SECTION 6

AIR QUALITY

6.1 Introduction

6.1.1 This chapter provides an air quality assessment of the proposed An Camas Mòr development. The proposed development has the potential to affect air quality by causing dust emissions during the construction phase and by changing traffic flows on the local road network during the construction and operation phases.

6.1.2 The assessment includes the following key elements:

- Identification of relevant air quality legislation and policy;
- Assessment of existing air quality conditions in the study area;
- Description of the air quality assessment methodology;
- Qualitative assessment of emissions associated with the construction phase;
- Quantitative screening assessment of air quality effects from emissions associated with changes in traffic flows on the local road network during the operation phase;
- Identification of suitable mitigation measures; and
- Identification of the residual air quality effects.

6.2 Legislation and Policy Context

Introduction

6.2.1 This section summarises the relevant international and national legislation, policy and planning guidance in relation to air quality for the proposed development. In addition, Scottish and local planning policy guidance has been reviewed in order to identify air quality policy implications related to the proposed development.

Legislation

European Union (EU)

6.2.2 EU Framework Directive 96/62/EEC [Ref 1] on ambient air quality assessment and management came into force in November 1996 and had to be implemented by Member States by May 1998. This Directive amends to protect human health and the environment by avoiding, reducing or preventing concentrations of air pollutants. As a Framework Directive, it required the European Commission to propose 'Daughter' Directives which set air quality limit and target values for seven pollutants, alert thresholds and guidance on monitoring, siting and measurement for individual pollutants. The four Daughter Directives are as follows:

- Council Directive 1999/30/EC (the first Daughter Directive) relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air;
- Directive 2000/69/EC (the second Daughter Directive) relating to limit values for benzene and carbon monoxide in ambient air;
- Directive 2002/3/EC (the third Daughter Directive) relating to ozone in ambient air; and
- Directive 2004/107/EC (the fourth Daughter Directive) relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.

6.2.3 Directive 2008/50/EC on ambient air quality and cleaner air for Europe [Ref 2] was adopted in May 2008. This latest Directive merges the first three existing Daughter Directives and one Council Decision into a single Directive on air quality (it is anticipated that the fourth Daughter Directive will be brought within the new Directive at a later date). It also sets new standards and target dates for reducing concentrations of fine particles. Member States have two years to transpose the new Directive and until then the existing national legislation applies.

Scotland

Air Quality

6.2.4 The Air Quality Standards (Scotland) Regulations 2007 [Ref 3] came into force in March 2007 and implement the provisions of Air Quality Framework, First, Second, Third and Fourth Air Quality Daughter Directives. They supersede the previous Air Quality Limit Values (Scotland) Regulations 2003 as amended [Ref 4] and 2005 [Ref 5].

6.2.5 Part IV of the Environment Act 1995 [Ref 6] requires that every local authority shall periodically carry out a review of air quality within its area, including likely future air quality.

6.2.6 As part of this review, the authority must assess whether air quality standards and objectives are being achieved, or likely to be achieved within the relevant periods. Any parts of an Authority's area where the standards or objectives are not being achieved, or are not likely to be achieved within the relevant period must be identified and declared as an Air Quality Management Area (AQMA). Once such a declaration has been made, Authorities are under a duty to prepare an Action Plan which sets out measures to pursue the achievement of the air quality standards and objectives within the AQMA.

6.2.7 The air quality objectives specifically for use by Local Authorities in carrying out their air quality management duties are set out in the Air Quality (Scotland) Regulations

2000 [Ref 7] and the Air Quality (Scotland) Amendment Regulations 2002 [Ref 8]. In most cases, the air quality objectives are numerically synonymous with the limit values specified in the EU Directives and Scottish Regulations, although compliance dates differ.

6.2.8 It should be noted that these objectives only apply at locations where the members of the public might reasonably be exposed to pollutants for the respective averaging periods.

6.2.9 The Environment Act also requires that the UK Government produces a national 'Air Quality Strategy' containing standards, objectives and measures for improving ambient air quality and to keep these policies under review. Further details of the Air Quality Strategy are presented in paragraph 6.2.11 – 6.12.13.

Statutory Nuisance

6.2.10 Legislative control on dust from construction activities is to be found in Section 79, Part III of the Environmental Protection Act (1990) (as amended) [Ref 9] where it falls within the definition of 'statutory nuisance'. Where a local authority is satisfied that a statutory nuisance exists, or is likely to occur or recur, it must serve an abatement notice. Failure to comply with an abatement notice is an offence. However, it is a defence if an operator employs the best practicable means to prevent or to counteract the effects of the nuisance.

Policy

UK Air Quality Strategy 2007

6.2.11 As described above, the Environment Act 1995 requires the UK Government and the devolved administrations for Scotland and Wales to produce a national Air Quality Strategy (AQS). The AQS establishes the framework for air quality improvements. Measures agreed at the national and international level are the foundations on which the strategy is based. The first Air Quality Strategy was adopted in 1997 and replaced by the Air Quality Strategy for England, Scotland, Wales and Northern Ireland published in January 2000. The 2000 Strategy has subsequently been replaced by the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 [Ref 10].

6.2.12 In addition, the Environment Act 1995 requires that the Scottish Environment Protection Agency (SEPA) has regard to the Air Quality Strategy in exercising its pollution control functions, particularly under the Environmental Protection Act 1990 and under the Pollution Prevention and Control Regulations 2000 (PPC) and the Pollution Prevention and Control (Scotland) Regulations 2000. Local Authorities are also required to work towards the Strategy's objectives prescribed in the Air Quality (Scotland) Regulations 2000 and the Air Quality (Scotland) Amendment Regulations 2002.

6.2.13 The air quality objectives included in the 2007 AQS are a statement of policy intentions or policy targets. As such, there is no legal requirement to meet these objectives except in as far as these mirror any equivalent legally binding limit values in EU legislation and relevant Scottish regulations.

National Planning Policy

6.2.14 Planning Advice Note 51 – Planning, Environmental Protection and Regulation (PAN51) [Ref 11] offers guidance to local authorities on the relationship between controls on development under planning laws, and under pollution control legislation. PAN51 states that any consideration of air quality arising from a development that could affect health is capable of being a material consideration.

6.2.15 Further advice on air quality and land use planning has been provided by the Scottish Executive in Local Air Quality Management – Revised Policy Guidance [Ref 12], subsequently updated by Air Quality and Land Use Planning [Ref 13]. This guidance notes that effects on ambient air quality are likely to be particularly important where:

- The development is proposed inside, or adjacent to, an AQMA as designated under Part IV of the Environment Act 1995;
- The development could in itself result in the designation of an AQMA; and/or
- To grant planning permission would conflict with, or render unworkable, elements of a local authority's Air Quality Action Plan.

6.2.16 However, it also advises that not all planning applications for developments inside or adjacent to AQMAs should be rejected if developments would result in a deterioration of local air quality. Local Planning Authorities (LPAs) should explore the possibility of applying planning conditions to mitigate adverse effects.

Regional Planning Policy

6.2.17 The Highland Structure Plan sets out the strategic policy framework for Highland. The plan was approved and came into force in March 2001. The Structure Plan together with the Local Plan makes up the Development Plan. The Structure Plan identifies strategies which address issues facing Highland in the period up to 2017. With regard to local air quality Policy G2 states:

6.2.18 "Policy G2 Design for sustainability:

- Proposed developments will be assessed on the extent to which they:
- …impact on the following resources, including pollution and discharges, particularly within designated areas: habitats, freshwater systems, species, marine systems, landscape, cultural heritage, scenery, air quality;
- demonstrate sensitive siting and high quality design in keeping with local character and historic and natural environment and in making use of appropriate materials; and

- …Developments which are judged to be significantly detrimental in terms of the above criteria shall not accord with the Structure Plan"

Local Planning Policy

6.2.19 Relevant local planning policy is provided in the Badenoch & Strathspey Local Plan 1997 and the Cairngorms National Park Deposit Local Plan. Details of the relevant policies in these plans are provided in the Planning Statement included within the application.

Summary

6.2.20 This Section has identified the legislation and policy framework relevant to the assessment. On the basis of the above, applicable numerical environmental quality standards are summarised in Table 6.1 hereafter referred to as air quality 'objectives'.

Table 6.1: Applicable Air Quality Objectives

Pollutant	Averaging Period	Objective		To be Achieved By
		Concentration	Allowance	
Nitrogen Dioxide (NO_2)	Annual mean	40 µg.m^{-3}	-	31st December 2005(a) 1st January 2010(b)
	1 hour mean	200 µg.m^{-3}	18 per year	31st December 2005(a) 1st January 2010(b)
Nitrogen Oxides (NO_x)	Annual Mean	30 µg.m^{-3}	-	31st December 2000(a)(b)
Particles (PM_{10})	Annual mean	40 µg.m^{-3}	-	31st December 2004(a) 1st January 2005(b)
		18 µg.m^{-3}	-	31st December 2010(a)
	24 hour mean	50 µg.m^{-3}	35 per year	31st December 2004(a) 1st January 2005(b)
			7 per year	31st December 2010(a)

Notes: (a) Air Quality Strategy objective
(b) EU limit
(c) Expressed as the 99.79th percentile of hourly means over a year
(d) Expressed as the 90.41st percentile of 24 hour means over a year
(e) Expressed as the 98.08th percentile of 24 hour means over a year

6.3 Existing Air Quality

Introduction

6.3.1 In order to undertake an assessment of the air quality effects of the proposed development it is important to understand the existing air quality of the locality.

6.3.2 Information compiled to determine baseline air quality for the proposed development was taken from a variety of sources including the Scottish Air Quality website [Ref 14] and the UK Air Quality Archive (AQA) [Ref 15]. Further information was obtained from publicly available reports produced by The Highland Council (THC).

Local Authority Review and Assessment

6.3.3 THC completed its Stage 1 Review and Assessment (R&A) Report in June 1998 [Ref 16] and its subsequent addendum in June 2001 [Ref 17]. The first version of the R&A report concluded that a second stage review and assessment was required. In 2001, an Addendum Report concluded that the risk of traffic sources causing exceedences of the air quality objectives at relevant locations within the THC area was insignificant. Consequently, no AQMAs were declared.

6.3.4 In 2003 THC produced an Updating and Screening Assessment (USA) [Ref 18]. The main conclusion recommended detailed assessments of a coastal petrol terminal, a petroleum refining process, residential properties where solid fuels were burned and an aluminium smelter. Following the assessments, no AQMAs were declared. THC produced a further USA in 2006 [Ref 19] which again confirmed that there were no predicted exceedences of the air quality objectives.

6.3.5 The preliminary main findings of the latest (draft) Progress Report in 2008 [Ref 20] states that monitoring results at the Telford Street continuous analyser for PM_{10} in 2006 were significantly higher than in previous years. Further assessment is planned by THC to determine whether this is a long or short term trend. In addition, all other monitoring results and information available indicates compliance within air quality objectives.

Monitoring Data

6.3.6 Currently, THC does not carry out any air quality monitoring in the vicinity of the proposed development site. The nearest automatic air quality monitoring station is located in Inverness which is approximately 40 km from the proposed development. Air quality data measured at Telford Street station (roadside location – one of the busiest roads in THC's area), Inverness is summarised in Table 6.2. Following consultation with THC, it was agreed that the data for the Inverness site be presented to provide an indication of likely worst case conditions in the THC authority area. The air quality data presented in Table 6.2 shows that the air quality objectives were not breached at a roadside location. The proposed development is located in a rural area, and therefore existing air quality concentrations for the selected pollutants are expected to be far lower than those presented in Table 6.2.

Table 6.2: Automatic Air Quality Monitoring Station - Telford Street, Inverness (µg/m3)

Pollutant	Averaging Period	2005	2006	2007	2008
NO_2	Annual	21	21	22	21
	1 hr. (99.79th percentile)	99	101	115	-
NO_X	Annual	44	45	45	42
PM_{10}	Annual	17	19	21	-
	24 hrs (90.41th percentile)	28	30	33	-

Notes: All data Capture rate >90%
Source - Scottish Air Quality website [Ref 14]

UK Air Quality Archive Data

6.3.7 The UK Air Quality Archive Data (AQA) website [Ref 15] provides estimates of background concentrations across the UK at a resolution of 1 square kilometre for the objective year of the specified pollutant.

6.3.8 The centre point of the proposed development is located at National Grid Reference (NGR) x=290759, y= 812464. The AQA projected concentrations for this location in 2008 and 2028 are shown in Table 6.3.

Table 6.3: Projected Annual Mean Background Concentrations (µg/m^3)

Pollutant	2008	2016	2028
NO_X	2.5	2.0	2.0
NO_2	2.1	1.7	1.6
PM_{10}	9.5	9.1	9.0

Notes: Source = AQA
2028 assumed to be equal to 2020 values (furthest projected year for which data are available)

Summary

6.3.9 The data presented indicates that there are no significant existing air quality issues affecting the site of the proposed development. Ambient concentrations are below the air quality objectives for NO_2 and PM_{10} in busy roadside locations in an urban area. The findings of the local authority's R&A work and available monitoring data confirm that the concentrations of pollutants in the study area are likely to be well below the relevant air quality objectives. The proposed development is located in a rural area, and therefore existing air quality concentrations for the selected pollutants are expected to be far lower than those measured at Telford St air quality monitoring station. The background concentrations provided by the AQA have been used to support the assessment.

6.4 Methodology

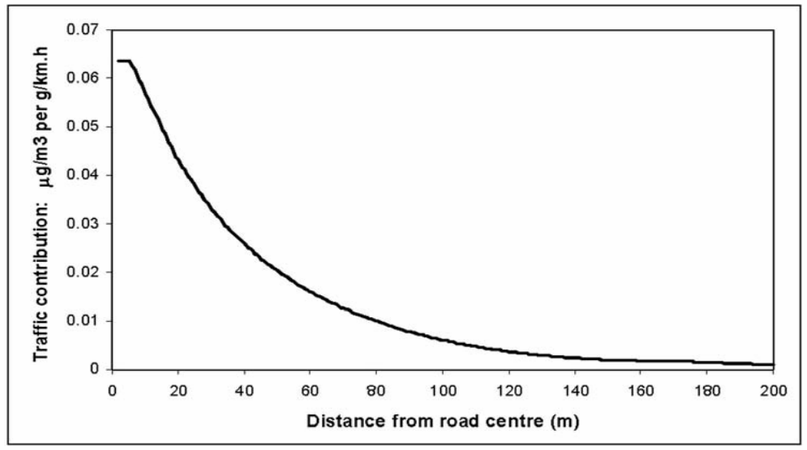
Introduction

6.4.1 This section describes the methodology applied to undertake the assessments of air quality effects resulting from construction and operation phases of the proposed development. This section describes the study area for the assessment and the significance criteria which have been applied.

Study Area

6.4.2 Potential effects from construction activities that generate dust are generally limited to within 200 m of a construction site boundary, depending on the extent of prevailing wind, rainfall, the presence of natural screening by, for example, vegetation or existing physical screening such as boundary walls on a site and other mitigation measures. Receptors closer to construction activities could experience significantly greater exposure and nuisance as a result of dust emissions if effects are not suitably mitigated. Effects of traffic on air quality are generally limited to 200 m from the centre of the road. Figure 6.1 is a graphic representation of pollutant concentrations decreasing with distance to the road [Ref 21]. Therefore, both the construction and operation phase assessments have focussed on a study area which is within 200 m of the proposed site, and roads with potentially significant changes in traffic flows as a result of the development (see Section 6.4 for further discussion on the consideration of 'affected' roads).

Figure6.1: Traffic Contribution to Pollutant Concentration at Different Distances from the Road Centre



- **Source: Highways Agency (2007) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 HA 207/07, Air Quality.**

Construction Phase

6.4.3 The construction of the development will take place during four discrete periods and is anticipated to be completed in 2027. The following subsection addresses the methodology used to assess key potential construction phase effects.

Dust Emissions

6.4.4 Construction activities can result in temporary effects from dust. 'Dust' is a generic term which usually refers to particulate matter in the size range 1-75 microns [Ref 22]. Emissions of construction dust are predominantly associated with the movement and handling of minerals and therefore composed of the larger fractions of this range which do not penetrate far into the respiratory system. Particles such as PM_{10} and $PM_{2.5}$ which have a greater potential for health effects normally represent a smaller fraction of emissions. Therefore the primary air quality issue associated with construction phase dust emissions is therefore loss of amenity and / or nuisance caused by, for example, soiling of buildings, vegetation and washing and reduced visibility. There is no formally recognised methodology for determining

these effects and no statutory environmental quality standards for which to compare levels of deposited dust or concentrations in air.

6.4.5 Dust deposition is expressed in terms of mass per unit area per unit time, e.g. mg.m^{-2}day^{-1}. UK guidance states that most non-toxic dusts will begin to be perceived as a nuisance when deposition reaches 200 mg.m^{-2}day^{-1} [Ref 23]. This figure is based on an annual deposition rate and represents the threshold for significant nuisance. A range of criteria from 133 to 350 mg.m^{-2}day^{-1} is found outside of the UK.

6.4.6 Research indicates that the most sensitive species of vegetation will be affected by dust deposition at levels above 1000 mg/m^2 per day [Ref 24]. This is considered to be approximately five times greater than the level at which non-toxic dust deposition may begin to be perceived as a nuisance at human receptors.

6.4.7 The usefulness of numerical criteria to determine effects from construction dust is limited as the perception of loss of amenity or nuisance is affected by a wide range of factors such as character of the locality and sensitivity of receptors. Because of this, assessment methodologies that are based on a qualitative approach are advocated in a range of guidance, including that produced by the Mayor of London [Ref 25], Buildings Research Establishment (BRE) [Ref 26] and Defra [Ref 27]. Therefore, a qualitative approach has been adopted for this assessment based on key issues identified in the guidance described above. This is a three stage approach.

6.4.8 The first stage of the assessment has involved the identification of construction activities which have the potential to cause dust emissions, and the degree of that potential, in accordance with the generic activities presented in Table 6.4 below.

Table 6.4: Generic Dust Emitting Activities

Stage	Description	Potential Dust Emitting Activities	Dust Emission Potential
Setup and enabling works	Rerouting of utilities	Excavation works	Medium-high
Roads and Infrastructure	Decommissioning, Re-energising of existing mains. Diversion of public sewers. Installation of new roads as required. Installation of infrastructure below road level. Roads to be constructed as phasing dictates.	Excavation works. Transport of materials. Re-suspension of dust on un-surfaced roads.	Medium
Site clearance and ground works	Soft-stripping of the walls and floors. Demolished material will be considered for use on-site; this material will therefore be crushed on-site.	Earthmoving Excavation Demolition Crushing Transport of materials Wind Re-suspension of dust on un-surfaced roads	High
Basement car parks	Preparation of foundations depending on building configurations.	Pile driving Excavation Earthmoving Transport of materials	High
		Wind	
Construction of new buildings	Details of exact building materials required not yet known.	Transport of materials Storage of materials Preparation of materials (cutting etc.) Re-suspension of dust on un-surfaced roads Wind	Low-Medium
Landscaping	Landscaping of the Development may be employed at a future date.	Earthworks Storage of materials Wind	Low-Medium

6.4.9 In the second stage of the assessment, all sensitive receptors with the potential to be significantly affected by construction dust emissions have been identified. The distances from source that construction dust effects are felt are dependent on the extent and nature of mitigation measures, prevailing wind conditions, rainfall and the presence of natural screening by, for example, vegetation or existing physical screening such as boundary walls on a site. However, research indicates that effects from construction activities that generate dust are generally limited to within 150-200 m of the construction site boundary [Ref 28]. Therefore, sensitive receptors within 200 m of the construction site boundary have been identified, and their sensitivity to effects determined in accordance with Table 6.5.

Table 6.5: Receptor Sensitivity

Sensitivity		
High	**Medium**	**Low**
Hospitals and clinics	Schools	Farms
Retirement Homes	Residential areas	Light and heavy industry
IT,-Technology industries	Food retailers	Outdoor storage
Painting and furnishing	Glasshouse and nurseries	Designated Sites
Food processing	Horticultural land	
	Offices	

Notes: Ref 23

6.4.10 The final stage of the assessment has been to identify other local factors which may affect dust emissions such as meteorological conditions and natural screening.

6.4.11 On the basis of the above, elements of the construction phase has been afforded a risk descriptor of high, medium or low in relation to its potential for causing significant dust effects and receptor sensitivity as presented in Table 6.4. This is then used to describe the overall risk of construction dust effects, as presented in Table 6.6 Mitigation measures have then been provided with reference to the Mayor of London's best practice guidance [Ref 29]

Table 6.6: Construction Phase Significance Criteria – Risk of Dust Effects

Dust Emission Potential	Receptor Sensitivity		
	Low	Medium	High
Low	None	Minor	Minor
Medium	Minor	Moderate	Moderate
High	Minor	Moderate	Substantial

Road Traffic Emissions

6.4.12 Construction of the proposed scheme will require associated construction traffic, comprising contractors' vehicles and HGV's and other diesel-powered vehicles. This will result in emissions of nitrogen oxides, fine particles and other combustion-related pollutants. These pollutants are covered by air quality objectives (see Section 6.2).

6.4.13 Specific construction traffic flows are not available at this stage and therefore is not included within the operational phase road traffic emissions assessment. However, construction traffic is expected to be lower than operational phase traffic which has been assessed quantitatively. Therefore, construction traffic emissions have not been assessed further.

Site Plant Emissions

6.4.14 Construction work requires the use of a range of site plant, such as excavators, piling equipment, cranes, on-site generators and hand tools. Each of these plant has an energy demand and therefore leads to an emission either directly (i.e. from the exhaust gas of the plant) or indirectly (for example, emission associated with electricity production).

6.4.15 Given the local and temporary nature of site plant and distance from off site receptors, effects of emissions on local air quality are considered to be of negligible significance and have not been assessed further.

Operation Phase

Assessment Scenarios

6.4.16 The proposed development will occur from the year of approval to 2027. For the purposes of environmental assessment, this has been separated into four separate 'Periods', as shown in Table 6.7

Table 6.7: Assessment Periods

Period	Years	Total Number of Residential Units[(a)]
A	to 2011	120
B	2011 to 2016	310
C	2016 to 2018	200
D	2018 to 2027	870

Notes: (a) Units constructed in each period

6.4.17 The development will affect traffic flows on the local road network as well as alter the layout of access roads near to the development site itself. The potential effects of these changes on local air quality at sensitive receptors have been assessed using the Highway's Agency's Design Manual for Roads and Bridges (DMRB) screening tool (version 1.03C) [Ref 30]. This method calculates pollutant concentrations at user defined locations using background concentrations and traffic flow data. This approach has been agreed in consultation with THC.

6.4.18 The following scenarios have been assessed:

- Baseline 2008 – The current situation;
- Scenario 2 – 2016 without the proposed development;
- Scenario 3 – 2016 with the proposed development;
- Scenario 4 - 2028 without the proposed development; and
- Scenario 5 - 2028 with the proposed development.

6.4.19 Occupation of the site, and subsequent development related traffic on the local road network, will steadily increase between Period A to 2028 (see Table 6.7). Background pollutant concentrations are predicted to decrease between 2008 and 2028 across the UK.

6.4.20 The year 2016 has been assessed as this represents the earliest year in which a substantial part of the development will be completed (end of Period B). The New Substation B970 Route will not be in use in 2016. The year 2028 has been assessed as this represents the first year that the site will be fully occupied and the New Substation B970 Route will be in use. The years 2016 and 2028 represent those with the greatest potential for negative air quality impacts from road traffic emissions.

6.4.21 Traffic data for the assessment scenarios have been provided by the project traffic consultant. A summary of the key inputs to the air quality assessment is presented in Table 6.8. Traffic speeds near to main junctions have been assumed to be 20 km per hour in accordance with government guidance [Ref 21].

Table 6.8: Traffic Data Used in DMRB Assessment

Link Name	2008 Baseline[a]			Scenario 2 – 2016 WO[a]			Scenario 3 – 2016 W[a]			Scenario 4 - 2028 WO[a]			Scenario 5 - 2028 W[a]		
	LDV	% HDV	Speed[b] (km/hr)	LDV	% HDV	Speed[b] (km/hr)	LDV	% HDV	Speed[b] (km/hr)	LDV	% HDV	Speeds[b] (km/hr)	LDV	% HDV	Speeds[b] (km/hr)
A9 south to junction with A86	10900	16.8	88	12500	17.3	54	12650	17.3	54	14650	18.6	85	15200	18.6	85
A9 north to junction with A96	9200	19	88	10550	20	53	11000	20	53	12400	21	83	13200	21	83
A9 Junction Link Road	2200	6.4	38.4	2500	6.6	22	3100	6.6	22	3000	7.1	32	5150	7.1	32
B9152 south to Kincraig	2100	2	67.2	2400	2.2	41	2400	2.2	41	2850	2.6	64	2850	2.6	64
B9152	6250	4.7	72	7150	4.9	43	7750	4.9	43	8400	5.2	66	10550	5.2	66
B9152 in Aviemore	6850	4.7	44.8	7850	4.9	25	9300	4.9	25	9200	5.2	32	14350	5.2	32
B970 to existing Dell Road	4000	2.9	48	4600	3	28	6600	3	28	5400	3.2	40	12700	3.2	40
Existing Dell Road to Nethy Bridge Road (B970)	2100	2.9	56	2400	3	35	4450	3	35	2850	3.2	58	2400	3.2	58
Ski Road to An Camas Mòr Site access (B970)	350	2	51.2	400	2.1	32	2450	2.1	32	450	2.2	54	150	2.2	54
Link Name	**2008 Baseline[a]**			**Scenario 2 – 2016 WO[a]**			**Scenario 3 – 2016 W[a]**			**Scenario 4 - 2028 WO[a]**			**Scenario 5 - 2028 W[a]**		
An Camas Mòr site access north (B970) includes Street of Kincardine	350	2	68.8	400	2.1	42	500	2.1	42	450	2.2	64	800	2.2	64
Ski Road	2050	1.8	72	2350	1.8	45	2350	1.8	45	2750	1.8	64	2750	1.8	64
New Substation B970 Route (site access road)	-	-		-	-	-	-	-	-	-	-	56	7500	2.2	56

1. **Notes: [a] Annual average daily traffic flows**
2. **[b] All speeds near to junctions assumed to be 20 km/hr**
3. **'WO' = Without development' scenario,**
4. **'W' = 'With development' scenario,**
5. **LDV – Light Duty Vehicle,**
6. **HDV – Heavy Duty Vehicle**
7.

NO_X to NO_2 Relationship

6.4.22 A number of methods for determining NO_2 concentrations from NO_X concentrations are available and supported by government guidance. Recent research [Ref 31] has provided a new method for the deriving NO_2 concentrations from NO_X concentrations specifically for use within road assessment scenarios from 2003 onwards. This is set out in Equation 6.1 below, and has been applied in this assessment to determine NO_2 concentrations from the DMRB NO_X output.

Equation 6.4: NOx to NO2 Conversion

$$\text{Road } NO_2 = ((-0.0719 \times \text{Ln}(\text{Total } NO_x)) + 0.6248) \times \text{Road } NO_x$$

Notes: Ref 31

Domestic Solid Fuel Generation Systems

6.4.23 It is anticipated that the proposed development will use domestic solid fuel heating systems in many of the proposed houses, although the exact number of systems is not known at this stage.

6.4.24 Solid fuel burning can result in emissions of NO_X, sulphur dioxide SO_2 and particulates which are regulated under the UK Air Quality Strategy and Scottish air quality Regulations through the air quality 'objectives (see Section 2). Under the Clean Air Act, local authorities may declare the whole or part of their district as a smoke control area. It is an offence to emit smoke from the chimney of a building, from a furnace or from any fixed boiler if located in a smoke control area. It is also an offence to acquire an “unauthorised fuel” for use within a smoke control area unless it is used in an “exempt” appliance. Certain appliances are considered “exempt” from the requirements of the Act as they have passed tests to confirm that they are capable of burning an unauthorised or inherently smoky solid fuel without emitting smoke [Ref 32] [Ref 33].

6.4.25 At present, THC has not declared a Smoke Control Area encompassing the proposed development site. Nevertheless, the appliances proposed to be used for domestic heating systems would burn smokeless fuel only and be of a design standard considered to be exempt from the requirements of a Smoke Control Area. In addition, the proposed domestic heating systems for the project will comply with the British adopted European Standard (BS EN 13240:2001+A2:2004) [Ref 34] and EU guidelines (EN 13240) [Ref 35] which relate to requirements for room heaters fired by solid fuels.

6.4.26 Given the very low existing background concentrations of NO_X and PM_{10} in and around the proposed development site, and the design of the proposed heating systems and fuel, it is considered that contributions from domestic fuel burning will not cause significant effects and have therefore not been considered further.

Effects on Sensitive Ecological Sites

6.4.27 The Design Manual for Roads and Bridges (DMRB) guidance provides a methodology for assessing air quality effects on Special Areas of Conservation (SAC), Special Protection Areas (SPA), National Nature Reserves (NNR), Sites of Special Scientific Interests (SSSI) and Ramsar sites (hereafter collectively referred to as ‘Designated Sites’).

6.4.28 Assessment of NO_X concentrations has included the following key stages (following the DMRB methodology):

6.4.29 Identification of all Designated Sites which are within 200 m of roads ‘affected’ (see below) by the project and have designated features which are sensitive to air pollutants directly or indirectly; and

6.4.30 Calculation of annual average NO_X concentrations at the Designated Sites with and without the proposals.

6.4.31 ‘‘Affected’ roads are defined as:

- Road alignment will change by 5 m or more; or
- Daily traffic flows will change by 1,000 AADT or more; or
- HDV flows will change by 200 AADT or more; or
- Daily average speed will change by 10 $km.hr^{-1}$ or more; or
- Peak hour speed will change by 20 $km.hr^{-1}$ or more.

3.4.32 Following a review of the traffic data provided and the location of Designated Sites within the study area, the Craigellachie Forest SSSI, River Spey SAC and the North Rothiemurchus Pine Woods SSSI have been identified as requiring assessment.

6.4.33 Results from the DMRB have been used to compare concentrations at the Designated Sites with and without the proposed development and to identify potentially significant effects in accordance with the above criteria.

6.4.34 Assessment of nitrogen deposition has included the following key stages (following the DMRB methodology):

- Identification of all Designated Sites which are within 200 m of roads ‘affected’ by the project and have designated features which are sensitive to nitrogen deposition;
- Obtaining total average nitrogen deposition for all 5 km by 5 km grid squares for the study area of interest from the Air Pollution Information System (APIS) [Ref 36];
- Obtaining background NO_X and nitrogen dioxide (NO_2) concentrations for the study area from the UK Air Quality Archive (AQA) [Ref 14];

- Calculation of annual average NO_2 concentrations at the Designated Sites with and without the proposals;
- Estimation of the dry deposition of NO_2 at the Designated Sites with and without the proposals and the dry deposition of NO_2 in the 5 km by 5 km APIS square;
- Determination of the road contribution to NO_2 dry deposition, and total nitrogen deposition; and
- Comparison with the relevant critical load.

6.4.35 Increases in nitrogen deposition at Designated Sites as a result of the proposals are concluded to be potentially significant when the critical load for the site is exceeded.

6.4.36 No assessment has been made of acid deposition or contributions to wet deposition as these are considered to be regional issues.

Receptors

6.4.37 Pollutant concentrations were predicted using the DMRB screening method at receptor locations within the study area, representing existing receptors where concentrations were likely to be highest and changes in air quality, as a result of the proposed development, were likely to be greatest. In addition, concentrations were modelled at discrete locations representing receptors introduced by the proposed development.

6.4.38 In all cases, human health receptors have been chosen in order to represent various locations within the study area where exposure is consistent with the averaging periods specified by the air quality objectives. LAQM.TG(03) [Ref 31] provides examples of where the air quality objectives should and should not apply. Relevant exposure locations are summarised in Table 6.9. Details of assessed receptors are provided in Table 6.10 and their location presented in Figure 6.2.

Table 6.9: Examples of Where the Air Quality Objectives Apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual Mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, libraries.	Building façades of offices or other places of work where members of the public do not have regular access. Gardens of residential properties. Kerbside sites (as opposed to locations at the buildings façades), or any other location where public exposure is expected to be short-term.
24 Hour Mean	All locations where the annual mean objective would apply. Gardens of residential properties.	Kerbside sites (as opposed to locations at the buildings façade), or any other location where public exposure is expect to be short-term.
1 Hour mean	All locations where the annual mean and 24 hour mean would apply. Kerbside sites (e.g. pavements of busy shopping streets). Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.

Table 6.10: DMRB Human Health Receptors

Receptor Name	Receptor Number	National Grid Reference	
		X	Y
South of the Fish Farm	1	289860	811387
On B970 South of Site Access	2	291414	811098
On B970 North of Junction with Ski Road	3	291498	810926
Coylum Road	4	291638	810850
Coylum Bridge	5	291680	810750
Coylum Cottage	6	291535	810743
On B970 West of Junction with Ski Road	7	291303	810703
On B970 off south track	8	290380	810681
On B970 on North Cul-de-sac	9	290349	810817
On Junction of B970 and existing Dell Road	10	290130	811037
B970 West of existing Dell Road	11	289892	811293
In-between B970, Dalfaber Road and Grampian Road	12	289406	811684
On Grampian Road (B9152) North of Junction with B970	13	289368	811799
On Junction of B9152 and B970	14	289273	811684
In between Grampian Road (B9152) and A9	15	289185	811639
On Grampian Road (B9152) opposite Rail Station	16	289498	812012
On Grampian Road (B9152) next to Carnigorn Hotel	17	289516	812531
West of A9	18	289104	811465
Next to A9	19	289100	811341
Receptor Name	**Receptor Number**	**National Grid Reference**	
In between A9 and B9152	20	289142	811272
East of B9152	21	289166	811154
In between A9 and B9152 north of junction	22	288999	811040
Lynwilg Farm	23	288098	810642
Lynwilg Farm House	24	287958	810431
South of Junction between A9 and B9152	25	288048	810159
East of A9 North of Ski Slope	26	289138	812711
High Density Housing near site access	27	291163	812199
Medium Density Housing near site access	28	291041	812198

Low Density Housing near new B970 substation route	29	290427	811974

6.4.39 In order to assess effects on the Craigellachie Forest SSSI, River Spey SAC and the North Rothiemurchus Pine Woods SSSI, receptors have been identified which represent locations where changes in concentrations of NO_X and NO_2 as a result of the proposed development are likely to be highest. Table 6.11 identifies the chosen receptors and the distance from the road and designated site.

Table 6.11: Receptors for Ecological Assessment

Receptor Name	Receptor Number	National Grid Reference		Road Name	Distance from Road (m)	Year of Assessment[(a)]	Designated site
		X	Y				
Next to A9 North	30	289134	811536	A9 North	27	2008 and 2028	Craigellachie Forest SSSI
				B9152	54		
Next to B9152	31	288635	810795	B9152	50		
				A9 North	17		
South East of B9152	32	288463	810477	B9152	117	2008 and 2028	River Spey SAC
				A9 North	170		
Over the River Spey on B970	33	288542	811583	B970	1	2008, 2016 and 2028	
Within Aviemore	34	289602	812032	B9152 in Aviemore	83		
Next to B870 near Coylum Bridge	35	291459	810678	Existing Dell Road to Nethy Bridge Road (B970)	5	2008 and 2016	North Rothiemurchus Pine Woods SSSI
				Ski Road to An Camas Mòr Site access (B970)	148		

Significance Criteria

6.4.40 A number of approaches can be used to determine whether the potential air quality effects of a development are significant. However, there remains no universally recognised definition of what constitutes 'significance' in relation to air quality. Guidance is available from a range of regulatory authorities and advisory bodies on how best to determine and present the significance of effects within an air quality assessment. It is generally considered good practice that, where possible, an assessment should communicate effects both numerically and descriptively.

6.4.41 Any description of an effect of a development is informed by numerical results. However, an element of professional judgement must also be involved. To ensure that the descriptions of effects used within this assessment are clear, consistent and in accordance with recent guidance, definitions for human health effects have been adapted from Environmental Protection UK's (EPUK) Development Control: Planning for Air Quality document [Ref 37]. Table 6.12 provides descriptors used for changes in NO_2 and PM_{10} concentrations as a result of the proposed development.

Table 6.12: Magnitude Descriptors for Predicted Change in Concentrations at Human Health Receptors

Descriptor	NO_2 / PM_{10} Concentrations (as % of Objective)
Very large	Increase/decrease > 25%
Large	Increase/decrease ≥ 15 - 25%
Medium	Increase/decrease ≥ 10 - 15%
Small	Increase/decrease ≥ 5 - 10%
Very Small	Increase/decrease ≥ 1 - 5%
Extremely Small	Increase/decrease < 1%

Note: Adapted from EPUK guidance [Ref 39]

6.4.42 The magnitude of any change identified must be considered in the context of existing air quality conditions within the study area to determine the significance of that magnitude (Section 3). Important aspects to consider are whether existing concentrations are above or below the relevant air quality objectives and limit values (Section 2), and whether existing receptors are within an AQMA.

6.4.43 Table 6.13 and Table 6.14 provide descriptors for the significance of air quality effects based on the magnitude of change in the context of existing conditions. Table 6.13 is applicable to receptors where concentrations increase as a result of the proposed Development and Table 6.14 is applicable to receptors where concentrations decrease as a result of the proposed Development. EPUK recognise that professional judgement is required in the interpretation of air quality assessment significance. The tables are intended as tools to help interpret the results of the air quality assessment.

Table 6.13: Descriptors for Effect Significance for Pollutants when Concentrations Increase with Proposed Development at Human Health Receptors

Absolute Concentrations in Relation to Standard/Location	Magnitude of Change in Concentrations due to the Proposed Development					
	Extremely Small	Very Small	Small	Medium	Large	Very Large
Above standard without scheme	Not Significant Adverse (Slight adverse)	Not Significant Adverse (Slight adverse)	Significant Adverse (Substantial adverse)	Significant Adverse (Substantial adverse)	Significant Adverse (Very Substantial adverse)	Significant Adverse (Very Substantial adverse)
Below standard without scheme, above with scheme	Not Significant Adverse (Slight adverse)	Significant Adverse (Moderate adverse)	Significant Adverse (Substantial adverse)	Significant Adverse (Substantial adverse)	Significant Adverse Very (Substantial adverse)	Significant Adverse (Very Substantial adverse)
Below standard with scheme, but not well below	Not significant (Negligible)	Not significant Adverse (Slight adverse)	Not significant Adverse (Slight adverse)	Significant Adverse (Moderate adverse)	Significant Adverse (Moderate adverse)	Significant Adverse (Substantial adverse)
Well below standard with scheme	Not significant (Negligible)	Not significant (Negligible)	Not Significant (Adverse Slight adverse)	Not significant (Slight adverse)	Not significant Adverse (Slight adverse)	Significant Adverse (Moderate adverse)

Table 6.14: Descriptors for Effect Significance for Pollutants when Concentrations Decrease with Proposed Development at Human Health Receptors

Absolute Concentrations in Relation to Standard/Location	Magnitude of Change in Concentrations due to the Proposed Development					
	Extremely Small	Very Small	Small	Medium	Large	Very Large
Above standard without scheme	Not significant Beneficial (Slight beneficial)	Not significant Beneficial (Slight beneficial)	Significant Beneficial (Substantial beneficial)	Significant Beneficial (Substantial beneficial)	Significant Beneficial (Very Substantial beneficial)	Significant Beneficial (Very Substantial beneficial)
Below standard without scheme, above with scheme	Not significant Beneficial (Slight beneficial)	Significant Beneficial (Moderate beneficial)	Significant Beneficial (Moderate beneficial)	Significant Beneficial (Moderate beneficial)	Significant Beneficial (Very Substantial beneficial)	Significant Beneficial (Very Substantial beneficial)
Below standard with scheme, but not well below	Not Significant (Negligible)	Not significant Beneficial (Slight beneficial)	Not significant Beneficial (Slight beneficial)	Significant Beneficial (Moderate beneficial)	Significant Beneficial (Moderate beneficial)	Significant Beneficial (Substantial beneficial)
Well below standard with scheme	Not Significant (Negligible)	Not Significant (Negligible)	Not significant Beneficial (Slight beneficial)	Not significant Beneficial (Slight beneficial)	Not significant Beneficial (Slight beneficial)	Significant Beneficial (Moderate beneficial)

Notes: The EPUK example had been used as a framework for this assessment; however, professional judgment is still required to determine the significance of any change.
'Well below standard' =< 75% of the standard level;
'Standard' = Air quality objective
AQMA = Air Quality Management Area,
Adapted from EPUK guidance Ref 37

6.4.44 For receptors that are introduced as part of the proposed development, the determination of significance is based on the absolute pollutant concentrations that receptors will be exposed to rather than changes in concentrations. Table 6.15 provides descriptors for the significance of air quality effects of NO_2 and PM_{10}, for receptors introduced by the proposed development. The relevant 'standards' are provided by the air quality objectives and therefore significance is determined in the context of potential effects on the health of receptors introduced by the development.

Table 6.15: Descriptors for Effect Significance for Pollutants at New Human Health Receptors

Concentrations at New Receptors	Number of Properties Exposed to Concentration			
	0-20	20-100	100-500	>500
Above Standard	Not Significant Adverse (Slight adverse)	Significant Adverse (Moderate adverse)	Significant Adverse (Substantial adverse)	Significant Adverse (Very substantial adverse)
Below standard but not Well below	Not significant (Negligible)	Not significant (Negligible)	Not Significant Adverse (Slight adverse)	Not Significant Adverse (Slight adverse)
Well below standard	Not significant (Negligible)	Not significant (Negligible)	Not significant (Negligible)	Not significant (Negligible)

Notes: 'Well below standard' = <75% of the standard level
Adapted from EPUK guidance

6.4.45 In accordance with the DMRB guidance increases in NO_X concentrations at Designated Sites as a result of the proposals are concluded to be potentially significant when:

- Changes in traffic flows as a result of the proposed development predicted to cause an increase in annual mean NO_X concentrations of at least 2 $\mu g.m^{-3}$; and
- Predicted concentrations (including background) are very close to or exceed the criterion of 30 $\mu g.m^{-3}$ [Ref 38].

6.4.46 Therefore, these two criteria will be used to identify whether changes NOX concentrations are potentially significant. Assessment of Construction Phase Impacts

6.5 Assessment of Construction Phase Impacts

Overview

6.5.1 A range of construction activities will take place during the An Camas Mòr development. The development is proposed to be undertaken in four consecutive phases, each of which will completely develop an area of the site to meet the requirements of residential living, including housing, all roads and services, open space, landscaping and local business, with the entire site being fully developed by 2027. Each phase will take between three and ten years.

6.5.2 A number of site compounds will be required for main road building / improvements; internal road building and building construction. There are to be two or three main site compounds established at any one time. They will provide staff welfare facilities, car park areas, storage areas for plant and equipment.

6.5.3 Activities during the construction phase will be controlled through a Construction Environmental Management Plan (CEMP) to be produced at a later stage. The CEMP will provide specific detail of the type and location of construction activities and particularly of site specific controls for environmental protection and pollution prevention and will be updated as the development progresses.

Identification of Dust Raising Activities

6.5.4 Detailed construction information is not available at this stage and therefore this assessment has been based on the broad construction information currently available. Construction activities which have the potential to cause dust emissions, and the degree of that potential are presented in Table 6.16.

Table 6.16: Dust Raising Potential from Construction Activities

Activity	Description	Phase	Materials and equipment used	Potential Dust Emitting Activities	Dust Emissions Potential (see Table 8.4)
Site Establishment	Site Preparation Works: vegetation trimming or removal, topsoil stripping to 300 mm, temporary drainage for construction works, laying of foundations, storage of waste, installation of services, transport of materials.	A	In situ concrete, timber, excavators, dumpers, HGVs	Transport of materials, excavation works,	Medium
Landscaping and Re-vegetation	Vegetation removal prior to laying of foundations. Vegetation will remain where possible. Topsoil stripping, material to be stored in bunds or stockpiles	A - D	Excavators, HGVs	Excavation works, transport of materials	Low - Medium
Services	Include sewage treatment and foul drainage, potable water provision, telecommunications and electricity.		UPVC pipes, electricity cables,	Transport of materials	Low - Medium
Traffic	Types of construction traffic include: HGV's, passenger vehicles for staff, bulldozers, and cranes.		As per 'Description'	Transport of materials, re-suspension of dust on un-surfaced roads.	Medium
Earthworks Strategy	Excavation, filling (except geological features (kettle holes)), storage of materials to be re-used.		Excavators	Excavation works, earthmoving, transport of materials, re-suspension of dust on un-surfaced roads.	Medium - High
Road Construction: -Road building and the development of pedestrian and cycle paths	Site preparation, excavation to expose road/footway formation, materials to be re-used, lay concrete kerb foundations, lay sub-base/bitumen/cement bound road pavement, apply road markings, lay bitumen, upgrading existing roads, installation of lighting and services. Laying of gravel on paths,		In situ concrete, bitumen, thermoplastic paint, aluminium, cast iron and plastic. Excavators, compactors, road laying machinery, compressors,	Excavation works, earthmoving, transport of materials, re-suspension of dust on un-surfaced roads	High
Development and construction of the Sustainable Drainage System Strategy	Site Preparation Works, excavation of pipes and drainage channels, lay pipe-work and backfilling trenches, connection of pipe-work to permanent SUDS, re-vegetation/seeding of areas in line with landscape strategy. Surface water drains laid, drains laid to housing manholes.		In situ concrete, brickworks, pre-cast concrete, UPVC Pipes.	Excavation works, re-suspension of dust on un-surfaced roads.	Medium - High
Development of Housing	Site Preparation works, excavation for drainage and house foundations, laying of foundation material, lay concrete strip foundations, lay concrete/timber ground floor, complete internal finishes with plaster and timber, connect water supply, connect electricity, complete landscaping, complete public and private road access.		In situ concrete, brickworks, glass and cladding, roofing membranes and insulation, timber, electric cables, plaster, insulation.	Transport of materials, storage of materials, preparation of materials (cutting etc.), re-suspension of dust on un-surfaced roads.	High

Identification of Sensitive Receptors

6.5.5 Figure 6.3 presents a map of the proposed development and a 200 m radius within which potentially significant dust impacts could occur. Eight residential receptors are located to the North West of the proposed development and along the new B970. The River Spey SAC is also located within the 200 m boundary to the North West of the proposed development. Within the 200 m boundary includes the Rothiemurchus

Fishery, farmland, offices and outdoor storage facilities. The proposed development will also be introducing new receptors including residential areas and schools to the area during the construction phase. These new receptors will be of medium sensitivity but will be included within the CEMP. Therefore overall receptor sensitivities are considered to be of medium sensitivity in accordance with Table 6.5.

Summary

6.5.6 Vegetation will be retained where possible throughout the development particularly within open spaces and on the periphery of the site as part of the design approach, providing a screening effect from construction activities. Based on the above assessment, receptor sensitivity is considered to be medium and overall dust raising potential medium to high. Therefore the proposed development is concluded to represent an overall 'moderate' risk of causing dust effects during the construction phase. Mitigation measures, consistent with the level of risk identified are presented in Section 6.7.

6.6 Assessment of Operation Phase Impacts

Effects on Human Health

6.6.1 Increases in NO_2 and PM_{10} concentrations at each receptor as a result of the operation phase traffic, along with the significance of the increase, are presented in Appendix D.

6.6.2 Annual mean NO_2 and PM_{10} concentrations are predicted to be 'well below' the air quality objectives at all receptors in 2008, 2016 and 2028 with or without the proposed development.

6.6.3 In 2016 the greatest predicted change of NO_2 concentrations is at receptor number 6 which is located 8 m from the centre of the B970 (Dell Road to Nethy Bridge Road). The increase of 1.58 % is considered to be 'very small' in accordance with the significance criteria adopted for this assessment. As total concentrations in the with development scenario are 'well below' the air quality objectives this impact is considered to be 'negligible'.

6.6.4 The greatest change in 2028 of NO_2 concentration is at receptor number 11 which is located 9 m from the centre of the B970 (B9152 to existing Dell Road). The increase of 5.7 % is considered to be 'small' in accordance with the significance criteria adopted for the assessment. As total concentrations in the with development scenario are 'well below' the air quality objectives this impact is considered to be 'slight adverse'. Receptor numbers 2 to 4 and 6 to 10 are predicted to experience 'extremely small' decreases in annual mean NO_2 concentrations in 2028 due to the redistribution of traffic flows along the new B970 through the proposed development. However, this improvement is also concluded to be 'negligible'.

6.6.5 Research has shown that where the annual mean NO_2 concentration is below 60 $\mu g.m^{-3}$, the hourly air quality objective (of 200 $\mu g.m^{-3}$ not to be exceeded more than 18 times per year) will also be met [Ref 39]. On this basis, none of the receptors assessed are predicted to experience NO_2 concentrations exceeding the hourly objective and impacts are concluded to be 'negligible', that is not significant.

6.6.6 Changes in annual mean PM_{10} concentrations are predicted to be consistent with the NO_2 concentrations for 2016 although generally smaller. The greatest change is at receptor number 11 with an increase of 0.97 % which is considered to be 'extremely small' in accordance with the significance criteria adopted for this assessment. As total concentrations in the with development scenario are 'well below' the air quality objectives this impacts in considered to be 'negligible'.

6.6.7 Changes in annual mean PM_{10} concentrations are also consistent with NO_2 concentrations for 2028, although generally smaller. Impacts are predicted to be 'negligible' for all receptors considered. The DMRB results indicate that the number of days where the 24 hour PM_{10} concentrations is over 50 $\mu g.m^{-3}$ is well below the objective at all assessed receptors, short term PM_{10} impacts are therefore concluded to be 'negligible' for all years with and without the proposed development.

6.6.8 The differences in the increases in concentrations as a result of the proposed development in 2016 and 2028 are due to the redistribution of traffic flows caused by the introduction of the New Substation B970 Route.

6.6.9 Background concentrations of NO_2 and PM_{10} within the proposed development are predicted to be 'well below' the relevant air quality objectives in 2016 by which a total of 430 residential units could be occupied. The air quality at these proposed on site receptors (receptor numbers 27 and 28) is anticipated to be 'well below' the air quality objectives. Therefore, in accordance with the significance criteria adopted for the assessment the air quality impact associated with the introduction of new on site receptors is concluded to be 'negligible'.

6.6.10 Background concentrations of NO_2 and PM_{10} within the proposed development are predicted to be well below the relevant air quality objectives in 2028 which is the year of completion. The air quality at the proposed on site receptors (receptor numbers, 27, 28 and 29) is anticipated to remain well below the objectives. Therefore, in accordance with the significance criteria adopted for the assessment, the air quality impact associated with the introduction of new on site receptors is concluded to be 'negligible'.

Effects on Sensitive Ecological Sites

Atmospheric NO_X Concentrations

6.6.11 Table 6.17 presents the results of the DMRB assessment for the specific receptors at the three Designated Sites. In all years and scenarios shown there are no exceedences of the NO_X limit value of 30 $\mu g.m^{-3}$.

6.6.12 In detail the results show that increases in NO_X concentrations as a result of the proposed development occur at locations closest to the affected roads at the River Spey and Craigellachie Forest and North Rothiemurchus Pine Woods Designated Sites. However concentrations decrease further from the affected roads as

pollutants disperse. Only Receptors 33 in 2028 experiences an increase in annual mean NO_X concentrations above 2 µg.m^{-3}, however, as total concentrations of NO_X are 'well below' 30 µg.m^{-3} this increase is not considered to be significant and all effects are therefore 'negligible', that is, not significant.

Table 6.17: Annual Mean NO_X Concentrations at Designated Sites

Designated Site	Receptor Number	Annual Mean NO_X Concentrations (µg.m^{-3})					Difference Between With and Without the proposed development for 2016	Difference Between With and Without the proposed development for 2028
		2008	2016 WO	2016 W	2028 WO	2028 W		
Craigellachie Forest SSSI	30	23.1	-	-	16.8	18.0	-	1.3
	31	29.0	-	-	21.0	22.6	-	1.6
River Spey SAC	32	3.8	-	-	3.0	3.1	-	0.1
	33	6.2	4.9	6.1	5.3	9.7	1.3	4.4
	34	3.7	2.9	3.0	3.0	3.6	0.2	0.6
North Rothiemurchus Pine Woods SSSI	35	4.5	3.5	4.9	-	-	1.3	-

Note: 'W'= With development scenario
'WO' = Without development scenario
'-' = Scenario not assessed

Nitrogen Deposition

6.6.13 The project ecologists have advised that there are four habitat classifications within Craigellachie Forest, one habitat classification within the River Spey and two habitat classifications within the North Rothiemurchus Pine Woods, as defined by APIS. APIS total average existing nitrogen deposition rates for these classifications, at these locations are presented in Table 6.17.

Table 6.18: APIS Total Nitrogen Deposition (Background)

APIS Grid Square (NGR)		Designated Site	Specific Sub Type	APIS Habitat Classification	Total Nitrogen Deposition (kg N ha^{-1} yr^{-1})		
X	Y				2003-2005	2016(1)	2028(1)(2)
287500	812500	Craigellachie Forest SSSI	Alder Woodland	Birch Woodland	12.9	-	9.3
			Birch Woodland				
			Northern Wet Heath	Lowland Heath	6	-	4.3
			Dry Heath				
287500	812500	River Spey SAC	Alder Woodland	Birch Woodland	12.9	10.1	9.3
292500	812500	North Rothiemurchus Pine Wood SSSI	Deciduous and Coniferous Forest	Coniferous Forest	12.2	9.6	-
			Raised and Blanket Bog	Blanket Bog	6.3	4.9	-

Note: NGR = National Grid Reference
(1) Based on a 2% reduction from 2003 – 2005 values per year [Ref 21].
(2) Values for 2020 used as this is the latest year for which data on background atmospheric concentrations are available

6.6.14 Tables 6.17 and 6.18 provide results for 2008, 2016 and 2028 (with and without the proposed development), assuming the different APIS average total nitrogen deposition rates which apply at the two Designated Sites (Birch Woodland, Lowland Heath, Coniferous Forest and Blanket Bog). These tables also provide a comparison with the relevant critical loads for the habitat classifications provided. Table 6.17 and Table 6.18 present the increase in nitrogen deposition caused by the proposed development.

6.6.15 In 2008, for Birch Woodland, all receptors are predicted to experience nitrogen deposition slightly above the lowest applicable critical load. In 2016, for Birch Woodland, all receptors representing the River Spey SAC are predicted to experience nitrogen deposition slightly above the lowest applicable critical load. The largest increase in nitrogen deposition as a percentage of the lowest critical load (i.e. most conservative) is 1.9% and occurs at Receptor 33.

6.6.16 In 2028, for Birch Woodland, all receptors representing the River Spey SAC are predicted to experience nitrogen deposition below the lowest applicable critical load. The largest increase in nitrogen deposition as a percentage of the lowest critical load (i.e. most conservative) is 3.2 % and occurs at Receptor 33. All receptors representing the Craigellachie SSSI are at or above the lowest critical load in 2028. The largest increase in nitrogen deposition as a percentage of the lowest critical load (i.e. most conservative) is 0.5% and occurs at both receptors.

6.6.17 In 2008 and 2028, for Lowland Heath, all receptors are predicted to experience nitrogen deposition below the lowest applicable critical load with or without the proposed development. The largest increase in nitrogen deposition as a percentage of the lowest critical load (i.e. most conservative) is 0.5 % and occurs at receptor 31.

6.6.18 In 2008, for Coniferous Forest, Receptor 35 which represents the North Rothiemurchus Pine Wood SSSI is predicted to experience nitrogen deposition slightly above the lowest applicable critical load. In 2016, for Coniferous Forest, Receptor 35 is predicted to experience nitrogen deposition below the lowest applicable critical load, with an increase in nitrogen deposition as a percentage of the lowest critical load (i.e. most conservative) of 0.6 %.

6.6.19 In 2008, for Blanket Bog, Receptor 35 which represents the North Rothiemurchus Pine Wood SSSI is predicted to experience nitrogen deposition slightly above the lowest applicable critical load. In 2016, for Blanket Bog, Receptor 35 is predicted to experience nitrogen deposition slightly above the lowest applicable critical load, with an increase in nitrogen deposition as a percentage of the lowest critical load (i.e. most conservative) of 1.3 %.

6.6.20 As all increases in nitrogen deposition as a result of the proposed development are small relative to the critical loads, and no exceedences are predicted to be caused, overall effects are concluded to be 'negligible', that is, not significant.

6.7 Mitigation Measures

Construction Phase

6.7.1 The assessment has identified a number of receptors which are potentially sensitive to dust emissions and it is therefore recommended that mitigation measures be applied to avoid the risk of nuisance effects or loss of amenity.

6.7.2 The mitigation measures provided below are consistent with current best practice for construction sites [Ref 40] and are suitable for incorporation into the CEMP.

Site Planning

- Erect solid barriers to site boundary;
- Plan site layout – machinery and dust causing activities should be located away from sensitive receptors where practicable;
- Identify to the local residents responsible person in charge; and
- Hard surface site haul routes where appropriate.

Construction Traffic

- All vehicles to switch off engines – no idling vehicles;
- Vehicles to be regularly maintained to comply with legislative requirements or in accordance with manufacturers recommendations;
- Effective vehicle cleaning and specific wheel-washing on leaving site;
- All loads entering and leaving site to be covered;
- No site runoff of water or mud; and
- Hard surfacing and effective cleaning of haul routes and appropriate speed limit around site.

Site Activities

- Minimise dust generating activities;
- Use water as dust suppressant where applicable;
- Enclose stockpiles or keep them securely sheeted; and
- If applicable, ensure concrete crusher or concrete batcher has permit to operate.

Operation Phase

- No mitigation measures are proposed for the operation phase as impacts are concluded to be negligible.

6.8 Residual Effects

6.8.1 For the construction phase, the implementation of the mitigation measures described above is anticipated to reduce the risk dust effects to a low level. On this basis, and that construction activities will occur for a limited period, residual effects are concluded to be negligible, that is not significant.

6.8.2 For the operational phase, no significant residual effects are anticipated as impacts are concluded to be negligible, that is, not significant.

6.9 Cumulative Effects

6.9.1 The assessment for future years is based upon the high growth traffic figures used for the Transport Assessment. The Transport Assessment has calculated for a high traffic growth rate within it's Baseline data and is thus assumed to have taken cumulative effects into account.

6.10 Summary and Conclusions

6.10.1 THC's local air quality assessments monitoring have not highlighted any areas of elevated NO_2 and PM_{10} concentrations in Aviemore, therefore there are no AQMAs within THC.

6.10.2 The potential for construction dust nuisance has been considered through a qualitative impact assessment. Due to the nature of the works, and location of sensitive receptors, it is anticipated that the construction phase represents a 'moderate' risk of causing significant dust effects if mitigation measures are not applied. Therefore, best practise mitigation measures have been committed to prevent or reduce the risk and effects would not be significant.

6.10.3 A DMRB assessment has been undertaken to ascertain the pollutant concentrations at existing sensitive receptors surrounding the affected roads and at new receptors introduced as part of the proposed development.

6.10.4 Annual mean NO_2 and PM_{10} concentrations are predicted to the 'well below' the air quality objectives in 2008, 2016 and 2028 with or without the proposed development. All predicted increased in annual mean NO_2 and PM_{10} concentrations are considered to be 'extremely small' or 'very small' in magnitude and of 'negligible' significance overall when considered in the context of the air quality objectives with the exception of receptor number 11 (B970 West of existing Dell Road) in 2028, where predicted increase in annual mean NO_2 concentrations are considered 'slight adverse' and therefore not a significant effect.

6.10.5 It has been determined that the proposed development leads to small increases in NO_X concentrations in areas of the North Rothiemurchus Pine Woods SSSI, River Spey SAC and Craigellachie Forest SSSI which are closest to affected roads. The

concentrations are below the NO_X limit value of 30 $\mu g.m^{-3}$ and therefore are concluded to be 'negligible' and therefore not a significant effect.

6.10.6 With regards to nitrogen deposition, as all increases in nitrogen deposition as a result of the proposed development are small relative to the critical loads, and no exceedences are predicted to be caused, overall effects are concluded to be 'negligible' and therefore not a significant effect.

6.10.7 With regard to sensitive ecological sites in can be concluded that annual NO_X concentrations will not be significant.

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