annex 1: Considerations on site position, structures and safety zones;
- Annex 2: Navigation, collision avoidance and communications;
- Annex 3: MCA template for assessing distances between wind farm boundaries and shipping routes;
- Annex 4: Safety and mitigation measures recommended for OREI during construction, operation and decommissioning; and
- Annex 5: Standards and procedures for generator shutdown and other operational requirements in the event of a search and rescue, counter pollution or salvage incident in or around an OREI.

Other Guidance

5.2.1.41 Other forms of marine and navigation based guidance used in this assessment are listed as follows:

- Department of Environment and Climate Change (DECC) Guidance Notes on Safety Zones, DECC (2007);
- IALA Recommendation O-139 (2008), The Marking of Man-Made Offshore Structures;
- MCA Marine Guidance Notice 372 (MGN 372) Offshore Renewable Energy Installations (OREIs) Guidance to Mariners Operating in the Vicinity of UK OREIs (2008) – Section 2.7 effects of wind farms and wind turbines on routeing and Section 4 safety zone and exclusion zones;
- International Maritime Organisation (IMO), Guidelines for Formal Safety Assessment (FSA) (2007); and
- Search and Rescue (SAR) Framework, MCA (2002) – Chapter 1 MCA and Chapter 4 Royal National Lifeboat Institution (RNLI).

5.2.2 Impact Assessment

Summary of Effects and Mitigation

5.2.2.1 This section presents an assessment of the likely effects of the construction, operation and decommissioning of the modified OfTI on shipping and navigation. The potential impacts of the modified OfTI are listed below.

Construction and Decommissioning

Summary of Effects and Mitigation

- Increasing ship-to-ship encounter and collision risk for commercial shipping, fishing vessels and recreational vessels;
- Deviations around cable installations;
- Allision risk for commercial shipping, fishing and recreational vessels with OSP's (partially constructed OSPs); and
- Fishing vessel gear snagging with partially laid or unprotected cable.

Summary of Effects

5.2.2.2 Compared with other areas of the UK there is a relatively low level of commercial shipping activity along the offshore export cable route corridor and in the vicinity of the OSPs, with a denser volume of traffic transiting to the east of the wind farm sites

passing between the Pentland Firth and around the north east coast of Scotland. There will be an increased number of vessels within the area associated with the installation (and decommissioning) of both the cable and the OSP's however, given the available sea room, all commercial vessels shall be able to increase passing distance from onsite vessels and associated works / safety zones mitigating effects and resulting in a minor effect on shipping and navigation with respect to increased ship-to-ship encounter and collision risk.

5.2.2.3 The area is regularly used by a moderate level of commercial fishing vessels in particular the inshore and near shore cable area. However with embedded mitigation of construction safety zones, promulgation of information and guard vessels, the effect on fishing vessels of increased ship-to-ship encounters and collision risks is considered to be minor.

5.2.2.4 Recreational vessel (mostly sailing vessels) tend to transit along the coast within inshore waters but again this traffic is at low levels compared to other areas of the UK therefore with embedded mitigation, including direct promulgation of information to local sailing clubs in place, the effect of increased encounters and collision risk is considered to be minor.

5.2.2.5 As noted, the area where the OSPs are to be located is transited by relatively low levels of commercial shipping, fishing vessels and recreational craft. Combined with the likely limited area of the cable and OSP installation activities the effects on these vessels with regards to deviation (including increased transit times for commercial vessels) and additional allision risk is considered to be minor. This effect considered that rolling construction safety zones will be in place around any works or un-commissioned structures.

5.2.2.6 Fishing vessels engaged in bottom gear activities may also be at risk from partially buried or exposed cables during the installation phase, especially within the near shore cable area where fishing activity is common. However with direct liaison with local fisheries (as to any potential hazards) and guard vessel(s) in place, this effect can be reduced to minor.

Additional Notes on Decommissioning

5.2.2.7 During the decommissioning phase of the project, the likely effects are not considered to be any greater than those identified during the construction phase.

5.2.2.8 A Decommissioning Plan in line with standard requirements would be developed and should consider the scenario where, on decommissioning, and on completion of removal operations, an obstruction attributable to the wind farm is left on-site which is considered to be a danger to navigation and which it has not proved possible to remove.

5.2.2.9 Buried cables would be left in-situ and would be notified to UKHO for inclusion in navigation charts.

Operation and Maintenance

Summary of Effects and Mitigation

- Increasing ship-to-ship encounter and collision risk for commercial shipping, fishing vessels and recreational vessels;
- Allision risk for commercial shipping, fishing and recreational vessels with OSPs;
- Displacement / re-routeing resulting in increased transit times for commercial shipping, fishing vessels and recreational vessels;

- Snagging risk to both anchoring commercial and recreational vessels due to the cable and associated protection;
- Snagging risk to fishing vessels anchoring and to their gear due to the cable and associated protection;
- Reduction in under keel clearance and therefore grounding risk associated with cable protection methods; and
- Electromagnetic effects from the cable on shipborne navigational equipment.

5.2.2.10 For the operation and maintenance phase it is assumed that the cable will be either buried (including a burial target depth of 1m) and/or protected therefore should not present increased risk to commercial, fishing or recreational craft in transit.

5.2.2.11 There will be a small increase in vessel activity on site associated with the maintenance of the cable and the OSPs but not at a level that would increase ship-to-ship encounters or collision risk especially with embedded mitigation of marine vessel coordination to coordinate craft associated with the development. Given the low level of traffic and the embedded mitigation, increased collision risk for all receptors associated with the offshore export cable route corridor and the OSPs is **minor.**

5.2.2.12 With respect to the OSPs during operation, commercial vessels will again distance themselves from the site and smaller vessels (fishing and recreational) will be able to navigate whilst keeping a safe passing distance from structures. With the use of embedded mitigation such as lighting and marking the overall effect of additional allision risk is considered to be **minor**.

5.2.2.13 It is noted there is very little commercial traffic passing through the site and these vessels (based on historical experience) will avoid the site but there will be increases in transit times and distances however for the purposes of the OSPs, this effect is considered to be **minor.**

5.2.2.14 The Moray Firth provides commercial, fishing and recreational vessels with anchorages that are sheltered from adverse sea/weather conditions. Vessels are observed to anchor in close proximity to the cable route. However, in areas where the cable route is adjacent to known anchorages (off Banff near the cable landing) the cable burial depths may need to be deeper or protected (target of 1m) than other areas (informed by a cable burial index study) to mitigate the effect of any displacement of anchoring vessels dragging across the cable. With burial depths (target 1 m) being monitored by regular surveys to monitor the cable coverage, as well as other embedded mitigations in place, the effect is considered to be **minor**.

5.2.2.15 Based on the higher levels of commercial fishing activity in the area the snagging risk during the operational phase is considered to be moderate but can be reduced to **minor** due to the types of trawling used through the implementation of mitigation measures including cable burial to a target depth of 1m and use of other means of protection where the target burial depth is not possible.

5.2.2.16 Recent lessons learnt by the industry have noted that cable protection in shallow waters can reduce under keel clearance for small craft transiting in the area. MCA guidance indicates that up to approximately a 5% reduction in Chart Datum is acceptable. Consideration of under keel clearance will be assessed within the cable burial index study.

5.2.2.17 The effect on shipborne navigational equipment from electromagnetic effects during the operational phase of the cable is considered to be **minor.** Industry

research to date shows that the only noted effect is on magnetic compasses but that burial or protection of the cable will reduce this to tolerable levels. It is noted that the magnetic compass, for the majority of vessels, is not a primary method of navigation.

Proposed Mitigation Measures and Residual Effects

5.2.2.18 The following embedded mitigations are part of the modified OfTI:

- Burial of the cable to a minimum of 1m and/or protection;
- Aids to Navigation as required by NLB;
- Charting of cables as per UKHO requirements;
- Compliance with MGN 371;
- Construction safety zones;
- Monitoring – depth and coverage surveys during the operational phase of the cables; and
- Notices to Mariners.

5.2.2.19 The following are additional mitigation measures considered in addition to embedded standard mitigation measures.

- Consideration of designated anchorages (additional burial requirements) and under keel clearance as part of the Cable Burial Index Study (to be completed post consent);
- Guard vessel during construction and major maintenance;
- Promulgation of information including targeted information to local sailing and fishing organisations; and
- Works vessel coordination for wind farm support and construction vessels.

5.2.2.20 Following implementation of mitigation all effects have been reduced to **minor** and therefore residual effects are considered to be not significant under EIA terminology.

5.2.2.21 Table 5.2-3 provides a summary of the impacts.

Table 5.2-3 Impact Assessment Summary – Shipping and Navigation

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Construction & Decommissioning				
Allision risk for commercial shipping, fishing and recreational vessels with OSP's during construction and decommissioning phases (partially constructed OSPs).	Fishing Vessels	Minor	N/A	Minor
	Commercial Vessels	Minor	N/A	Minor
	Recreational Vessels	Minor	N/A	Minor

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Fishing vessel gear snagging with partially laid or unprotected cable during installation	Fishing Vessels	Moderate	Safety Zones during construction Guard Vessels Works Vessel Coordination Promulgation of Information including Fisheries Liaison	Minor
Increasing ship-to-ship encounter and collision risk for commercial shipping, fishing vessels and recreational vessels during construction and decommissioning phases	Fishing Vessels	Moderate	Safety Zones during construction Guard Vessels Works Vessel Coordination Promulgation of Information including Fisheries Liaison	Minor
	Recreational Vessel	Minor	N/A	Minor
	Commercial shipping	Minor	N/A	Minor
Deviations around cable installations during construction and decommissioning phases.	Commercial Shipping	Minor	N/A	Minor
Operation and Maintenance				
Allision risk for commercial shipping, fishing and recreational vessels with OSP's during operation	Fishing Vessels	Moderate	Works Vessel Coordination Promulgation of Information including Fisheries Liaison	Minor
	Commercial Vessels	Minor	N/A	Minor
	Recreational Vessels	Minor	N/A	Minor
Increasing ship-to-ship encounter and collision risk for commercial shipping, fishing vessels and recreational vessels during operation	Commercial Shipping	Minor	N/A	Minor
	Recreational Craft	Minor	N/A	Minor
	Fishing Vessels	Minor	N/A	Minor
Deviations around cable installations during operation	Commercial Shipping	Minor	N/A	Minor

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Snagging risk to both anchoring commercial and recreational vessels due to the cable and associated protection during operational phase.	Commercial vessels	Moderate	Additional burial requirements or protection in proximity to anchorage area. Ongoing surveying of cable once installed. Other mitigations strategies include, marine control centre and vessels setting up anchoring alarm zones to warn of dragging anchor near cables.	Minor
Anchoring on cable	Recreational Vessels	Minor	Not Required	Minor
Fishing Gear Snagging on Cable	Fishing Vessels	Minor	Additional protection in event of cable burial not being possible. Ongoing surveys of cable once installed. Depending on the success of the trials and industry interest, modified scallop dredging gear may be implemented as an additional mitigation (but is not assumed here).	Minor
Electromagnetic /Effects on Navigation Equipment	Commercial, fishing and recreational vessels	Minor	N/A	Minor

Introduction to Impact Assessment

5.2.2.22 This chapter addresses the likely significant effects on shipping and navigation from the modified OfTI to the landfall on the north east coast of Scotland.

5.2.2.23 The scope of this section is to assess the effects on shipping and navigation including commercial shipping, recreation and fishing vessels. This assessment also informs, and is informed by, the Commercial Fisheries assessments (Chapters 5.1 (Commercial Fisheries)) and Rochdale Envelope Parameters Considered in Chapter 5.1.

5.2.2.24 The Rochdale envelope for the modified OfTI includes the export cable route and a maximum of two OSPs, located within the boundary of the three consented wind farm sites (Chapter 2.2 (Project Description).

5.2.2.25 The assessment of the likely significant effects on shipping and navigation is based on the modified OfTI, including a 5 nm buffer from the offshore export cable route to ensure that wider effects on shipping and navigation are identified and assessed. This buffer includes most of the boundary of the three consented wind farm sites, within which the OSPs will be located.

5.2.2.26 The offshore export cable landfall will be located at Inverboyndie and the cable route length is up to 52 km from the boundary of the three consented wind farms. The maximum number of cables will be 4 and it is assumed that each cable will be in a separate trench. The target burial depth is 1m, Table 5.2-4 summarises the Rochdale envelope parameters relevant to the Shipping and Navigation Impact Assessment.

Table 5.2-4 Rochdale Envelope Parameters relevant to the Shipping and Navigation Impact Assessment

Potential Effect	Rochdale Envelope Scenario Assessed
Construction & Decommissioning	
Increased level of vessel activity with the installation of the export cable and the OSPs resulting in increased collision risk.	• OSP layout giving maximum loss of navigable sea area. • 4 circuits in 4 trenches, total width up to 1,200 m depending on water depth (based on current geophysical data). • Installation related vessel activity in the area.
Re-routeing of shipping (commercial vessels, fishing and recreational vessels) in the area due to installation and cable laying vessels.	• OSP layout giving maximum loss of navigable sea area. • 4 cables in 4 trenches, total width up to 1,200 m depending on water depth. • Installation related vessel activity in the area.
Operation	
Effect on vessel anchoring (loss of anchorage, anchor dragging or snagging cable) due to export cable(s).	• 4 cables in 4 trenches in closest proximity to the anchorage area at Banff / Macduff.
Vessel to Structure allision risk during operations for commercial, fishing and recreational vessels.	• Two OSPs.
Fishing gear interaction / snagging export cable(s) and the OSPs.	• 4 cables in 4 trenches, total width up to 1,200 m depending on water depth. • 2 OSPs.
Electromagnetic interference on shipborne navigational equipment	• 4 cables in 4 trenches, total width up 1,200 m depending on water depth.

EIA Methodology

5.2.2.27 The methodology used to assess the likely significant effects of the modified OfTI principally follows the MCA MGN 371 (MGN 371 M+F) (2008) and Department of Energy and Climate Change (DECC) Risk Assessment Methodology (2005).

5.2.2.28 The baseline study allowed higher risk areas to be identified through the use of real time shipping survey data, desk-based research and consultation.

5.2.2.29 The effect on shipping and navigation associated with the modified OfTI works was assessed and a series of mitigation measures and monitoring plans are presented.

Significance Criteria

5.2.2.30 The likely significant effects on shipping and navigation from the modified OfTI cannot be easily categorised, hence the application of significance criteria to an assessment of effects is, subjective.

5.2.2.31 In terms of the modified OfTI, the effects on the shipping and navigation receptors for different phases of the project are assessed using the significance terminology as described below:

- **Not significant**. Effects that are slight and negligible deviations in terms of vessel navigation / routeing, anchor / fishing gear interaction risk causing no damage, negligible risk of allision with OSP and radar interference on navigational equipment which does not affect a vessel's ability to navigate;
- **Minor significance.** Effects which are generally small in magnitude in terms of vessel navigation (e.g. minor deviation around cable laying vessels for regular routes), anchor / fishing gear interaction risk causing minor damage to vessel / gear, low risk of allision with OSP and radar interference on navigational equipment restricting a vessel's ability to navigate safely.
- **Moderate significance.** Effects which are moderate in magnitude in terms of vessel navigation (e.g. moderate deviation for regular route around cable laying vessels), anchor / fishing gear interaction risk causing moderate damage to vessel / gear and / or injury to crew, moderate risk of allision with OSP and radar interference on navigational equipment reducing a vessel's ability to navigate in proximity to the infrastructure; and
- **Major significance.** Effects which are of major significant in magnitude, in terms of vessel navigation (e.g. large deviations for dense shipping), anchor / fishing gear interaction risk causing major damage to vessel / gear and major injuries to crew, high risk of allision with OSP and radar interference on navigational equipment which means a vessel can no longer navigate safely in the vicinity of the infrastructure.

Mitigation Measures

5.2.2.32 During the construction, operation and decommissioning phases of the modified OfTI works, a number of mitigation measures will be in place and these are listed below:

- Any marine Aids to Navigation (AtoNs) required to mark the structures, land falls and/or subsea features will be provided in accordance with the Northern Lighthouse Board (NLB) requirements;
- Marking of structures and subsea cabling on appropriate scale Admiralty Charts by the United Kingdom Hydrographic Office (UKHO);
- Positions of the OSPs and export cable routes notified to FISHSAFE via Kingfisher Information Services-Cable Awareness (KIS-CA) for inclusion in cable awareness charts and plotters for the fishing industry;
- Promulgation of information and appropriate liaison with local fishing and recreational sailing organisations as well as local ports and harbours. This ensures information on the modified OfTI works are circulated in Notices to Mariners, Navigation Information Broadcasts and other appropriate media to allow vessels to effectively and safely pre-plan navigation around any installation / cable laying vessels;
- A Search and Rescue (SAR) Emergency Response Cooperation Plan (ERCoP) will be developed and put in place for the construction, operation and the

decommissioning phases of the entire wind farm and modified TI project. A Safety Management System (SMS) will be developed to ensure the effective co-ordination of emergency response for the modified OfTI works. It will be designed to ensure that the risks related to marine operations (construction, operation/maintenance and decommissioning) specific to the project are managed carefully and over the long-term;

- Based on the Rochdale envelope, it is assumed that the modified offshore export cable will be buried to a minimum target depth of 1m. Where this burial depth is not achieved, then appropriate protection measures will be put in place. Consideration of designated anchorages (additional burial requirements) and under keel clearance to be considered as part of the Cable Burial Index Study (to be completed post consent);
- Construction safety zones;
- Guard vessel during construction and major maintenance;
- Works Vessel Coordination for wind farm support and construction vessels;
- Monitoring – depth and coverage surveys during the operational phase of the cables; and
- Compliance with MGN 371.

5.2.2.33 The impact assessment assumes that these industry standard mitigation measures will be put in place.

Impact Assessment

5.2.2.34 In order to assess the effects associated with the modified OFTI a comprehensive analysis of real time shipping survey data was carried out. A review of AIS shipping data was presented along the offshore export cable route corridor of the modified OfTI to the landfall. A detailed study area of 5 nm either side of the offshore export cable route corridor was defined in order to assess the wider impacts on users in the area. The shipping data used in the assessment was from July 2013 and December 2013 to record fluctuations in shipping and vessel activity due to seasonal and tidal variations.

5.2.2.35 A range of vessel types were recorded on AIS and in order to ensure the main vessel types including commercial, fishing and recreational vessels were also recorded in the wider area around the modified export cable route corridor and the OSPs.

5.2.2.36 The review of likely significant effects was carried out by experienced personnel. This gives further confidence in the findings of the work. As a result of the approach adopted, the limitations associated with this study are not considered to be significant.

5.2.2.37 The baseline vessel activity and navigational features in the vicinity of the modified OfTI were detailed in the baseline of this chapter. The assessment identified the shipping and navigation receptors that may be affected by the modified OfTI works.

5.2.2.38 The main part of the assessment covers the likely significant effects on shipping and navigation in relation to commercial shipping, recreation vessels, fishing vessels and effects on shipborne navigational equipment. Effects on commercial fishing are also assessed separately in Chapter 5.1.

Construction

5.2.2.39 In terms of the shipping and navigation receptors, the effect associated with the modified OfTI has been assessed for the construction/installation phase of the project.

Effect on Commercial Vessels Allision and Ship Collision Risks

5.2.2.40 The presence of cable laying and installation vessels associated with the modified OfTI works can pose additional risks to navigation. This is due to increased vessel activity and the fact that the installation vessels are restricted in their manoeuvrability. This may lead to an increase in ship-to-ship encounters in the area as passing shipping deviates around cable laying works.

5.2.2.41 From the baseline information, it is seen that there is a relatively low density of commercial vessels transiting the area, approximately 5 unique vessels per day. The majority of vessels recorded in close proximity to the offshore export cable route corridor were vessels fishing in the area. There is sea room available for passing vessels to re-route around additional marine operations traffic and cable laying vessels operating in this area.

5.2.2.42 Assuming standard mitigation measures are in place, it is expected that cable laying works can be carried out safely, with a **minor**, effect on commercial shipping with respect to ship-to-ship encounters and increased collision risk.

Effect on Recreational Vessel Allision/Collision Risk & Journey/Transit Times

5.2.2.43 A small number of recreational vessels (approximately one per day during summer) were recorded on AIS routeing along the Aberdeenshire coast (within approximately 5 nm of the coast), however, only a small minority of such vessels are likely to broadcast on AIS. More generally, four medium use RYA / CA cruising routes intersect the offshore export cable route corridor and consented wind farm areas, two of which are associated with Macduff harbour.

5.2.2.44 Overall, given that there is sea room available for vessels to deviate around installation and cable laying vessels and assuming standard mitigation measures are in place, a **minor**, effect is predicted on recreational vessel routeing distance / voyage time as well as for allision and collision risks.

Effect on Fishing Vessel Allision/Collision Risk

5.2.2.45 There is a significant level of fishing activity in the vicinity of the modified OfTI and there will be an increase in the ship-to-ship encounters and hence collision risk in the area during construction activities. Whilst the effect is considered to be **moderate** given the additional mitigation through liaison with local fisheries organisations as well as through the use of guard vessels and safety zones in the construction phases of the project, the impact is reduced to **minor.**

Effect on Commercial Shipping Routeing

5.2.2.46 The presence of cable installation vessels could cause re-routeing of commercial shipping, leading to increased voyage distance and time.

5.2.2.47 The baseline information shows that the main shipping route intersecting the proposed offshore export cable route corridor was traffic headed east and west to / from the Moray Firth, between 2-7 nm north of the landfall, near Banff. This mostly comprised shuttle tankers and small-to-medium sized coastal cargo vessels, with approximately two commercial vessels per day using this route.

5.2.2.48 For the OSPs, the densest route passes to the east with one vessel every 10 days recorded on a route transiting from Wick to the south.

5.2.2.49 Offshore supply vessels also intersect the offshore export cable route corridor, to the north and east, supporting mobile/temporary drilling operations and fixed offshore platforms in the area, including Ross Field, Captain Field and Beatrice/Jacky Fields.

5.2.2.50 In general, commercial shipping in the area of the offshore export cable route corridor keeps in the order of at least 1-2.5 nm north of the Aberdeenshire coast, clear of shallower areas where the possibility exists of a vessel grounding. A number of coastal vessels were recorded passing closer to shore (dependent on draught and sea conditions). However, in general, most commercial vessels avoid inshore routes.

5.2.2.51 For the OSPs it is considered that commercial shipping will be able to pre-plan any revised passage in advance of encountering the area of the proposed sites and there will only be a minor increase to voyage distance and time. Given the low levels of shipping on the affected routes, available sea room to the east and west of the of the offshore export cable route corridor and the low levels of inshore commercial vessels in close proximity to the cable land fall, a **minor**, effect on commercial ship routeing is predicted.

Effect on Fishing Vessel Routeing

5.2.2.52 The AIS data (July and December 2013) recorded a relatively low density of fishing vessels on passage, approximately 5 nm clear of Banff. A number of vessels were also recorded on passage to Macduff, passing approximately 1.5 nm east of the offshore export cable route corridor. Less than one fishing vessel a day was recorded as entering or leaving Macduff.

5.2.2.53 Local fishing vessels will be made aware of installation works and cable laying vessels within the offshore export cable route corridor through Notices to Mariners (NtMs) and fisheries liaison. Non-local fishing vessels will become aware of the cable laying activities as they arrive at fishing grounds through day marks and lights used by the cable laying vessels to advise passing vessels of restrictions in manoeuvrability.

5.2.2.54 Given the low density of fishing vessels on passage crossing the offshore export cable route and the relatively small size and draught of fishing vessels (mean length of 20 m and mean draught 4 m), there will be a **minor** effect on routeing of fishing vessels during the construction / installation phase.

Effect on Fishing Operations

5.2.2.55 The effect on fishing vessel grounds is assessed within the Commercial Fisheries Assessment, Chapter 5.1 In terms of fishing gear interaction, there was a significant area of fishing activity over the cable route, from approximately 6 nm north of the coast to approximately 6 nm south of the boundary of the three consented wind farm sites, with the majority of activity being demersal trawlers. A number of scallop dredgers were also sighted along the offshore export cable route corridor and within the boundary of the three consented wind farms.

5.2.2.56 Demersal trawlers drag their gear along the seabed and could penetrate up to 30 cm. Scallop dredgers have a chain bag with teeth that dig into the sediments to about 20 cm, which drags along the sea bed collecting the catch. Scallop gear penetration depth varies (based on gear type/ weight and sea bed type) but gear can penetrate up to 75 cm and therefore these vessels are at higher risk of gear interaction with the offshore export cable, particularly if the cable is partially buried

or exposed during the installation phase. Overall, the risk to demersal trawlers and scallop dredgers operating in the vicinity of the export cable route is likely to be **moderate**.

5.2.2.57 However with direct liaison with local fisheries (as to any potential hazards) and guard vessels this impact can be reduced to **minor**

Operation

5.2.2.58 This section considers the effects of the modified OfTI on shipping and navigation receptors during the operational phase.

Effect on Commercial Vessels Anchoring

5.2.2.59 A Navigational Hazard Review Workshop was carried out in July 2011, as part of the Navigational Risk Assessment (NRA) for the offshore wind farm developments within the Moray Firth. The workshop highlighted that the Moray Firth provides vessels with sheltered anchorages, located inshore of adverse sea and weather conditions that can be experienced in the North Sea. Vessels including shuttle tankers, offshore supply ships, survey and cable laying vessels, anchor off the Moray Firth coastline during severe weather.

5.2.2.60 Anchoring within 5 nm of the offshore export cable route was recorded in Inverboyndie Bay in the anchorage servicing Banff and Macduff. This anchorage is located east of the offshore export cable route corridor and is less than 0.4 nm from the corridor at its nearest point. Nine vessels anchored within, or close to, the Banff anchorage during the two month survey period. These vessels were comprised of 2 large and 3 medium-sized shuttle tankers and 4 small offshore support vessels. In this anchorage area, the sea bed type is sandy gravel where there is good holding ground for anchoring.

5.2.2.61 Small container ships, offshore support vessels and a research vessel were also recorded anchoring further along the coast to the west, near Cullen and Portsoy. In addition, a large military tanker was recorded 1 nm east of the modified OfTI corridor, in sand / muddy sand sea bed type.

5.2.2.62 Sea bed mobility is relatively high within and adjacent to the Southern Trench. Therefore, to minimise the risk of export cables becoming exposed to anchor interaction, alternative forms of protection will be considered where the export cable cannot be satisfactorily buried (i.e. mattresses and/or rock placement), as well as regular surveys to monitor cable burial depths.

5.2.2.63 Assuming industry standard mitigation measures, including a target burial depth of 1m, a **moderate** effect on anchoring is predicted, due to the proximity of the cable to the anchorage area close to Banff and Macduff and the large tankers recorded at anchor there. This is reduced to **minor** due the additional burial requirements in proximity to the anchorage area as well as ongoing surveys of the cables once installed.

Effect on Smaller Vessels Anchoring

5.2.2.64 The effect on smaller vessels anchoring, including fishing and recreational vessels is expected to be similar in nature and extent to those discussed for commercial shipping anchoring effects. However, small vessels are likely to anchor in more sheltered and inshore areas, which are shallower and do not restrict small vessels anchor chain lengths.

5.2.2.65 Consultation with the RYA and CA stated that, given a target burial depth of 1m, the risk to recreational vessel anchoring is considered low as anchors tend to run to approximately 20 cm depth. It was requested that in water depths less than 10 m, any cable protection should not present further hazard to recreational vessels, i.e. by introducing an uneven seabed. The burial plans for the cable route will take this into consideration.

5.2.2.66 Therefore a **minor**, effect is predicted on small vessel anchoring.

Effect on Commercial Shipping and Collision Risk

5.2.2.67 In terms of an errant vessel under power deviating from its route to the extent that it comes into proximity with the OSPs, it is not considered to be a probable event. The allision risk was calculated for the offshore Transmission Infrastructure in the MORL ES, assuming a worst case scenario of eight OSPs, and estimated to be one every 261,000 years. This is low compared to the historical average of 5.3 x 10^{-4} per installation-year for offshore installations on the United Kingdom Continental Shelf (UKCS) (1 in 1,900 years). The modified OfTI Rochdale envelope states a maximum of two OSPs. Given that the shipping data has remained relatively unchanged, the allision risk is estimated to be lower than that calculated in the MORL ES. This conclusion is also supported by the fact that the up to date shipping survey data does not show any significant change in the numbers of vessels and shipping routes in the vicinity of the development.

5.2.2.68 The drifting vessel allision risk for the eight OSPs was identified as one every 18,100,000 years. There have been no reported 'passing' drifting ('Not under Command') ship collisions with structures on the UKCS in over 6,000 operational years. Whilst a number of drifting ship incidents are recorded each year in UK waters, most vessels have been recovered in time, (e.g. anchored, restarted engines or taken in tow.)

5.2.2.69 Overall, through the baseline data, consultation and collision risk models, a **minor**, effect is predicted on commercial shipping allision risk given the low levels of traffic / baseline risk and the small change in allision risk due to the physical presence of the OSPs.

5.2.2.70 With respect to the effect on ship-to-ship collision risk, there will be additional traffic in the area in relation to the operation of the modified OfTI. However, given the low volume of vessel activity in the Moray Firth in general the effect is considered to be **minor**.

Effect on Commercial Vessels Re-Routeing

5.2.2.71 Once the modified OfTI is in place then vessels will require to re-route around the structures. Very few vessels are observed from survey data as routeing in the vicinity of the OSP's and therefore the impact with respect to vessels requiring to deviate from their existing routes is consider to be **minor**.

Effect on Fishing Vessels Allision and Collision Risks

5.2.2.72 There is a risk that fishing vessels collide with other vessels or that they have an allision with an OSP. It is noted that there is good prospect for fishing vessels to navigate within / between structures. The decision to do this however lies with the Master of the vessel who will be responsible for assessing the risks associated with navigating in proximity to and through an offshore wind farm. The risk of allision between fishing vessels and an OSP is considered to be **moderate**. However, with the additional mitigation measures implemented then this is reduced to **minor**.

Fishing Gear Snagging Risks

5.2.2.73 There is a risk to fishing vessels should they snag their gear on unprotected cables or cables running over spans or on the OSPs subsurface. However, with identification and mitigation of potential snagging hazards including cable protection / burial as well as survey / monitoring and liaison with the fishing industry, it is considered that the operational phase of the transmission works will have a **minor** effect on fishing vessels.

Effect on Shipborne Navigational Equipment

5.2.2.74 An additional navigational effect has previously been identified based on electromagnetic interference on vessels navigational equipment, e.g. magnetic compasses and communication equipment.

5.2.2.75 A decision has been made to use HVAC export cabling for the modified TI. HVDC export cables were assessed in the MORL ES (MORL, 2012). HVDC export cables do have impacts different to Alternating Current (AC) and could potentially cause deflection of a compass needle through electromagnetic interference (Metoc, 2000). In addition, vessels can use an auto-pilot which is dependent on a magnetic sensor and may experience slight steering issues if crossing a high voltage cable. However, the decision to use HVAC export cabling will remove this as a potential effect.

5.2.2.76 It is also assumed that all equipment and offshore export cables will be rated and in compliance with design codes. In addition the offshore export cables will be buried (where possible) or protected and any generated electromagnetic fields will be very weak resulting in a **minor** effect on shipborne navigational equipment.

5.2.2.77 A small number of vessels identified during the baseline assessment, including those on the Wick and offshore routes, will be subject to a low level of radar interference; however, based on the revised routeing patterns, radar interference is predicted to be minor given the distance which they are likely to pass from the structures.

Decommissioning

5.2.2.78 The effects associated with decommissioning the modified OfTI are anticipated to be similar in nature and extent to those identified during the construction phase.

5.2.2.79 However, the likely significant effects associated with decommissioning the offshore export cables could be dependent upon the method used for decommissioning and whether it is decided that offshore export cables shall remain buried in the seabed.

5.2.2.80 It is anticipated that the effect resulting from the decommissioning of the export cables shall be **minor** in terms of disruption to shipping and navigation receptors. In addition, any possible effects should be assessed as part of the Environmental Impact Assessment (EIA) undertaken to inform the final Decommissioning Plan.

Proposed Monitoring and Mitigation

5.2.2.81 In addition to the industry standard mitigation measures described above, additional mitigation and safety measures will be applied to the offshore export cables works appropriate to the level and type of risk determined during the EIA.

5.2.2.82 The specific measures to be employed will be selected in consultation with the MCA.

5.2.2.83 In addition, the following mitigation measures specific to a particular phase will be assumed.

Construction

5.2.2.84 One of the construction/installation vessels will be tasked with vessel monitoring and guard duties to monitor passing vessels and warn / contact errant vessels headed towards offshore transmission works or vessels restricted in manoeuvrability associated with the project.

Operation

5.2.2.85 Sections of the cable route identified to be high risk areas from anchoring and fishing activity will be buried to a suitable depth to protect against vessel anchors and fishing gear. Where a suitable burial depth is unachievable, the cables will be protected with concrete mattresses and / or rock placement. Following installation, the cables' over-trawlability will also be tested.

5.2.2.86 Periodic and planned surveys of the export cable routes will be carried out to monitor burial depths / protection and seabed mobility.

5.2.2.87 A Marine Control Centre is being considered as part of the three consented wind farm sites and monitoring could be extended to cover the modified export cable route to shore (i.e. to monitor any vessels anchoring in proximity to the cable route). Further consideration of vessel monitoring in proximity to the cable route will take place during construction / installation planning.

Decommissioning

5.2.2.88 The mitigation measures associated with decommissioning the export cables are anticipated to be similar to those identified for the construction phase; however measures will also be dependent on the method of decommissioning (i.e. complete removal of export cables or leave the cable(s) buried in the seabed).

5.2.2.89 A decommissioning plan in line with standard requirements will be developed and this is likely to lead to a revision of the existing ERCoP and associated safety procedures.

5.2.2.90 Promulgation of information and appropriate liaison with marine stakeholders will be carried out prior to decommissioning works.

5.2.3 Cumulative Impact Assessment

Summary

5.2.3.1 This section presents the results of assessment of the potential cumulative effects upon shipping and navigation arising from the modified OfTI in conjunction with other existing or scoped marine receptors including coastal developments and activities.

5.2.3.2 An assessment of the likely significant effects of the whole project with the following projects has been done. The list notes there application status and distance from the OfTI;

- Beatrice Offshore Windfarm Limited (BOWL) (including the offshore generation station and associated TI) – Operational and planning (adjacent); and
- MORL WDA – Operational (adjacent).

5.2.3.3 A summary of the expected cumulative impacts is provided in Table 5.2-5 for shipping and navigation.

Table 5.2-5 Cumulative Impact Summary (Shipping and Navigation)

Effect/Receptor	Residual Significance Level for Modified TI	Whole Project Assessment: Modified TI + Stevenson, Telford and MacColl	Whole Project with Consented Projects + WDA	Whole Project with Unconsented but Likely Project	Mitigation Method
Construction/Decommissioning					
Displacement / re-routeing resulting in increased transit times associated with construction areas and safety zones / Commercial Ships, Fishing Vessels and Recreational Vessels *(Whole project plus those developments listed in section 5.2.3.2).*	Minor	Minor	Minor	Minor	N/A
Total Cumulative Impact Assessment	Minor				
Increasing ship-to-ship encounter and collision risk with construction and support vessels / commercial shipping, fishing vessels and recreational vessels. *(Whole project plus those developments listed in section 5.2.3.2).*	Minor	Moderate	Moderate	Moderate	Works Vessel Coordination Coordination between all Developments Promulgation of Information
Total Cumulative Impact Assessment	Minor				
Allision risk with OSPs and other structures (constructed and partially constructed) / Commercial shipping, fishing and recreational vessels *(Whole project plus those developments listed in section 5.2.3.2).*	Minor	Minor	Minor	Minor	N/A
Total Cumulative Impact Assessment	Minor				
Operation/Maintenance					
Displacement/re-routeing resulting in increased transit times associated from completed developments/ Commercial Ships, Fishing Vessels and Recreational Vessels *(Whole project plus*	Minor	Minor	Minor	Minor	N/A

Effect/Receptor	Residual Significance Level for Modified TI	Whole Project Assessment: Modified TI + Stevenson, Telford and MacColl	Whole Project with Consented Projects + WDA	Whole Project with Unconsented but Likely Project	Mitigation Method
those developments listed in section 5.2.3.2).					
Total Cumulative Impact Assessment	Minor				
Increasing ship-to-ship encounter and collision risk with operation al vessels and construction vessels associated with other projects / commercial shipping, fishing vessels and recreational vessels *(Whole project plus those developments listed in section 5.2.3.2).*	Minor	Moderate	Moderate	Moderate	Works Vessel Coordination Coordination between all Developments Promulgation of Information
Total Cumulative Impact Assessment	Minor				
Allision risk with OSPs and other constructed developments / Commercial shipping, fishing and recreational vessels *(Whole project plus those developments listed in section 5.2.3.2).*	Minor	Minor	Minor	Minor	N/A
Total Cumulative Impact Assessment	Minor				

Methodology

5.2.3.4 An assessment of the likely significant effects of the whole project with the following unconsented but likely projects has been done. The list notes there application status and distance from the OfTI;

- Beatrice Offshore Windfarm Limited (BOWL) (including the offshore generation station and associated TI) – Operational and planning (adjacent);
- MORL WDA – Operational (adjacent);
- Round Three Zone 2 (Forth) – Submitted (83 nm);
- Inch Cape – Submitted (90 nm);
- NNG Offshore Wind Farm – Submitted (105 nm);
- EOWDC – Consent (47 nm);
- Hywind - Scoping (36.5 nm);

- Kincardine Offshore Wind Farm (Floating) – Scoping (57 nm);
- SHE-T HVDC cable – In Planning (overlaps with array and landfall 25 nm approx.); and
- Initial planning framework for offshore wind energy in Scottish waters (spatial planning).

5.2.3.5 Projects and proposed developments were screened in to the assessment only where potential overlap between activities and receptors was identified due to the distance from the modified OfTI and the limited information available of in planning and scoped projects only those adjacent to the modified OfTI have been considered. It is noted that further consultation will be required with the SHE-T HVDC cable but this is not considered to have any cumulative impacts for shipping and navigation unless construction overlaps; however at this stage due to limited information it has been screened out of this cumulative study.

5.2.3.6 Cumulative impacts have been considered for an extended study area to include navigational waters between the Moray Firth and the Firth of Forth. Cumulative projects have been considered within 10 nm of the development area; however due to the nature of international shipping routeing to and from ports outside of this study area have also been considered but not quantified.

5.2.3.7 Cumulative impacts have been considered for shipping and navigation receptors, this includes other offshore developments, as well as in combination activities associated with other marine activities. However it should be noted that fishing, recreation and marine aggregate dredging transits have been considered as part of the baseline assessment.

5.2.3.8 Worst case assumption for all developments include the maximum number of structures are the largest development area as well as assuming that construction phases could overlap.

5.2.3.9 A number of projects and marine activities were scoped out of the assessment with regards to vessel movement as these were considered to be part of the baseline for vessel traffic. This includes traffic associated with aggregate extraction areas, fishing activity and recreational craft transits

Cumulative Assessment

5.2.3.10 The types of effects considered in this assessment during are:

- Construction and Decommissioning
  - Displacement/re-routeing resulting in increased transit times associated with construction areas and safety zones;
  - Increasing ship-to-ship encounter and collision risk with construction and support vessels; and
  - Allision risk with OSPs and other structures (constructed and partially constructed).
- Operation and Maintenance
  - Displacement / re-routeing resulting in increased transit times associated from completed developments;
  - Increasing ship-to-ship encounter and collision risk with operation al vessels and construction vessels associated with other projects; and
  - Allision risk with OSPs and other constructed developments.

5.2.3.11 The receptors identified for consideration in this cumulative assessment are:

- Commercial Shipping;
- Commercial Fishing; and
- Recreational Vessels.

5.2.3.12 Displacement / re-routeing resulting in increased transit times associated with construction areas and safety zones.

5.2.3.13 There is potential that significant deviations could affect commercial, fishing and recreational receptors associated with the cumulative development of the modified TI plus Stevenson, Telford and MacColl, WDA and BOWL However due to the temporary natured of the construction areas and safety zones all impacts associated with deviations are expected to be **minor** and do not require further mitigation above standard embedded mitigation.

Increasing Ship-to-ship Encounter and Collision Risk with Construction and Support Vessels

5.2.3.14 Should construction periods overlap there will be a significant increase in the number of vessels operating within the Moray area increasing encounters and collisions. However this can be reduced to **minor** with effective management of traffic (works vessel coordination), communication with other developments and promulgation of information. It is noted that this impact is temporary for the construction phase.

Allision Risk with OSPs and Other Structures (Constructed and Partially Constructed)

5.2.3.15 Despite the increased in structures with the Moray Firth increased allision (for all receptors) is considered not significant due to the embedded mitigation measure already in-situ including site design, lighting and marking which will enable the receptors to navigate safely around and within the development. Therefore this impact is considered **minor** and not significant under EIA methodologies. It is noted that during construction and decommissioning vulnerable areas of development will be protected by guard vessels and / or safety zones.

Displacement / Re-routeing Resulting in Increased Transit Times Associated from Completed Developments

5.2.3.16 Due to the limited amount of transits for recreational, fishing and commercial vessels across the proposed development areas and the overall foot print of the developments the impacts on routeing associated with cumulative developments are considered **minor** and not significant under EIA methodologies. It is noted that impacts associated with the displacement of fishing activity is considered separately within the Commercial Fisheries Chapter 5.1 (Commercial Fisheries).

Increasing Ship-to-ship Encounter and Collision Risk with Operation with Vessels and Construction Vessels Associated with Other Projects

5.2.3.17 Along with the small number of vessels expected on site during operation and the potential for this to overlap could be a significant increase in the number of vessels operating within the area increasing encounters and collisions. However this can be reduced to **minor** with effective management of traffic (works vessel coordination), communication with other developments and promulgation of information. It is noted that this effect is temporary for the construction phase.

Allision Risk with OSPs and Other Constructed Developments

5.2.3.18 As with the construction period despite the increase in structures with the Moray Firth increased allision (for all receptors) is considered not significant due to the embedded mitigation measure already in situ including site design, lighting and marking which will enable the receptors to navigate safely around and within the development. Therefore this effect is considered **minor** and not significant under EIA methodologies.

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5.1.3.156 The cumulative effect upon the nomadic scallop fishery is dependent upon the productivity of grounds affected and the scale of effect identified for each development. Information available for the projects listed above is not currently detailed enough to quantify the scale of effect upon the nomadic scallop fishery. It is, however, considered that in each instance the scale of effect will be largely defined by the engineering design and construction schedules of individual developments and the ability of vessels to regain access to grounds once the sites are operational.

Marine Energy Developments in the Pentland Firth and Orkney Waters

5.1.3.157 The receptors affected by the modified OfTI have not for the most part been identified as operating within the Pentland Firth and Orkney waters, although it is recognised that in certain years the squid fishery may attract vessels from around the Scottish coast, including the Orkney Islands, depending upon the productivity of the fishery. As a result, the marine developments in the Pentland Firth, including the MeyGen tidal project, will not have a cumulative effect.

SHE-T Cable

5.1.3.158 The construction activities during the installation of the proposed SHE-T cable and the modified OfTI have the potential to cumulatively affect fishing activities. The scale of effect will depend upon the construction schedule and the status of the infrastructure in the operational phase.

Shipping and Navigation

5.1.3.159 The principal cumulative effect of shipping and navigation upon commercial fishing activities is discussed in Chapter 5.2: Shipping and Navigation.

Offshore Oil and Gas Development

5.1.3.160 There is currently oil and gas development in the Greater Beatrice Area of the Moray Firth. This includes Beatrice Field infrastructure and the Jacky platform and corresponding subsea flow lines. All vessels are prohibited from within 500 m of any such infrastructure. Included within the oil and gas infrastructure are two operational demonstrator wind turbines. The existing Beatrice and Jacky infrastructure currently limits fishing activity in the Moray Firth as a result of these safety zones and the modified OfTI, MORL consented wind farms, BOWL project and WDA will cumulatively add to this. It is also noted that the offshore demonstrator turbines currently operational in the Moray Firth are located within the footprint of the safety zone currently encompassing the Greater Beatrice Field infrastructure. Site investigation surveys for currently licensed and unlicensed blocks may also temporarily displace fishing activity but the extent of such an effect is currently unknown.

MPAs and other Closed/Restricted Areas

5.1.3.161 MPAs currently in place have had the effect of restricting fishing activities in certain areas, particularly those activities affecting the seabed (i.e. bottom towed gear). For example, in Cardigan Bay (a designated Special Area of Conservation (SAC)), all scallop dredging is prohibited. It is considered that the Marine Conservation Zone (MCZ) announcements in England and Wales and the Nature Conservation MPAs in Scotland will enforce additional limitations upon certain, if not all, fishing activities in the future.

5.1.3.162 The potential for cumulative effects of the modified OfTI, MORL consented wind farms, WDA, BOWL project and unconsented developments in the Forth and Tay in

conjunction with existing and proposed MPAs in the Moray Firth (for example the proposed Southern Trench MPA) and wider area (with particular reference to the nomadic scallop fleet) is noted, although it is not possible to quantify the cumulative significance of the effect.

5.1.3.163 There are additional fisheries management policies in place which also restrict or prohibit certain or all type of fishing activities. Such restrictions may be seasonal or annual and are subject to review. There are not currently any restricted or closed areas in the Moray Firth.

5.1.3.164 Management policies around the UK which result in restricted access to grounds have the potential to affect the nomadic scallop fleet (for example, the closure in Isle of Man waters). It is possible that additional closed areas may apply in the future.

5.1.4 References

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