MORAY WEST
OFFSHORE WINDFARM

Onshore Transmission Infrastructure Environmental Impact Assessment (EIA)

Moray Offshore Windfarm (West) Limited

Chapter 9 Traffic and Transport

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Acronyms	
Acronym	**Expanded Term**
AADT	24 hour Annual Average Daily Traffic flow
AC	Aberdeenshire Council
AIL	Abnormal Indivisible Load
ATC	Automatic Traffic Counts
DfT	Department for Transport
EIA	Environmental Impact Assessment
GEART	Institute of Environmental Assessment (IEA) publication Guidance Notes No. 1: Guidelines for the Environmental Assessment of Road Traffic (1993)
GIS	Geographic Information System
HDD	Horizontal Directional Drilling
HGV	Heavy goods vehicles
MC	Moray Council
NCN	National Cycle Network
NRTF	National Road Traffic Forecasts
NTEM	National Trip End Model
OnTI	Moray Onshore Transmission Infrastructure
PAN 75	Planning Advice Note 75: Planning for transport
PAB	Planning application boundary
PCTMP	Preliminary Construction Traffic Management Plan
PIA	Personal Injury Accidents
TA	Transport Assessment
TEMPRO	Trip End Model Presentation Program version 7.2

9 Traffic and Transport

9.1 Introduction

9.1.1.1 This chapter considers the potential effects on traffic and transport associated with the construction, operation and decommissioning of the Moray West Onshore Transmission Infrastructure (OnTI).

9.1.1.2 The specific objectives of this chapter are to:

- Describe the local road network;
- Set out the transport policy framework;
- Provide information on consultation;
- Present the predicted traffic generation / distribution of the OnTI; and
- Appraise the potential impact on the local and strategic road network and mitigation if required.

9.1.1.3 This chapter is supported by the following Technical Appendices:

- Technical Appendix 9.1: Transport Assessment (TA);
- Technical Appendix 9.2: Preliminary Construction Traffic Management Plan (PCTMP); and
- Technical Appendix 9.3: Abnormal Load Traffic Route Assessment Report

9.2 Approach to Assessment

9.2.1 Planning Policy and Legislative Context

9.2.1.1 Policy and guidance documents of relevance to the traffic and transport environmental effects of the OnTI are listed below:

- Institute of Environmental Assessment (IEA) publication Guidance Notes No. 1: Guidelines for the Environmental Assessment of Road Traffic 1993 (GEART);
- Scottish Planning Policy (SPP) including subject policy relating to Energy Infrastructure and Promoting Sustainable Transport and Active Travel;
- Planning Advice Note 75: Planning for Transport;
- Regional Transport Strategies (Nestrans and Hitrans);
- Aberdeenshire Local Transport Strategy 2012; and
- The Second Moray Local Transport Strategy 2011.

9.2.1.2 A more detailed overview of applicable planning policies is provided in Section 3: Policy, Legislation and Guidance of Technical Appendix 9.1: Transport Assessment, and also Chapter 4: Planning Policy Context of the EIA Report.

9.2.2 Scope of Assessment

9.2.2.1 Moray Offshore Windfarm (West) Limited (Moray West) issued an Environmental Impact Assessment (EIA) Scoping Report for the OnTI in June 2017. This used a study area that included the following roads:

- A98 (main road);
- A942 (minor road);
- A96 (trunk road); and
- A95 (trunk road).

9.2.2.2 The baseline presented within the OnTI Scoping Report described these roads plus the walking, cycling and public transport opportunities within the Scoping Study Area. The potential effects of the construction, operation and decommissioning phases of the OnTI was set out. It was determined that the construction phase will represent the realistic worst case scenario in traffic and transport terms.

9.2.2.3 The onshore substation will not be permanently staffed. However, a small number of staff will make regular visits to carry out routine checks and maintenance. Occasional access will also be required at joint bays along the onshore cable circuits. It was considered likely that operational effects will not be significant and so it was proposed that they be scoped out of any detailed assessment. A discussion regarding decommissioning effects is provided in Section 9.5.3.

9.2.2.4 The Scoping Report proposed a methodology for estimating future year traffic flows and reviewing the road safety record. The assessment methodology proposed was taken from GEART.

9.2.2.5 In its OnTI Scoping Opinion (August 2017), Aberdeenshire Council (AC) was satisfied that the assessment proposals included core paths and wider transport and traffic issues. It was also agreed that the operational effects of the OnTI could be scoped out.

9.2.2.6 Moray Council's (MC) Scoping Opinion (August 2017) stated that a PCTMP will be essential for dealing with abnormal loads and wear and tear agreements on key roads.

Consultation

9.2.2.7 The methodology of assessment for the OnTI (including the preparation of a TA, a PCTMP, an Abnormal Indivisible Loads (AIL) study and the EIA Report chapter) was developed through consultation with Moray Council (MC), Aberdeenshire Council (AC) and Transport Scotland. E-mail consultation was undertaken during November 2017; Table 9.2.1 sets out a summary of consultation responses.

Table 9.2.1: Consultation

Date	Consultee	Issued Raised	Moray West Approach
November 2017	Transport Scotland	Transport Scotland would be satisfied with an EIA Report chapter which identifies the potential traffic impacts of the OnTI and associated environmental impacts. It was also commented that the potential environmental impacts only require to be assessed where: • Traffic flows will increase by more than 30 %, or • The number of Heavy Good Vehicles (HGV) will increase by more than 30 %, or • Traffic flows will increase by 10 % or more in sensitive areas. Transport Scotland would accept the use of either Trip End Model Program (TEMPRO) 7.2 or National Road Traffic Forecasts (NRTF). The PCTMP and AIL study proposed methodologies and scopes confirmed as acceptable. Transport Scotland considers that the production of a robust PCTMP which has a section covering workforce travel will suffice and, therefore, did not consider that a Travel Plan would be necessary.	The EIA has been undertaken as proposed; the methodology is set out in Section 9.2.4. TEMPRO 7.2 has been used in establishing baseline and future baseline traffic flows (see Section 9.3.8). A PCTMP and an AIL study are included in Technical Appendices 9.2 and 9.3 respectively.

9.2.3 Data Gathering

Study Area

9.2.3.1 A visual overview of the planning application boundary (PAB), the study area utilised for the transport study and the key local and national roads are set out as Figure 9.2.1.

9.2.3.2 The PAB for the OnTI is located in both AC and the MC administrative areas. The study area extends from the A98 / A96 junction near Fochabers in the west to the B9022 in the east and from the coast in the north to the A96 just north of Cairnie in the south as clearly shown in Figure 9.2.1. The study area covers the key local road network which is likely to be affected by traffic associated with the OnTI.

Desk Study / Field Survey

Site Visit

9.2.3.3 A site visit was undertaken on 17, 18 and 19 October 2017. During the site visit extensive observations were taken of the road network throughout the study area. Each road was visually assessed for its appropriateness to serve as a construction access for the OnTI. The road widths, surfacing, availability of passing places, location of sensitive receptors and any potential safety concerns were identified and logged on a Geographic Information System (GIS) base.

Accident Data

9.2.3.4 Records of Personal Injury Accidents (PIA) have been obtained from AC and MC for the five year period from 2013 to 2017 for the study area. The accident study area and the location of all recorded accidents is shown in Figure 9.2.2 and covers all of the identified key study links and junctions. The full accident records received from AC and MC are available on request.

Traffic Surveys

9.2.3.5 As part of the assessment and to understand the existing traffic conditions within the area, Nationwide Data Collection was commissioned to undertake a series of unattended Automatic Traffic Counts (ATCs). A random week was chosen during school term time for the survey and this resulted in a start day of Thursday 23 November 2017 and an end day of Wednesday 29 November 2017.

9.2.4 Evaluation of Effects

Sensitivity of Receptor

9.2.4.1 The initial screening approach to assessing the environmental impacts of road traffic associated with new developments is within GEART. GEART provides a framework for the assessment of traffic borne environmental impacts, such as pedestrian severance and amenity, driver delay, accidents and safety, noise and vibration and air quality. Any potential noise, vibration or air quality effects are considered in Chapter 10: Noise and Vibration and Chapter 11: Air Quality.

9.2.4.2 GEART suggests the following rules to define the extent and scale of the assessment required:

- Rule 1 – Include roads where traffic flows are predicted to increase by more than 30 % (or where the number of HGVs is predicted to increase by more than 30 %); and
- Rule 2 – Include any specifically sensitive areas where traffic flows are predicted to increase by 10 % or more.

9.2.4.3 Once receptors have been identified they are assigned a level of sensitivity according to the population exposed to each impact. This is on a scale of high (e.g. at a regional or higher level), moderate (e.g. at a district level) or low (e.g. only local populations).

Magnitude of Impact

9.2.4.4 Impact magnitude will be determined according to the criteria set out in Table 9.2.2.

Table 9.2.2: Determining Magnitude of Impact

Transport Effect	High	Moderate	Low	Negligible
Driver delay	Change in total traffic or HGV flows over 90 %.	Change in total traffic or HGV flows of 60 % to 90 %.	Change in total traffic or HGV flows of 30 % to 60 %.	Change in total traffic or HGV flows of less than 30 %.
Pedestrian amenity and pedestrian severance	Change in total traffic or HGV flows over 90 %. And / or Where there will be a temporary maximum increase in pedestrian journey length of 500 m or more along a road or other public right of way for more than 6 months over a 12 month period.	Change in total traffic or HGV flows of 60 % to 90 %. And / or Where there will be a temporary maximum increase in pedestrian journey length of 250 m to 500 m along a road or other public right of way for 3-6 months over a 12 month period.	Change in total traffic or HGV flows of 30 % to 60 %. And / or Where there will be a temporary increase in pedestrian journey length of up to 250 m along a road or other public right of way for between 1-3 months over a 12 month period.	Change in total traffic or HGV flows of less than 30 %. And Where there will be no temporary increase in pedestrian journey length.
Core paths	Change in total traffic or HGV flows over 90 %. And / or Where there will be a temporary maximum increase in pedestrian journey length of 500 m or more along a road or other public right of way for more than 6 months over a 12 month period.	Change in total traffic or HGV flows of 60 % to 90 %. And / or Where there will be a temporary maximum increase in pedestrian journey length of 250 m to 500 m along a road or other public right of way for 3-6 months over a 12 month period.	Change in total traffic or HGV flows of 30 % to 60 %. And / or Where there will be a temporary increase in pedestrian journey length of up to 250 m along a road or other public right of way for between 1-3 months over a 12 month period.	Change in total traffic or HGV flows of less than 30 %. And Where there will be no temporary increase in pedestrian journey length.
Public transport delay	Change in total traffic or HGV flows over 90 %. And / or Any change to total journey times by public transport of more than 80 % lasting for more than four weeks in any 12 month period.	Change in total traffic or HGV flows of 60 % to 90 %. And / or Any change to total journey times by public transport of 60 % to 80 % lasting for more than four weeks in any 12 month period.	Change in total traffic or HGV flows of 30 % to 60 %. And / or Any change to total journey times by public transport of 40 % to 60 % lasting for more than four weeks in any 12 month period.	Change in total traffic or HGV flows of less than 30 %. And / or Any change to total journey times by public transport of 20 % to 40 % lasting for more than four weeks in any 12 month period.

9.2.4.5 In addition to the criteria set out above, another possible transport effect is 'accidents and road safety'. The magnitude of impact will be determined as major if there is any predicted increase in accidents / reduction in road safety as a result of the OnTI.

Significance of Effect

9.2.4.6 For the purposes of this assessment, judging the significance of an effect is based on professional judgement taking account of the relationship between the magnitude of impact and the EIA sensitivity of the receptor, or road link affected (as opposed to the GEART sensitivity).

9.2.4.7 The matrix of outcomes based on receptor sensitivity and impact magnitude is presented in Table 9.2.3. Effects that are assessed as major or moderate / major are considered significant.

Table 9.2.3: Establishing Significance of Effect

Magnitude of Impact	Sensitivity		
	Low	Moderate	High
Negligible	Negligible	Minor / Negligible	Minor
Low	Minor	Minor / Moderate	Moderate
Moderate	Minor / Moderate	Moderate	Moderate / Major
High	Moderate	Moderate / Major	Major

9.3 Baseline Conditions

9.3.1.1 Further details of the baseline conditions are presented in Chapter 4: Existing Conditions of Technical Appendix 9.1: Transport Assessment. This section provides a summary of those findings.

9.3.2 National and Local Road Networks

9.3.2.1 Within the study area, both the A95 and A96 are trunk roads and hence are the responsibility of the Scottish Government and Transport Scotland, with all other roads under the jurisdiction of either AC or MC. The roads considered in this assessment are shown in Figure 9.2.1 and the nature of them are as follows:

- A95 – The A95 within the study area is a two-way single carriageway road. The speed limit of this road varies within the residential areas. Outside the residential areas it is subject to the national speed limit (in this case 60 mph);
- A96 – The A96 within the study area is a two-way single carriageway road that passes through Keith. The sections of the A96 within residential areas are subject to either a 30 mph or a 40 mph speed limit, while the rest of the road is subject to the national speed limit (in this case 60 mph);
- B9022 – The B9022 within the study area is a two-way single carriageway road. It is presumed that national speed limit applies as there are no signs to state otherwise, until it reaches the junction at Gordonstown where a 40 mph speed restriction is applied;
- A98 – The A98 within the study area is a two-way single carriageway road. The sections of road within residential areas are subject to either a 30 mph or a 40 mph speed limit. The rest of the A98 is subject to the national speed limit (in this case 60 mph);

- B9018 – The B9018 within the study area is a two-way single carriageway road. The section of this road within the residential area of Lintmill is subject to a 40 mph speed limit, whilst the rest of the road is subject to the national speed limit (in this case 60 mph);
- B9115 – The B9115 within the study area is a narrow two-way road of some 5.5 m. It is assumed that the national speed limit applies, as there are no signs to state otherwise.

9.3.2.2 In addition, there are a number of other C and unnamed / unclassified roads situated in the study area, some of which may be used by OnTI related traffic. These include locations such as Fordyce, Hoggie, Crannach and around Keith connecting to the main roads outlined above.

GEART Sensitivity

9.3.2.3 To undertake the initial sensitivity screening based upon the GEART criteria (Rules 1 and 2: 30 % or 10 %) each receptor has been defined as sensitive or not sensitive based on the nature of the road, its users and the surrounding land uses. This is presented in Table 9.3.1.

Table 9.3.1: Identified Receptors

Receptor Number	Road	Sensitivity	Reasoning
1	A98 near Buckie.	Not considered sensitive.	Agricultural land use adjacent.
2	A98 in Cullen.	Sensitive.	Frontage residences.
3	B9018 near Lintmill.	Sensitive.	Frontage residences.
4	A98 near Sandend.	Not considered sensitive.	Agricultural land use adjacent.
5	A98 in Portsoy.	Sensitive.	Frontage residences.
6	B9022 north of A95.	Not considered sensitive.	Agricultural land use adjacent.
7	B9018 near Berryhillock.	Not considered sensitive.	Agricultural land use adjacent.
8	B9018 near Grange Crossroads.	Sensitive.	Frontage residences and school.
9	A95 near Drumnagorrach.	Not considered sensitive.	Agricultural land use adjacent.
10	A95 east of B9018.	Not considered sensitive.	Agricultural land use adjacent.
11	A96 in Keith.	Sensitive.	Frontage residences.
12	A96 between Fochabers and Keith.	Not considered sensitive.	Agricultural land use adjacent.
13	A95 west of Keith.	Not considered sensitive.	Agricultural land use adjacent.
14	A96 south of Keith.	Not considered sensitive.	Agricultural land use adjacent.

9.3.3 Traffic Surveys

9.3.3.1 As part of the assessment and to understand the existing traffic conditions within the area, Nationwide Data Collection were commissioned to undertake a series of Automatic Traffic Counts (ATC) for a period of one week between Thursday 23 November 2017 and Wednesday 29 November 2017.

9.3.3.2 Figure 9.3.1 shows the location of these traffic counts as follows:

- Site 1 – A98 south of Buckie and west of the A98 / A942 junction;
- Site 2 – A98 Seafield Street in Cullen, south of The Square and Reidhaven Street;
- Site 3 – B9018 within Lintmill;
- Site 4 – A98 south of Sandend and east of Seaview Road;
- Site 5 – A98 Seafield Street in Portsoy between Burnside Street and Shillinghill;
- Site 6 – B9022 between Portsoy and Gordonstown, immediately south of Longmuir farm;
- Site 7 – B9018 at Deskford;
- Site 8 – B9018 south of the Grange Crossroads;
- Site 9 – A95 between Drumnagorrach and Limehillock;
- Site 10 – A95 east of the B9018 / A95 junction;
- Site 11 – A96 Moss Street in Keith, south of Union Terrace;
- Site 12 – A96 between Keith and Fochabers;
- Site 13 – A95 between Keith and Mulben; and
- Site 14 – A96 east of the B9115 / A96 junction at Edintore.

9.3.3.3 The ATC for site 4 was resurveyed between Friday 01 December 2017 and Thursday 07 December 2017 as the original count was unavailable for interpretation. This is usually due to a fault with the software or counting tube.

9.3.3.4 This information provides base network flows which have been used to inform the calculation of future year traffic flows. Further details are presented in Section 4: Existing Conditions Technical Appendix 9.1: Transport Assessment.

9.3.3.5 The results of the traffic surveys undertaken on each of these roads are presented in Table 9.3.2 below.

Table 9.3.2: Surveyed Two-way 24-Hour Traffic Flows (all vehicles and HGV)				
Receptor Number	**Road**	**24 Hour All Vehicles AADT***	**24 Hour HGV**	**% HGV**
1	A98 near Buckie.	8,629	928	11 %
2	A98 in Cullen.	6,008	636	11 %
3	B9018 near Lintmill.	730	109	15 %
4	A98 near Sandend.	4,361	756	17 %
5	A98 in Portsoy.	5,172	635	12 %
6	B9022 north of A95.	1,009	124	12 %
7	B9018 near Berryhillock.	516	92	18 %
8	B9018 near Grange Crossroads.	843	116	14 %
9	A95 near Drumnagorrach.	1,298	227	17 %
10	A95 east of B9018.	2,060	336	16 %
11	A96 in Keith.	15,441	1,065	7 %
12	A96 between Fochabers and Keith.	7,997	1,190	15 %
13	A95 west of Keith.	1,878	375	20 %
14	A96 south of Keith.	8,175	1,408	17 %

*AADT – Annual Average Daily Traffic

9.3.4 Public Transport Network

9.3.4.1 Four bus services have been identified which use the road network within the study area which may also be used by the construction traffic. The bus routes identified which can be described as follows:

- The bus service 35 – Elgin – Banff – Turriff – Aberdeen. The bus service runs every 30 minutes from Monday to Friday, and continues more intermittently on a Saturday and Sunday;
- The bus service 10 – Inverness - Elgin – Huntly – Inverurie – Aberdeen. This bus service runs once an hour from Monday to Sunday;
- The bus service 405 – Cullen – Cornhill – Macduff. The bus service is run once a day on Monday, Tuesday and Thursday and twice a day on Wednesday and Friday. It does not run on weekends;
- The bus service 365 – Tomintoul – Dufftown – Keith. This bus service is run once a day on Tuesdays, Thursdays and Fridays. It does not run on weekends.

9.3.4.2 The closest railway station to the PAB is at Keith and is served Mondays to Saturdays with trains running approximately every two hours in each direction, westbound to Inverness and eastbound to Inverurie and Aberdeen. There is a single early morning through service to Dundee and Edinburgh Waverley eastbound, which returns in the evening. Five trains each way run on Sundays. One of the Aberdeen bound trains continues to Glasgow Queen Street. The proposed cable corridor crosses the railway line east of Keith, south of the A95 and River Isla infrastructure.

9.3.5 Core Paths

9.3.5.1 In Aberdeenshire, three Core Paths have been identified within the study area that may be affected by the OnTI:

- A path that runs between Banff and Lintmill via Fordyce and Portsoy (National Cycle Network (NCN) 1;
- A path connecting Fordyce and Cullen via Sandend; and
- A path connecting Portsoy to Sandend.

9.3.5.2 In Moray, there are several Core Paths within the study area, with many of the paths concentrated in and around settlements. Some of these may be affected by the OnTI. The Core Paths identified are listed in Table 9.3.3. In addition to these named paths, the Core Paths plan maps may also identify some unnamed promoted paths.

Table 9.3.3: Moray Core Paths within the Study Area

Location	Core path number	Description	Length	Intersection
Cullen	CU03	NCN 1 – Cullen to Lintmill.	2.1 km	Shares the B9018.
Cullen	CU05	Crannoch circular path (starts and finishes in Cullen square).	2.4 km	Crosses the A98.
Buckie	BK03	Laird's Way.	3 km	Crosses the A98.
Keith	KT03	Balloch Wood Path.	7.5 km	Does not cross any public road.
Keith	KT04	Auchoynanie Path.	1.8 km	Crosses Edindiach Road at Keith.
Keith	KT06	Den Path.	1.3 km	2 Public road crossing points (unnamed roads).
Keith	KT07	Green Roadies Path.	2.8 km	Crosses the A95.
Keith	KT08	Town Centre Link.	1.3 km	Crosses the A96.

9.3.5.3 Figure 9.3.2 shows the routes of the Core Paths.

9.3.6 Cycling

9.3.6.1 There is one NCN route that crosses the study area. Between Portsoy and Port Knockie, the NCN 1 runs roughly parallel to the A98, via Fordyce and Lintmill, using both on-road and off-road cycleways. A short section of this route also runs on the A98.

9.3.6.2 In addition to the NCN 1, there are local cycle routes that could be potentially affected by construction traffic, these include local routes at Sandend, Fordyce and Portsoy. These are also shown on Figure 9.3.2.

9.3.7 Accident Data

9.3.7.1 Records of Personal Injury Accidents (PIA) have been obtained from AC and MC for the five year period from 2013 to 2017 for the study area.

9.3.7.2 The accident study area and the location of all recorded accidents is shown in Figure 9.2.2 and covers all of the identified key study links and junctions. The full accident records received from AC and MC are available on request.

9.3.7.3 It is important to review the locations and causation factors for each accident that has occurred over recent years within the study area. This can identify trends and numbers of accidents,

which should highlight any specific location(s) with a high incidence and where increases in traffic flow could exacerbate the issue.

9.3.7.4 The data indicates that 78 accidents have occurred on the local road network within the study area over the five year period. Table 9.3.4 presents a summary of the accident data according to location and severity (fatal / serious / slight). Of the total accidents recorded, some involved Heavy Goods Vehicles (HGV) and / or vulnerable road users (i.e. pedestrians, cyclists and motorcyclists) and this information is provided in the last two columns.

Table 9.3.4: Summary of Accident Records Between 2013 and 2017

Road	Total Records	Fatal	Serious	Slight	Vulnerable	HGVs
A98 – between Fochabers and Cullen.	19	1	8	10	2	0
A98 – between Cullen and Portsoy.	8	3	2	3	2	0
A95 – between Cornhill and Keith.	13	0	1	12	0	0
A96 – at Keith.	24	1	9	14	8	4
A96 – between Keith and Huntley.	6	0	2	4	0	0
B9018.	3	0	1	2	1	0
B9022.	5	0	1	4	0	0
Total	**78**	**5**	**24**	**49**	**13**	**4**

9.3.7.5 Analysis of the accident records is included within Technical Appendix 9.1: Transport Assessment (Chapter 4: Existing Conditions). By way of a summary, the analysis indicates that there are numerous accidents across the study area over the last 5 years. It is considered that these accidents are within normal parameters for trunk, A and B roads and assessment of the clusters of accidents on these links has shown that driver error is the predominate cause of accidents. No clusters of accidents involving vulnerable road users were identified on these routes.

9.3.7.6 In summary, the accident assessments set out above do not indicate any locations where accidents may be made worse by the OnTI traffic. All construction traffic will be routed to site, and instructions given on how to drive through the local area as set out in the PCTMP.

9.3.8 Future Baseline

9.3.8.1 2023 is considered to be the most appropriate year of assessment as it is when the highest levels of construction traffic will be on the network. To establish the 2023 future baseline, the 2017 baseline traffic flows have been factored by background traffic growth. The growth rates have been developed based on the National Trip End Model (NTEM) growth rates extracted from the Department for Transport's (DfT) TEMPRO 7.2 software for the Scotland and Moray area. The daily background traffic growth expected between 2017 and 2023 has been calculated as 1.0528 total vehicles.

9.3.8.2 Table 9.3.5 sets out the forecast 2023 two-way 24-hour traffic flows for all vehicles and HGV (without OnTI) at each receptor location considered as part of the assessment. As anticipated, the data in the table show increased traffic flows compared with the surveyed traffic volumes.

Table 9.3.5: 2023 Two-way 24-Hour Traffic Flows (all vehicles and HGV)				
Receptor Number	**Road**	**24 Hour All Vehicles AADT***	**24 Hour HGV**	**% HGV**
1	A98 near Buckie.	9,085	977	11 %
2	A98 in Cullen.	6,325	670	11 %
3	B9018 near Lintmill.	769	115	15 %
4	A98 near Sandend.	4,591	796	17 %
5	A98 in Portsoy.	5,445	669	12 %
6	B9022 north of A95.	1,062	131	12 %
7	B9018 near Berryhillock.	543	97	18 %
8	B9018 near Grange Crossroads.	888	122	14 %
9	A95 near Drumnagorrach.	1,367	239	17 %
10	A95 east of B9018.	2,169	354	16 %
11	A96 in Keith.	16,256	1,121	7 %
12	A96 between Fochabers and Keith.	8,419	1,253	15 %
13	A95 west of Keith.	1,977	395	20 %
14	A96 south of Keith.	8,607	1,482	17 %

*AADT – Annual Average Daily Traffic

9.3.9 Data Limitations

9.3.9.1 The construction methodology and programme has been generated based on previous project experience and may change during the detailed design and planning processes, or following the appointment of a contractor. The final locations of construction accesses and compounds are still to be determined and this will impact the number of vehicle trips generated. The origins and destinations of materials, plant and employees are also likely to vary from the assumptions made thus impacting on the construction routes chosen. Finally, other infrastructure may be included within the OnTI that has not be accounted for. In most cases a series of realistic and robust assumptions have been made resulting in a cautious assessment.

9.4 Embedded Mitigation

9.4.1.1 Where possible, mitigation measures will be embedded into the design of the OnTI. Measures considered embedded by this assessment include the following:

- Selection of suitable access points and optimum routes and times for construction traffic movements will be part of the construction methodology;
- Reducing disruption to traffic in built up areas and along key pinch points through the adoption of haul routes and the use of Horizontal Directional Drilling (HDD) to install the cable circuits beneath major transport routes;
- Consolidating HGV and employee movements at a consolidation area close to a main road (such as at the construction compounds) to reduce vehicle movements along more sensitive local routes;
- Implementation of a CTMP and Travel Plan to manage road works, employee and HGV movements. The plans will also set out sensitive times to be avoided, which routes to use and strategies to continually monitor and enforce;

- Management measures to limit the impacts on Core Paths and cycle routes; and
- Repairing any damage caused to existing roads due to construction traffic movements.

9.5 Assessment of Potential Effects

9.5.1 Estimation of Construction Traffic Volumes

9.5.1.1 Further details of the methodology used and assumptions made to establish OnTI construction traffic flows are presented in Sections 6 and 8 of Technical Appendix 9.1: Transport Assessment. These chapters relate to trip generation, distribution and assignment to the local road network. Below is a summary of those findings.

Construction Traffic Generation

9.5.1.2 Details of each traffic generating construction activity associated with the OnTI are set out below along with the resultant traffic generation. Traffic generation is presented in Figures 9.5.1 to 9.5.3 as weekly traffic flows for each activity during the construction programme. The estimated overall construction duration of the OnTI is approximately 30 months. As a basis of assessment, a 30 month programme has been used starting in week one commencing April 2022 and running to the end of September 2024.

9.5.1.3 As a sensitivity test, a 24 month construction period has been considered where the onshore cable circuit works commence immediately after the construction at the Onshore Landfall Area. If this were to occur then the number of vehicle movements per day during the most intensive working week would increase from 744 vehicle movements per day to 746 vehicle movements per day across the whole study area. It is considered that this change is negligible and therefore the analysis that follows remains valid.

Construction at the Onshore Landfall Area

9.5.1.4 Construction at the Onshore Landfall Area is anticipated to need some 1,180 two-way[1] construction movements (590 inbound and 590 outbound) over a 23 week construction period. Of the 1,180 two-way construction movements, 730 two-way movements (365 inbound and 365 outbound) will be staff vehicle movements.

Construction Compound Works

9.5.1.5 The establishment of a main compound and three satellite compounds are assumed as a worst case to generate the same number of trips. This results in a requirement for 128 two-way HGV movements and two, two-way crane movements over a two week construction period at each compound location.

9.5.1.6 It is anticipated that 56 two-way staff vehicle movements (26 inbound and 26 outbound) will be required to construct each of the compounds and, in addition, there will be a requirement for permanently staffing each of the compound locations for security.

9.5.1.7 It is likely that three members of permanent staff will be required at each compound during its lifetime, resulting in six two-way staff vehicle movements (three inbound and three outbound) per day, seven days a week over a 78 week construction period.

Cable Circuits Haul Route Construction

9.5.1.8 The aggregate haul route is anticipated to require approximately 92,530 tonnes of aggregate which equates to approximately 4,649 HGV deliveries (9,298 HGV two-way movements) for its construction over a 35 week construction period.

[1] The number associated with a 'two-way vehicle movement' is the sum of the number of inbound trips and returning outbound trips.

9.5.1.9 It has been assumed that the security fencing will be delivered via the relevant compound in 12 HGV vehicles per week throughout the construction of the haul route (35 weeks). This results in a total of 840 two-way movements between the supplier and the compound and 564 two-way movements between the compounds and the working width.

Cable Circuits Materials Deliveries

9.5.1.10 Cable ducts, sand, limestone dust and cables would be delivered to the compounds for the installation of the cable circuits.

9.5.1.11 There is a requirement for approximately 175 km of cable ducts. It is anticipated that there will be a total of 234 two-way movements between the supplier and the compound and 110 two-way movements between the compounds and the working width over a 20 week construction period.

9.5.1.12 It is assumed that there will be a requirement for approximately 67,290 tonnes of sand to support the cable ducts. It is anticipated that there will be a total of 6,730 two-way movements between the supplier and the compound and 4,458 two-way movements between the compounds and the working width over a 20 week construction period.

9.5.1.13 There is also a requirement for approximately 175 km of cable. It is anticipated that there will be a total of 78 two-way movements between the supplier and the compound and 86 two-way movements between the compounds and the working width over a 20 week construction period.

Cable Circuits Civil Works, Joint Bays and Cable Installation

9.5.1.14 For the purposes of assessment, it has been assumed that 76 joint bays will be required (or one every 750m along the route of the onshore cable circuits), which will be accessed via the haul route. Each joint bay will require 11 deliveries (22 HGV two-way movements) of concrete which are assumed to arrive direct from local suppliers plus four ancillary HGV deliveries per day. As such 1,218 HGV deliveries or 2,436 two-way total HGV movements will be generated over a 20 week construction period.

Horizontal Directional Drilling

9.5.1.15 For the purposes of assessment, it has been assumed that HDD activities will occur at 14 locations in addition to the Onshore Landfall Area, including crossings of the major / main roads, the River Isla and Aberdeen – Inverness railway line.

9.5.1.16 Over the course of the HDD works, this results in 480 two-way HGV movements (240 inbound and 240 outbound) for equipment removal and delivery, 1,408 two-way staff trips (704 inbound and 704 outbound) between the lodgings and compound and 288 two-way staff van trips (144 inbound and 144 outbound) between the compound and working width over a 20 week construction period.

Cable Circuits Construction Staff

9.5.1.17 Experience from similar projects has shown that some 100 construction staff per day may be required in each phase of the works. For the purpose of this assessment it has been assumed that 100 construction staff will be present on site each day as this represents a worst case scenario. It is anticipated that further staff will be required to construct infrastructure at the Onshore Landfall Area and the onshore substation. In this geographical location is assumed that 63 staff cars (carrying 100 construction workers) will arrive at the relevant compound and depart for the working width in 20 vans every morning. The return journeys are assumed to be undertaken in the evening.

9.5.1.18 With cable circuit installation expected to take approximately 18 months, this equates to 46,142 two-way staff trips (23,071 inbound and 23,071 outbound) between the lodgings and compound

and 14,892 two-way staff van trips (7,446 inbound and 7,446 outbound) between the relevant compound and working width over a 69-week construction period.

Reinstatement Works

9.5.1.19 Reinstatement of the construction areas will be the reverse of the establishment works (i.e. those required for the construction compounds and haul route). This includes the 'realistic worst case' assumption that all aggregate required is removed from site.

Onshore Substation Construction

9.5.1.20 It is anticipated that there will be 169,112 two-way construction movements (84,556 inbound and 84,556 outbound) associated with the construction of the substation over a 100 week construction period. Of the 169,112 two-way construction movements, some 165,000 will be staff vehicles (82,500 inbound and 82,500 outbound).

Traffic Generation Summary

9.5.1.21 The anticipated traffic numbers for each element noted have been amalgamated to understand the overall impact on each road link during various times throughout the construction programme.

9.5.1.22 Three weeks have been identified when the combined traffic flows across the study area network will be at their highest (weeks 76, 80 and 85 during the third quarter of construction) and these are considered below.

9.5.1.23 Week 76 includes the installation phase at the onshore substation site, the construction of the haul route just north of the A95 and underground civil works, cable installation and HDD near Deskford.

9.5.1.24 During this week, 4,088 two-way construction vehicle movements are anticipated and of this, 1,278 two-way HGV movements could be expected across the study area network. Whilst these vehicle movements present the peak during a single week, a similar (if slightly lower) volume of construction traffic could be expected in weeks 77, 78 and 79 as the same activities are occurring.

9.5.1.25 Week 80 also includes the installation phase at the onshore substation, the construction of the haul route north of the A96 and civil works, cable installation and HDD near Crannock.

9.5.1.26 During this week, 4,094 two-way construction vehicle movements are anticipated and of this, 1,266 two-way HGV movements could be expected across the study area network. Whilst these vehicle movements present the peak during a single week, a similar (if slightly lower) volume of construction traffic could be expected for in weeks 81 and 82 as the same activities are occurring.

9.5.1.27 Week 85 includes the commissioning phase of the onshore substation, construction of the haul route south of the River Isla and underground civil works, cable installation and HDD south of the River Isla.

9.5.1.28 During this week 4,000 two-way construction vehicle movements are anticipated and of this, 1,188 two-way HGV movements could be expected across the study area network.

Construction Traffic Distribution

9.5.1.29 To determine the origins and destinations of the construction traffic, the following assumptions have been made relating to anticipated delivery routes and staff routes. These include:

- Concrete, stone, sand and limestone dust from the Breedon Boyne Bay Quarry, east of Portsoy which will access the study area via the A98 (east);
- All other materials and plant are likely to be sourced from Elgin and the surrounds and, as such, will access the study area via the A96 (west);

- All security, cable and HDD staff are anticipated to source lodging west of the study area and, as a result, will also access the study area from the A96 (west); and
- It has been assumed that all materials, plant and staff for both the Onshore Landfall Area and onshore substation site will arrive at site 50 % from the east via the A98 and 50 % from the west via the A96.

9.5.1.30 The construction traffic routes proposed are presented in Figure 9.5.4.

Construction Traffic Assignment

9.5.1.31 By taking the peak weeks traffic generation (Weeks 76, 80 and 85), the likely origins and destinations and the preferred construction routes, the OnTI construction traffic can be assigned to the local road network. Figures 9.5.5 to 9.5.7 present the anticipated weekly construction traffic flows from Weeks 76, 80 and 85 respectively assigned to the local road network within the study area.

9.5.1.32 Table 9.5.1 presents the future baseline traffic flows, the highest of the weekly traffic flows presented in Figures 9.5.5 to 9.5.7, the subsequent highest daily flows (assuming the construction teams work 5.5 days per week) and the resultant future baseline with OnTI construction traffic.

Table 9.5.1: Future Baseline Traffic Flows Without and With OnTI

Receptor Number	Location	2023 Future Baseline Traffic Flows AADT	The Highest Average Weekly Flow During Construction	The Highest Average Daily Flow During Construction AADT	2023 Future Baseline with OnTI AADT
1	A98 near Buckie.	9,085	586[1]	107[1]	9,191
2	A98 in Cullen.	6,325	586[1]	107[1]	6,432
3	B9018 near Lintmill.	769	715[1]	130[1]	898
4	A98 near Sandend.	4,591	524[2]	95[2]	4,687
5	A98 in Portsoy.	5,445	524[2]	95[2]	5,540
6	B9022 north of A95.	1,062	1,600[3]	291[3]	1,353
7	B9018 near Berryhillock.	543	715[1]	130[1]	673
8	B9018 near Grange Crossroads.	888	535[2]	97[2]	985
9	A95 near Drumnagorrach.	1,367	1,600[3]	291[3]	1,658
10	A95 east of B9018.	2,169	1,600[3]	291[3]	2,460
11	A96 in Keith.	16,256	3,285[3]	597[3]	16,854
12	A96 between Fochabers and Keith.	8,419	1,768[3]	322[3]	8,741
13	A95 west of Keith.	1,977	0	0	1,977
14	A96 south of Keith.	8,607	3,285[3]	597[3]	9,204

1 – Traffic flows taken from week 76, 2 – Traffic flows taken from week 80, 3 – Traffic flows taken from week 85.

9.5.2 Construction Phase Assessment

Sensitivity of Receptor

9.5.2.1 To calculate the predicted effects of the construction of the OnTI and their significance, comparison of the traffic flows during the worst construction week are shown in Table 9.5.2.

9.5.2.2 The rows in bold identify those receptors where the thresholds in GEART Rules 1 and 2 are exceeded and consequently further assessment is required.

Table 9.5.2: Predicted Percentage Impact During Construction

Receptor Number	Road and Sensitivity Not Sensitive (NS) Sensitive (S)	2023 Future Baseline		2023 with OnTI		% Change	
		All Veh	HGV	All Veh	HGV	All Veh	HGV
1	A98 near Buckie (NS)	9,085	977	9,191	986	1%	1 %
2	A98 in Cullen (S)	6,325	670	6,432	679	2%	1 %
3	**B9018 near Lintmill (S)**	**769**	**115**	**898**	**217**	**17%**	**89 %**
4	A98 near Sandend (NS)	4,591	796	4,687	891	2%	12 %
5	A98 in Portsoy (S)	5,445	669	5,540	764	2%	14 %
6	**B9022 north of A95 (NS)**	**1,062**	**131**	**1,353**	**264**	**27%**	**102 %**
7	**B9018 near Berryhillock (NS)**	**543**	**97**	**6,73**	**199**	**24%**	**105 %**
8	**B9018 near Grange Crossroads (S)**	**888**	**122**	**985**	**125**	**11%**	**2 %**
9	**A95 near Drumnagorrach (NS)**	**1,367**	**239**	**1,658**	**373**	**21%**	**56 %**
10	**A95 east of B9018 (NS)**	**2,169**	**354**	**2,460**	**487**	**13%**	**38 %**
11	A96 in Keith (S)	16,256	1,121	1,6854	1,270	4%	13 %
12	A96 between Fochabers and Keith (NS)	8,419	1,253	8,741	1,268	4%	1 %
13	A95 west of Keith (NS)	1,977	395	1,977	395	0%	0 %
14	A96 south of Keith (NS)	8,607	1,482	9,204	1,631	7%	10 %

9.5.2.3 The percentage impact shown in Table 9.5.2 predicts that there will be an increase in total traffic or HGV during construction of more than 30 % on Receptors 3, 6, 7, 9 and 10 and there will be an increase in total traffic of more than 10% on Receptor 8, a sensitive receptor. Therefore a formal assessment based on Chapter 9.2.4 is required of these receptors.

9.5.2.4 The EIA sensitivity of receptor criteria based on the population exposed (set out in Paragraph 9.2.4.3) can be applied to each identified receptor. This results in the following sensitivity:

- Receptor 3 – Low sensitivity due to only local populations exposed;
- Receptor 6 – Low sensitivity due to only local populations exposed;
- Receptor 7 – Low sensitivity due to only local populations exposed;
- Receptor 8 – Low sensitivity due to only local populations exposed;

- Receptor 9 – Low sensitivity due to only local populations exposed;
- Receptor 10 – Low sensitivity due to only local populations exposed;

Magnitude of Impact

9.5.2.5 The magnitude of impact criteria set out in Table 9.2.2 can be applied to each identified receptor. This results in the following impact presented in Table 9.5.3.

Table 9.5.3: Magnitude of Impact for Receptors 3,6,7,9 and 10

Transport Effect	Receptors						Overall
	3	6	7	8	9	10	
Driver delay	Moderate	High	High	Negligible	Low	Low	**High**
Pedestrian amenity and pedestrian severance	Moderate	High	High	Negligible	Low	Low	**High**
Core Paths	Moderate	N/A	N/A	Negligible	N/A	N/A	**Moderate**
Accidents and road safety	Low	Low	Low	Low	Low	Low	**Low**
Public transport delay	N/A	N/A	N/A	Negligible	N/A	N/A	**N/A**
Overall	**Moderate**	**High**	**High**	**Low**	**Low**	**Low**	

Significance of Effect

9.5.2.6 Paragraphs 9.2.4.3 and 9.2.4.7 plus Tables 9.2.2 and 9.2.3, outline the criteria and matrix for evaluating the significance of effect, where a major or a moderate / major outcome is considered significant.

9.5.2.7 For receptor 3 on the B9018 near Lintmill, the magnitude of impact from Table 9.5.3 is **moderate** and the sensitivity of the population exposed to the impact is considered to be **low (local populations)**. Therefore, the significance of effect is **minor / moderate (not significant)**.

9.5.2.8 For receptor 6 on the B9022 north of the A95, the magnitude of impact from Table 9.5.3 is **high** and the population exposed to the impact is considered to be **low (local populations)**. Therefore, the significance of effect is **moderate (not significant)**.

9.5.2.9 For receptor 7 on the B9018 near Berryhillock, the magnitude of impact from Table 9.5.3 is **high** and the population exposed to the impact is considered to be **low (local populations)**. Therefore, the significance of effect is **moderate (not significant)**.

9.5.2.10 For receptor 8 on the B9018 near Grange Crossroads (S), the magnitude of impact from Table 9.5.3 is **low** and the population exposed to the impact is considered to be **low (local populations)**. Therefore, the significance of effect is **minor (not significant).**

9.5.2.11 For receptor 9 on the A95 near Drumnagorrach, the magnitude of impact from Table 9.5.3 is **low** and the population exposed to the impact is considered to be **low (local populations)**. Therefore, the significance of effect is **minor (not significant)**.

9.5.2.12 For receptor 10 on the A95 east of B9018, the magnitude of impact from Table 9.5.3 is **low** and the population exposed to the impact is considered to be **low (local populations)**. Therefore, the significance of effect is **minor (not significant)**.

9.5.2.13 Based on the above outcomes none are considered significant.

9.5.3 Decommissioning Phase

9.5.3.1 After the lifetime of the Moray West Offshore Wind Farm (assumed to be up to 50 years), it is possible that the onshore substation may be retained and not decommissioned. However, in accordance with the Scoping Report and Scoping Opinion, the most likely decommissioning scenario for the OnTI is also considered here.

9.5.3.2 As noted in Chapter 2: The Proposed Development, in the event of decommissioning, the most likely scenario is that all underground infrastructure will remain in-situ, with only the onshore substation site being cleared at the surface and reinstated. It is therefore likely that the traffic generated by decommissioning of the OnTI will be considerably less than that generated by its construction. Consequently, the magnitude of any impacts will be less and **no significant effects** are predicted.

9.6 Additional Mitigation and Enhancement Measures

9.6.1.1 As none of the outcomes are considered significant, additional mitigation is not considered necessary at this stage. The embedded mitigation outlined in Section 9.4 contains industry standard approaches, procedures and methodologies that are proposed to be included within construction of the OnTI and hence the traffic and transport outcomes are not significant.

9.7 Residual Effects

9.7.1.1 Table 9.7.1 presents the outcome of the assessment described above and a written rationale for further explanation.

Table 9.7.1: Summary of Assessment						
Potential Effect	**Nature**	**Probability**	**Sensitivity of Receptor**	**Magnitude of Impact**	**Significance of Effect**	**Rationale**
Construction						
Driver delay	Short-term direct	Possible	Low	High	Moderate (Not Significant)	Although traffic flows are predicted to increase temporarily during the construction period, the high percentage change is due to the low levels of traffic currently observed. In all cases, the 2023 traffic flows with OnTI are significantly lower than the theoretical capacity of the road. Therefore, the effects are not considered to be significant.
Pedestrian amenity & pedestrian severance	Short-term direct	Possible	Low	High	Moderate (Not Significant)	With the exception of receptor 3, all other road links that form part of this assessment have no pedestrian infrastructure and are surrounded by land uses where the desire to cross the road will be negligible. Therefore, the effects are not considered to be significant. At receptor 3 in Lintmill, footways are provided and, with residential properties on both sides of the road, crossing is possible. However, estimated future traffic flows with OnTI remain low providing ample crossing opportunities and a 40 mph speed limit is in place which should enable safe crossing. Therefore, the effects are not considered to be significant
Core paths	Short-term direct	Possible	Low	Moderate	Minor / Moderate (Not Significant)	There is one Core Path (CU03) which passes through Lintmill. This will not require a deviation or temporary closure and therefore the effects are not considered to be significant
Public transport delay	N/A	N/A	N/A	N/A	N/A	There are no regular public bus services on the road links that form part of this assessment.

Table 9.7.1: Summary of Assessment						
Potential Effect	**Nature**	**Probability**	**Sensitivity of Receptor**	**Magnitude of Impact**	**Significance of Effect**	**Rationale**
Accidents and road safety	Short-term direct	Possible	Low	Low	Minor (Not Significant)	The accident record for the previous five years does not suggest any inherent road safety or accident concerns. The temporary traffic flow increases during the construction period are not expected reduce road safety. Therefore, the effects are not considered to be significant.
Operation and Maintenance						
Scoped out.						
Decommissioning						
Considered likely to be no greater than construction effects.						

9.8 Assessment of Cumulative Effects

9.8.1.1 As noted in Chapter 3: The Environmental Impact Assessment Process, there are two other proposed developments within 5 km of the PAB, the potential effects of which could be significant when considered cumulatively with those of the OnTI. The proposed developments are Aultmore Wind Energy Project and Lurg Hill Wind Farm. Neither development will be permanently staffed during operation; it is therefore considered that the potential for cumulative traffic and transport effects to arise in combination with the OnTI will be during construction only.

9.8.1.2 A review of the Environmental Statements for both proposed developments reveals that their construction start dates are unknown at the stage and therefore an accurate assessment of cumulative effects is not possible. However, a summary of their potential construction traffic generation is provided in Table 9.8.1.

Table 9.8.1: Other Proposed Developments and Construction Traffic Generation

Proposed Development	Construction Duration	Peak Day Flows (Total Vehicles)	Peak Day Flows (HGV)
Aultmore Wind Energy Project.	10 months.	37 total vehicle trips per weekday.	31 HGV trips per weekday.
Lurg Hill Wind Farm.	6 months.	81 vehicle trips per weekday.	69 HGV trips per weekday.
TOTAL		118 total vehicle trips per weekday.	100 HGV trips per weekday.

9.8.1.3 While there is potential for cumulative effects to occur, in the event that the OnTI is constructed at the same time as the other proposed developments, it is considered improbable the that the days of peak traffic flows will occur simultaneously since route options and peak delivery periods will vary.

9.8.1.4 However, in the unlikely event that all peak construction periods occur at the simultaneously, the percentage impact (reported in Section 9.5.2.3) can be re-calculated with the additional 118 total vehicle trips (including 100 HGV trips). The outcome of this assessment remains unchanged, with receptors 3, 6, 7, 9 and 10 requiring a formal assessment. With only local populations impacted at each receptor the significance of effect will be **moderate** and therefore **not significant**.

9.9 References

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