15. ROADS AND TRAFFIC

15.1 INTRODUCTION

15.1.1 Introduction

This Chapter assesses the effects of the proposed development on roads and traffic. The assessment was undertaken by Halcrow.

In this Chapter, the following definitions have been used:

- Construction Phase – the period of time associated with the site preparation and construction of the development.
- Construction Traffic – vehicles associated with site preparation and supply of plant and equipment, construction materials and labour during the construction phase. All these vehicles are expected to be less than 44 tonnes Gross Vehicle Weight, and operated under normal Construction and Use Regulations.
- Operational Phase – the period of time after construction has been completed, when the development has been commissioned and is producing electricity.
- Goods Vehicles - Light Goods Vehicles (LGV) under 7.5 tonne Gross Vehicle Weight; and Heavy Goods Vehicles (HGV) over 7.5 tonne Gross Vehicle Weight, but under 44 tonne Gross Vehicle Weight, operating within normal Construction & Use (C&U) Legislation. This excludes any vehicles designed or constructed to convey Abnormal Indivisible Loads under Special Types General Orders (1-3) or Special Order Permission Limits (i.e.: the turbines, blades and tower sections).
- Automatic Traffic Counter (ATC) data – traffic volume data undertaken at locations by Transport Scotland and Shetland Islands Council.
- NRTF – National Road Traffic Forecast.
- AADT/F – Annual Average Daily Traffic/Flow.

The assessment is based upon a Transport Statement (Appendix 15.1) which provides more detailed information on construction traffic, and its management. In turn the Transport Statement draws upon an Abnormal Load study (Appendix 15.2), which was commissioned to address the feasibility and requirements of delivering turbine components to the site.

15.2 SCOPE OF ASSESSMENT

15.2.1 Project interactions

There are two phases of development to be considered, the construction period and the operational period.

During construction, vehicles will access the site transporting construction staff, construction materials (aggregates, cement, steel bar etc) and plant items. This phase will involve the greatest number of vehicle movements to and from the site

Once the wind farm is operational, it is envisaged that the amount of traffic associated with the scheme would be minimal. Occasional visits may be made to the site for maintenance checks. The type of vehicle used for these visits is likely to be a Light Goods Vehicle and there may be an occasional need for an HGV to access the site for maintenance and repairs.

15.2.2 Study Area.

The study area comprises the parts of the road network that may be used by construction vehicles accessing the site.

15.2.3 Scoping and consultation

Subsequent to the Scoping Opinion, Halcrow undertook additional consultation, with particular emphasis on those who have a direct involvement or responsibility for roads and structures in the study area. Halcrow's consultation was based upon the requirement that "an initial stage of the EIA process is to consult with relevant third parties who may have a specific interest in roads and traffic matters" in order to:

- Seek their views on issues which they consider to be of specific local importance
- Seek their views on the proposed methodology of assessment; and
- Source any existing relevant information

In particular, Halcrow invited general comments regarding the scope of the intended assessment related to roads and traffic matters. Scoping and consultation response relating to roads and traffic are summarised in Table 15-1: Summary of Consultation Responses.

Table 15-1: Summary of Consultation Responses

Authority	Roads and Traffic Response
Shetland Islands Council	A meeting with Council Officers took place, and agreement regarding the use of the Spine Road network was achieved. Council provided details of Structures and Recent ATC Traffic Flows – refer to Scoping Opinion
Scottish Executive National Roads Directorate	Response from retained consultants, JMP Ltd, detailing the aspects which should be covered. Advice re-iterated in Scottish Executive response to Viking Scoping Study
Northern Constabulary	No specific problems expected, main road was upgraded for Sullom Voe development; roads generally lightly trafficked with little seasonable variation. Recommended scheduling to avoid delaying traffic to inter-island ferry terminals. Have had recent experience with the Burradale windfarm development. No longer required to escort abnormal loads.
Trunk Road Network Management company	Not consulted – no anticipated impact on any Trunk Road infrastructure
Network Rail	Not consulted – no anticipated impact on any railway infrastructures

15.2.4 Effects to be assessed

Table 15-1 presents the potential significant effects identified in scoping and forms the basis of the effects to be assessed in this chapter.

15.2.5 Effects scoped out of assessment

Construction and ongoing effects which have been scoped out of the assessment are presented in Table 15-19. Significant effects are unlikely to arise due to traffic during the operational phase.

Effects arising from the process of decommissioning have been scoped out since they are of a similar nature to construction issues, but of a smaller scale and shorter duration.

15.3 POLICY CONTEXT

15.3.1 Introduction

Three levels of policy regarding Roads and Traffic have been identified:

- National Policy – Scottish Executive White Papers, and policy guidance following from these
- Regional Policy – Regional Transport Strategies devised by the statutory partnerships to co-ordinate transport and expenditure issues at a regional level
- Local Policy – Local authorities are recommended to produce a Local Transport Strategy, which in general terms outlines the authority's policies, objectives and strategies for transport, and indicates how they contribute to national policies and the Road Traffic Reduction Act

15.3.2 National Transport Policy

Scotland's Transport Future, The Scottish Executive, June 2004 is the most recent White Paper relating to transport in Scotland.

Advice on transportation impacts relating to the proposed development are detailed in guidance and policies contained within Scottish Planning Policy 17 (SPP17) and Planning Advice Note 75 (PAN 75). These develop the integrated land use and transportation planning elements put forward in the previous Scottish White Papers. Of particular relevance are the following Statements.

SPP17 Statement 47: "In particular consideration should be given to partnership working between the local authority and the freight sector to improve delivery systems such as by agreeing preferred routes, re-examination of delivery time restrictions etc."

SPP17 Statement 48: Freight – states that "Where rail or water borne freight are not feasible, development which attracts significant movements of road freight should be located away from congested inner areas and from residential areas. They should have direct access to the local distributor road network and good links to the strategic road network.

It does not contain any specific information about the movement of materials for a one-off project such as a windfarm development.

15.3.3 Regional and Local Transport Policy

Regional Transport Partnerships are statutory bodies responsible for bringing together key stakeholders in transport planning in an area to produce and deliver strategies that aim to make a real improvement to users. The Zetland Regional Transport Partnership (ZetTrans) is one of seven within Scotland, and comprises solely the one local authority area of Shetland Islands Council. It was formed in 2006 the Final Draft of its Shetland Transport Strategy was approved by The Scottish Ministers in July 2008.

The Strategy notes that the document covers both Regional and Local Transport Strategies, and highlights the unique character of the Shetland Isles. It also notes the infrastructure benefits that have been derived from the influence of the oil industry sector on Shetland. The Strategy aims to tackle transport issues in a multi-modal way.

From a Vision Statement, eight principles are stated, and a series of specific objectives are developed, and these are considered under the five key topics of STAG (Scottish Transport Appraisal Guidance). Five strategic Options were appraised using STAG, ranging from a 'Do-Minimum' situation to a fully 'Aspirational' Option.

Shetland Islands Council (SIC) manages, maintains and develops some 1,045km of public road, the majority of which are unclassified roads, with no Trunk Roads. The roads network focuses principally on a north to south spine road, which provides strategic movement. This spine provides access to the many internal lifeline ferry services to the outer islands. The Strategy also notes that roads in Shetland are the best maintained in Scotland.

Seven significant road schemes are proposed for implementation within the Strategy, and a series of Key Performance Indicators are established to monitor the performance of scheme implementations and outcome.

15.3.4 Summary of Policy

Currently, Scottish transport policy focuses heavily on the movement of people, and attempts to promote public transport alternatives to the private car. It recognises that by easing or improving road capacity constraints, the network can become more efficient for the movement of goods. Expenditure on all forms of transport is increasing, but in some parts of the country, there is a considerable backlog of work required to be undertaken on the local roads network. The amount of the Shetland's road network in need of maintenance in 2007/8 was assessed as 40.2% compared to a Scottish Average of 37.4%.[1]

15.4 METHODOLOGY

15.4.1 Overview

Halcrow have followed the advice contained in IHT (1994) which recommends that for Environmental Statements relating to large developments, roads and traffic conditions should be assessed in accordance with the Institute of Environmental Assessment's (IEA's) 'Guidelines for the Environmental Assessment of Road Traffic'. The methodology used in this assessment adheres to that set out in that document and therefore focuses on:

[1] Sunday Times Online Article March 22 2009

- Potential impacts on local roads and the users of those roads
- Potential impacts on land uses and environmental resources fronting those roads, including the relevant occupiers and users

The following rules, taken from the IEA's guidelines, have been used as a screening process to define the scale and extent of this assessment:

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

It should be noted that increases below 10% are generally considered to be insignificant given that daily variations in background traffic flow may fluctuate by this amount. Changes in traffic flows below this level are therefore assumed to result in no discernible environmental impact.

In general, the comments received during consultation indicate that traffic conditions would be expected to fall within these parameters.

15.4.2 Baseline Assessment – Methodology

(a) **Desk surveys**

In undertaking the baseline assessment, various data sources and documents were reviewed. These included:

- Responses to the Scoping Report
- Responses to Halcrow's consultation
- Traffic flow data
- Review of any roads hierarchy promoted in relevant Local Transport Strategies
- OS plans to derive a local area roads network
- Consideration of potential supply locations for construction materials, if not available on-site, to inform extent of local area roads network

Halcrow also requested the provision of any specific local information which might aid the understanding of the local environment. These included:

- Traffic Volumes and Composition, by time, day or year
- Any established hierarchy of local roads for Heavy Goods Vehicles
- Sensitive junction locations
- Constraints to the roads network, with or without height/width/weight restrictions
- Any areas of road safety concerns
- Any other traffic sensitive receptors in the area (routes, communities, buildings etc)

(b) **Field survey techniques**

Field surveys were undertaken to further enhance the understanding of the roads network in the study area, and to identify potential constraints on that network. These included:

- Visual inspection of all roads identified in the study area network
- Photographic record of any constraints

15.4.3 Effects Evaluation - Methodology

(a) **Receptor sensitivity**

This evaluation identifies the scale and sensitivity of locations/settlements. The receptors were classified by settlement size, in terms of function, presence of school/community facilities, traffic calming or traffic management measures, vehicle speed limits, position on the roads hierarchy and sensitivity to road wear and tear. The classification uses the criteria identified in Table 15-2. The classification of settlements and road links was based upon professional judgement.

Table 15-2: Receptor Sensitivity Criteria

Receptor Sensitivity	Low	Medium	High
Location	Small rural settlement, few community or public facilities or services	Intermediate sized rural settlement, containing some community or public facilities and services	Large rural settlement containing a high number of community and public services and facilities,
Location	Little or no traffic calming or traffic management measures	Some traffic calming or traffic management measures	Traffic control signals, waiting and loading restrictions, traffic calming measures
Link	Trunk or A-class road, constructed to accommodate significant HGV composition	Local A or B class roads, capable of regular use by HGV traffic	Minor rural roads, not constructed to accommodate frequent use by HGVs

(b) **Impact magnitude**

The impacts are likely to cover changes in traffic, changes in levels of road safety and changes to vehicle delays. The magnitude of the impact of increased traffic volumes was measured against IEA (1993).The magnitude of the change (perceived and actual) on road safety was considered against traffic volume and composition, and vehicle speed. The effect on vehicle delay will be measured against journey time and junction delay. These magnitudes will be classified using the following criteria identified in Table 15-3.

Table 15-3: Impact Magnitude Criteria

Impact Magnitude	Low	Medium	High
Effect	Increase in HGVs of under 10%	Increase in HGVs between 10% and 30%	Increase in HGVs of over 30%

(c) **Effects significance**

The results from the receptor sensitivity and impact magnitude classifications were correlated, and classified using the five point effect significance scale in Table 15-4.

Table 15-4: Effects Significance Summary

	Sensitivity		
Magnitude	**Low**	**Medium**	**High**
Low	Insignificant	Low significance	Moderate significance
Medium	Low significance	Moderate significance	Moderate significance
High	Moderate significance	Moderate significance	Highly significant

15.4.4 Limitations of Assessment

This is a semi quantitative assessment that includes some professional judgement of conditions. Much of the assessment concerns traffic levels in rural areas and on minor roads, for which there is a lack of continuously recorded traffic flow data.

15.5 BASELINE CONDITIONS

15.5.1 Context

The main road linking the north and south of the mainland (A968/A970) runs through the middle of the site. The B9071 runs east-west and divides the northern two quadrants from the southern two, linking the A970 with the east coast. The B9075 runs around the eastern and southern boundary of the southern section of the site and links in to the A970. There are also some minor branching roads to properties, particularly along the east coast.

The proposed sites are therefore in relatively close proximity to a well defined road network, but some accesses rely on less well developed roads for final access. The baseline review focuses on the nature of the surrounding road infrastructure and the level of traffic that uses it. The following section is an inventory of the possible routes to the site and the most recent data on volumes of traffic that are currently using them.

15.5.2 Designations

The A970 is designated as being part of National Cycle Network Route 1, which itself forms part of the North Sea Cycle Route. None of the roads on Shetland is designated as a Trunk Road.

15.5.3 Desk Studies

(a) **Review of Roads Hierarchy**

Shetland Islands Council's Local Transport Strategy identifies the importance of the Spine Road and Ferry Route network in providing primary links. This Spine Road Network was taken as the hierarchy of roads on Shetland, and consultation with SIC concluded that the Spine Road network should be used as much as possible for reaching the proposed Site Access Junctions. The Spine Road Network is shown in Figure 15.1.

(b) **Review of Scottish Executive ATC Data**

A review was undertaken of ATC summary data provided by the Scottish Executive, with attention focusing on Annual Average Daily Flow (AADF) and where available the average percentage of HGVs. This is summarised in Table 15-5. Data relating to roads on the Shetland Islands were only available for year 2000, after which the Executive relinquished the role of data collector on non-trunk roads.

In general the data indicate low to moderate traffic flows on the rural sections of road. The counter with the highest levels of traffic is on A970 Holmsgarth Road in Lerwick, which carries commuter traffic into the town, and is set close to the area of main industrial and commercial activity. Elsewhere traffic flows average between 3-4000 vehicles on an average day along the A970 spine road.

The 2000 AADF values, with the percentage of HGVs are shown in Figure 15.2.

Table 15-5: Summary ATC Data

SITE	ROUTE	OSGR	2000 AADF	2000 % HGV
DTP01188	A970 North of Catfirth	442000 154000	2,385	8
DTP11000	A970 Voe	440000 163000	1,412	7
DTP11001	A970 East of Veensgarth	443200 144000	3,964	8
DTP11002	A970 North of Lerwick	445900 143000	5,877	6
DTP20997	A968 North of Voe	440700 168000	716	7
DTP20998	A970 South of Voe	441300 162000	2,235	8
DTP31003	A970 South of Catfirth	442500 150000	2,853	7
DTP41001	A968 North of Mossbank	443400 175000	500	6

Table 15-6: SIC Supplied Data

DATE	ROUTE	AADF
July 2005	B9076 Sullom Voe	948
July 2005	A968 north east of Voe	883
Sep 2003	A970 north west of Voe	1,815
Aug 2005	A970 south of Voe	2,937

Feb 2004	A970 north of Lerwick	2,715
July 2005	A970 Lerwick	6,583

Traffic monitoring on specific roads is undertaken by SIC on a regular, although not systematic basis, typically in relation to scheme assessments. Two monitoring loops are provided to the north and to the south of Lerwick. Long term monitoring suggests an annual growth rate of 2.1%. Despite these traffic level increases, congestion is not viewed as a problem in Shetland as corresponding traffic levels do not create significant adverse impacts. The latest data supplied by SIC is shown in and presented for comparative purposes only as there is no indication of the percentage of HGVs.

15.5.4 Field Studies

A site visit was undertaken to visually assess the general nature and condition of the routes being considered. The areas under consideration form four quadrants, split by the A970/A968 on a north-south axis, and the natural narrowing between Voe and Laxo (and the B9071) on an east-west axis. Access to all four development areas will be taken from the local roads adjoining the A970/A968 Spine Road. This section will consider this spine road, and then consider the accesses from it into the development quadrants.

15.5.5 To Access Point 1 - Delting Quadrant (B9076)

The route exits Sella Ness port by a priority junction and left to the B9076. It is then 1km south west to the new Site Access Point 1, a priority junction to the left.

The route from Sullom Voe Construction Jetty to the B9076 is a right turn and a distance of approximately 2.5km south west to the new access junction.

15.5.6 To Access Point 3 - Collafirth Quadrant (A968)

The route turns left from the Sella Ness port to the B9076 and heads northwards. It is joined at the Sullom Voe access road by nacelle loads. The route continues east on the B9076 to the junction with the A968 at Mossbank, joining the A-class road at a right hand priority junction. The route climbs around the Hill of Swinister, turning south. The route remains on the A968 until the side arm junction leading to Collafirth. The junction on the main road is a simple priority junction with good geometry and visibility. Loads turn left here and progress along an unclassified road for approximately 400m before reaching the proposed Site Access Point 3 with a right hand turn. The unclassified road is approximately 5m in width, narrowing to 3m single track with passing places after approximately 250m. .

15.5.7 To Access Point 4 - Nesting Quadrant (Northern Section) or Kergord Quadrant (central section) (A970)

As above for Access Point 3, but continues past the Collafirth junction, south to the village of Voe. Here the route is via a left turn to the A970 and south to Hamarigrind Scord. The route is either left or right at Access Point 4, depending on the final location.

15.5.8 To Access Point 6 - Kergord Quadrant (B9075)

As above to Access Point 4, but route continues south past Petta Dale to the junction with the B9075. The route then heads right, onto what is currently single track road with passing places. The proposal is to construct a new access track from the B9075, starting immediately west of the junction with the Upper Kergord lane and continuing northwards parallel to the lane for the first few hundred metres and then deviating further west.

15.5.9 To Access Point 8 - Nesting Quadrant (Southern section) (A970)

As above to Access Point 6, but passing the side arm to the B9075 (westbound) and continuing south for a further 1km. The route continues via a left at the new access junction.

15.5.10 Other Routes - Spine Road – Lerwick to Sullom Voe (A970 – A968 – B9076)

This route forms the spine from which any of the potential development quadrants will be reached. It runs from Lerwick to the oil terminal and port facility at Sullom Voe. Outwith Lerwick the road is generally two carriageway and 7.3m wide with side markings and hard edge strips. The road passes various junctions but there is no direct frontage activity on this section until the settlement of Voe. The A968 turns right from the A970 within Voe, a small community with residential and community frontages and a 30mph speed limit.

The A968 continues as 7.3m carriageway, with edge markings and hard edges and good alignment narrowing to 7m, with some tighter bends with chevron markings. The A968 joins the B9076 to Sullom Voe at a simple priority junction. The B9076 continuing westward as 7.3m carriageway with edge markings. At Quoys of Garth the B9076 turns southwest towards Scatsta Airport and the access road into Sullom Voe Oil Terminal continues westward for a further 1.5km to the main access gates.

15.5.11 Other Routes – Dales Voe/Greenhead Base nr Lerwick to Spine Road

The route from Dales Voe Base is a 7.5m A-class specification road which climbs gently from the base. There is one short stretch of carriageway which features a tighter bend and a sharp summit. The road then continues south to join the access road to the Greenhead Base. At this junction traffic to and from the Greenhead Base has priority, although the geometry of the junction suggests that the Greenhead access is the ‘side arm’ of the junction. The road then passes through the Gremista industrial estate, progressing onwards to join the A970 at the northern outskirts of Lerwick.

15.5.12 Modifying Influences

Modifying influences include committed developments in the general area which will alter traffic volumes, new or altered roads layouts, and potential impositions of vehicle weight or size restrictions not already in effect.

SIC have noted three locations where structural assessments will be required. These are noted in AIL (2008)

15.5.13 Summary

A summary of the Route Lengths from Sella Ness / Sullom Voe to each of the potential windfarm access locations windfarm is shown in Table 15-7.

Table 15-7: Route Option Summary

Route Option	Length	Length of A-class road	Sensitive Locations	Network Constraints
Access Point 1	2.5km	0%		
Access Point 3	15km	100%		Mossbank Jcn
Access Point 4	22km	100%	Voe	Voe & Mossbank Jcns
Access Point 6	26km	100%	Voe	Voe, Mossbank & B9075 Jcns
Access Point 8	28km	100%	Voe	Voe & Mossbank Jcns

15.6 IMPACT ASSESSMENT

15.6.1 Basis of Assessment

(a) **Development characteristics**

The assessment is based upon the following design features:

- Stone will be sourced from borrow pits on-site
- Concrete will be batched on-site
- Construction traffic requirements are as quantified in the Transport Statement (Appendix 15.1), as summarised in Table 15-8
- Due to the nature of materials and plant required on site, the majority of vehicles utilised will be Heavy Goods Vehicles.
- The construction programme is estimated to be over five years in six-month durations, with construction deliveries phased in accordance with Table 15-9
- Construction personnel/deliveries have been estimated by the partnership as an average of one hundred vehicles accessing the site per day. (Table 15-12)

Table 15-8: Estimated Goods Vehicle Traffic Deliveries

Movement	Total number	Delivery days	Average per day
Construction plant (in)	70	7	10
Construction plant (out)	70	7	10
Concrete - Aggregate	3,386	832	4
Concrete - Cement	1,021	832	2
Concrete - Sand	3,386	832	4
Cabling Sand	2,526	832	3
Balance of Deliveries	155	832	1
Total Vehicles	10,614	832	14 (1)

(1) Average per day does not include delivery of Construction Plant, the movements of which will be predominantly in the first and last weeks of the Construction Phase.

Table 15-9: Construction Programme & Transport Phasing for a typical year (37 Turbines Assumed[2])

Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Tracks									
Foundations									
Cabling									
Control building									
Turbine erection									
Construction plant	24	9	4	4	6	5	12	18	82
Concrete Materials		196	195	196	195	196			978
Cabling sand			70	69	69	69	70		347
Other	11	13	13	16	16	16	14	14	112
Totals	**35**	**226**	**281**	**285**	**286**	**286**	**96**	**32**	**1535**
Working Days	26	26	26	26	26	26	26	26	208
Daily average (rounded to nearest whole)	1	9	11	11	11	11	4	1	7

[2] Turbine erection will take place over years two to five of the five year construction period. Therefore approximately 37 turbines will be erected in each of years two to five.

(b) **Assumed design, management and mitigation measures**

Route Selection

The primary mitigation measure is the careful consideration of the roads network to identify a preferred route from and to the site access. This involves carefully considering the physical characteristics of the roads network and the number and location of potentially sensitive receptors along the various routes. The preferred route to the site access points is to use the Spine Road Network to reach either a direct access junction or a side arm junction leading to upgraded carriageway which in turn leads to an access junction.

Concrete batching

It is proposed that the concrete works on this site will be carried out by installing batching plants on-site, and to deliver aggregate and cement (and possibly water if site water is unsuitable) in tippers and tankers. Aggregates can be delivered for storage prior to use over a longer period than ready mixed concrete. By batching on-site, the number of vehicle loads required is significantly reduced over the duration of the construction phase. On-site batching also gives a greater degree of quality control over the concrete mixing process, eliminating the possibility of ready-mix vehicles arriving on-site only to have their load rejected due to quality issues, necessitating additional vehicle trips to provide the shortfall.

Road maintenance

Shetland Islands Council may indicate that they may require an agreement under section 96 of *The Roads (Scotland) Act 1989*. In essence, this agreement provides for a developer to cover the cost of abnormal wear and tear on roads not designed for that purpose.

The details of these agreements would be agreed subsequent to planning permission, but the requirement to enter into such an agreement may form a planning condition.

Traffic Management Measures

In addition to the specification of the preferred access route and the detailed phasing of construction traffic, additional measures and initiatives will be introduced to minimise the intrusive effects of construction-related traffic. Measures proposed are:

- Regulated site working hours, generally 7am to 6pm, although it may occasionally be necessary to extend beyond this
- Where appropriate, additional warning and speed control signs will be installed, temporarily or otherwise, with the agreement of the highways authority
- A construction liaison committee should be established to ensure the smooth management of the project / public interface. Traffic management is likely to be an issue considered by the liaison committee. It is proposed that representatives of Viking Energy, the construction contractors, the local community, and, if appropriate, the Police form the committee. This committee will form a means of communicating, and updating on forthcoming activities and dealing with any issues arising

- Driver's induction to include:
  - A safety briefing
  - The need for appropriate care and speed control
  - Identification of specific sensitive areas
  - Identification of the specified route
  - The requirement not to deviate from the specified route

Safety is of prime importance to Viking Energy; drivers breaching safety rules will be removed from the job.

15.6.2 Receptor sensitivity

This section considers the level of sensitivity to the increase in vehicle movements associated with the construction phase, as outlined in 15.4.3(a) above. The settlements identified all lie on at least one of the potential routes to the development sites from Lerwick Quayside, Scalloway or Sullom Voe and consideration has been given to the size and function of each settlement, particular characteristics identified during the Baseline Review and the preferred route strategy. The results are shown in Table 15-10.

Table 15-10: Receptor Sensitivity

Receptor	Low	Med	High	Comments
Lerwick north	**X**			Existing industrial estate and relatively high traffic volumes
Voe		**X**		Small settlement, frontages set back, primary school, on street parking

15.6.3 Construction effects

(a) **Congestion**

Impact magnitude

When considering the impact of construction traffic on the local roads network, there are several sites for which ATC data is available (Figure 15.2). The flows at these locations are shown in Table 15-11 along with the predicted increase in HGV traffic at those locations attributable to construction traffic.

Table 15-11: Existing and Predicted HGV Flows

Location	2000 AADF	2000 HGV	Predicted average daily increase of HGV (2-way movements)	Percentage increase in HGV (2-way movements)
A970 North of Catfirth	2,385	191	36	19%

A970 Voe	1,412	99	36	36%
A970 East of Veensgarth	3,964	317	36	11%
A970 North of Lerwick	5,877	353	36	10%
A968 North of Voe	716	50	36	72%
A970 South of Voe	2,235	179	36	20%
A970 South of Catfirth	2,853	200	36	18%
A968 North of Mossbank	500	30	36	120%
Average				38%

The increase in HGV traffic at three locations is greater than the 30% 'trigger' stated in Rule 1 in the "Guidelines for the Environmental Assessment of Road Traffic" at three of the ATC locations. It is evident however, that the base flows and the added flows due to construction are all very low – an average construction day would create less than one additional HGV movement per hour in each direction over the course of the working day. The predicted increase in HGV movements is based upon the relevant ATC sites for which HGV content is available (Table 15-5). The impact would be temporary, and moderated to a certain extent by the best practice measures identified in 15.6.1(b) above.

In addition to considering the effect of congestion related to the arrival and departure of heavy goods vehicles, traffic from staff travelling to and from the site in smaller vehicles (cars and light goods vehicles) and miscellaneous deliveries has also been considered. Evidence from other sites suggests that the number of staff vehicles/deliveries is likely to be of the magnitude of 100 arrivals and 100 departures each working day. The scale of this increase in vehicle numbers at the relevant ATC sites is shown in Table 15-12. The vehicle composition is expected to be a combination of off-road vehicles (such as Land Rovers) and minibus/crewcab vehicles (Transit type vehicles)

Table 15-12: Existing and Predicted Non-HGV Flows

Location	**2000 AADF**	**Predicted average daily increase of Non -HGV (2-way movements)**	**Percentage increase in Non - HGV (2-way movements)**
A970 North of Catfirth	2,385	200	8%
A970 Voe	1,412	200	14%
A970 East of Veensgarth	3,964	200	5%
A970 North of Lerwick	5,877	200	3%
A968 North of Voe	716	200	28%
A970 South of Voe	2,235	200	9%
A970 South of Catfirth	2,853	200	7%
A968 North of Mossbank	500	200	40%
Average			14%

The cumulative impact of HGV and staff traffic at the relevant ATC recording sites is shown in Table 15-13.

Table 15-13: Existing and Predicted Cumulative Vehicle Flows

Location	2000 AADF	Total increase in vehicles (2-way movements)	Percentage increase –all vehicles (2 way movements)
A970 North of Catfirth	2,385	236	10%
A970 Voe	1,412	236	17%
A970 East of Veensgarth	3,964	236	6%
A970 North of Lerwick	5,877	236	4%
A968 North of Voe	716	236	33%
A970 South of Voe	2,235	236	11%
A970 South of Catfirth	2,853	236	8%
A968 North of Mossbank	500	236	47%
Average			17%

The predicted additional number of vehicles of all types during the construction phase is fairly low, and in all but two locations falls below the 30% threshold (Rule 1) in the EIA Guidelines, However, in two locations the percentage increase is relatively high; although given that this is against a very low background level of traffic this is not surprising. The magnitude of the Congestion Effect is summarised in Table 15-14.

Table 15-14: Magnitude of Congestion Effect

	Magnitude			
Impact	**Low**	**Med**	**High**	**Comment**
Increase in HGV movements		**X**		Low average daily number of movements over phased construction period
Increase in non-HGV movements		**X**		Peaked flows at start/end of working day

Effects significance

Table 15-15 shows the significance of the congestion effect of additional heavy goods vehicle movements during the construction phase.

Table 15-16 presents the effects significance of the wear and tear effect of additional heavy goods vehicle movements during the construction phase.

Table 15-15: Effects Significance - Congestion

Receptor	Significance of Construction Effects – Congestion
A970 Lerwick north	Low significance
A970 Voe	Moderate significance

(b) Wear and Tear

Impact magnitude

There are limitations in quantifying the magnitude of wear and tear impact on the roads carriageway and pavement within the guidelines of the IEA (1993). However these impacts can be separately assessed using road condition surveys as part of any Section 96 Agreement.

Wear and tear on the physical fabric of a road is a function of vehicle axle weight (the weight imposed by any axle, rather than the overall vehicle weight), the frequency of the effect, and the condition of the roads pavement itself.

During site inspections, most roads in the Study Area were considered to be suitable for the regular passage of heavy goods vehicles, based upon visual inspection. The unclassified roads to Site Access Point 3 Collafirth and the length of the road from the A970 to the new Site Access Point 6 were considered to be at potential minor risk of wear and tear due to the passage of HGVs during the construction phase. Risks identified were the probability of vehicle over-run onto the soft verges and the possibility of structural damage to the road pavement.

Effects significance

Table 15-16 shows the significance of the wear and tear effect of additional heavy goods vehicle movements during the construction phase.

Table 15-16: Effects Significance – Wear and Tear

Receptor	Significance of Construction Effects – Wear and Tear
A970 Lerwick north	Insignificant
A970 Voe	Low significance

15.7 MITIGATION

15.7.1 Introduction

This section outlines the various types of mitigation proposed as part of the scheme although further detail can be found in the Transport Statement prepared as an appendix to this chapter.

15.7.2 Routing

The primary mitigation measure is the careful consideration of the roads network to identify a preferred route to and from the site access. The preferred route to the site access points is to use the Spine Road Network to reach either a direct access junction or to a side arm junction leading to upgraded carriageway which in turn leads to an access junction.

15.7.3 Road/Junction Improvements

It is considered that mitigation will involve the construction of five new accesses. These are likely to be in the form of widened priority junctions wide enough to handle the abnormal loads as well as general construction traffic.

In addition, improvements to three existing accesses are also necessary along with localised widening at two locations.

Details of the new accesses can be found in Chapter 4 of the Transport Statement.

15.7.4 Traffic Management

An essential part of the mitigation strategy will be traffic management measures to ensure the efficient transport of components and materials to the site, whilst minimising disruption to other road users and ensuring the safety of contractor personnel and the public.

Details of the different traffic management measures can be found in Chapter 5 of the Transport Statement.

15.8 SUMMARY OF RESIDUAL EFFECTS

15.8.1 Introduction

This section identifies the likely environmental impacts (slight as well as significant) of the proposed development. The purpose is to present the main residual effects of the scheme, taking into account the proposed mitigation measures as outlined above.

15.8.2 Adverse Effects

The main adverse environmental effects of the proposed development are as follows:

- There will be a moderate significance impact on the local highway network resulting from the construction traffic and movement of abnormal loads. Traffic

management measures to ensure the efficient transport of components and materials to the site have the potential to reduce this impact however.

- There is likely to be a low significance impact on the wear and tear of particular roads. This is however likely to be covered by a wear and tear agreement to ensure the condition remains as before the scheme.
- See Chapter 16 for the effects of the proposals on Air Quality.
- See Chapter 12 for the effects of the proposals on Noise.

15.8.3 Beneficial Effects

The main beneficial environmental effects of the proposed development are as follows:

- As a result of the scheme, proposed junction improvements at Sella Ness, Access, A968/B9076 Junction south of Mossbank and A968/A970 Junction at Voe will result in larger junctions with increased capacity and potentially safer designs.
- Localised widening and route improvement at the side roads to Access Points 3 & 6 will upgrade routes and improve the safety and operation of the roads.

15.8.4 Conclusion

As far as possible, any impact arising from the proposed phased development has been mitigated to ensure that the impact on the environment is as limited as possible. In general, the impacts are relatively minor and are typically confined to the construction period only. There will be little or no impact once the scheme has been constructed.

15.9 MONITORING

15.9.1 Introduction

This section outlines the monitoring required as part of the traffic element during and after the construction of the scheme.

15.9.2 Wear and Tear

Mitigation measures to help minimise the impact of construction traffic have been proposed, and it is considered likely that if Shetland Islands Council require roads condition surveys as part of a Section 96 Agreement, this will be negotiated as a planning condition.

15.9.3 Air and Noise

This is covered in Chapters 12 & 16.

15.10 REFERENCES

Department of Transport (1993) Institute of Environmental Assessment - Guidelines for the Environmental Assessment of Road Traffic, IEA, Department of Transport, London.

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The Scottish Executive (2004) Scotland's Transport Future, The Transport White Paper. The Scottish Executive, Edinburgh.

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Table 15-17: Summary of Roads and Traffic Effects

Construction Effects	Impact	Potential Effects on Receptors	Specific Receptor Identified in Scoping	Sensitivity	Impact magnitude	Effect significance
Traffic	Increase in HGV Traffic	Traffic congestion on local roads	Lerwick north	Low	Medium	Low significance
			Voe	Medium	Medium	Moderate significance
	Increase in HGV Traffic	Traffic congestion on local roads	Lerwick north	Low	Medium	Low significance
			Voe	Medium	Medium	Moderate significance
Traffic	Wear and Tear	Abnormal road wear and tear	Lerwick north	Low	Low	Insignificant
			Voe	Medium	Low	Low significance

Table 15-18*: Potential Construction Effects on Roads and Traffic*

Construction Effects	Impact	Nature	Duration	Permanence	Extent	Scale of Change	Certainty	Frequency	Potential Effects on Receptors	Likelihood of Significant Effect
Mobile plant operations	None	-	-	-	-	-	-	-	-	-
Borrow pit operations	None	-	-	-	-	-	-	-	-	-
Traffic	Increase in HGV traffic	Adverse	Short term	Temporary	Localised	Unknown	Certain	Frequent	Traffic congestion on local roads	Possible
									Abnormal road wear and tear	Possible
	Increase in non-HGV traffic	Adverse	Short term	Temporary	Localised	Unknown	Certain	Frequent	Traffic congestion on local roads	Possible
									Abnormal road wear and tear	Possible
Cable laying	None	-	-	-	-	-	-	-	-	-
Construction compounds	None	-	-	-	-	-	-	-	-	-

Table 15-19*: Potential Ongoing Effects on Roads and Traffic*

Ongoing Effects	Impact	Nature	Duration	Permanence	Extent	Scale of Change	Certainty	Frequency	Potential Effects on Receptors	Likelihood of Significant Effect
General	Increase in operational traffic levels.	Adverse	Long term	Temporary	Localised	Small	Certain	Occasional	Traffic congestion	Unlikely
Turbines	None	-	-	-	-	-	-	-	-	-
Foundations	None	-	-	-	-	-	-	-	-	-
Tracks	None	-	-	-	-	-	-	-	-	-
Cables	None	-	-	-	-	-	-	-	-	-
Anemometers	None	-	-	-	-	-	-	-	-	-
Sub-station / control building	None	-	-	-	-	-	-	-	-	-
Crane pads	None	-	-	-	-	-	-	-	-	-
Public road improvements	None	-	-	-	-	-	-	-	-	-
Borrow pits	None	-	-	-	-	-	-	-	-	-