ENVIRONMENTAL STATEMENT
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A7.1 AIR QUALITY & DUST – DETAILED ASSESSMENT

7.1 INTRODUCTION

This chapter presents the impacts to air quality that may arise as a result of the construction and operation of the proposed airport development and its supporting infrastructure. Potential impacts on local air quality during the key phases of construction will be related to dust generating activities, including the:

- Construction of the wharf in Rupert's Bay;
- Quarrying of construction materials for the wharf;
- Set-up and use of the Contractor's lay down and compound areas;
- Construction of the bulk fuel installation;
- Construction of the access/haul road;
- Use of the haul road by construction vehicles;
- Construction of the airport, terminal building and associated buildings; and
- Impact of construction traffic exhaust emissions on local air quality.

In addition, once the construction works are completed there may be:

- Impacts from dust emissions post construction; and
- Impacts from operations associated with the airport, post construction, on local air quality.

Where adverse impacts are predicted, control and mitigation measures to minimise the impacts at sensitive receptors are recommended and discussed.

The existing conditions relating to air quality, temporary and permanent potential effects and mitigation and residual effects, are described in this Chapter. These are described in order of the following areas and topics:

- **Rupert's Bay** (temporary and permanent wharf);
- **Rupert's Valley** (Contractor's offices and compound areas, bulk fuel installation and temporary quarry);
- **Rupert's Bay to Prosperous Bay Plain** (access/haul road);
- **Prosperous Bay Plain** (airport and associated infrastructure, temporary runway);
- **Government Garage & Prosperous Bay Plain** (construction compounds);
- **Water Supply** (Sharks Valley intake, Dry Gut reservoir, and Gill Point sea water abstraction); and
- **Ancillary Components**.

Emissions of carbon dioxide associated with accessing the island by air, post construction, are discussed in Chapter 8, Volume 2.

7.1.1 Background to Dust

The most significant impacts from construction and operation are likely to be associated with the generation, dispersion and deposition of dust. Dust is a generic term used to describe fine particles that are suspended in the atmosphere. The term is non-specific with respect to the size, shape and chemical make-up of the particles: particles as small as a few nanometres (nm), and as large as 100 microns (µm), have been measured in the atmosphere. Dust is formed when fine particles become entrained in the atmosphere by the turbulent action of wind, by the mechanical disturbance of fine materials, or through the release of particulate-rich gaseous emissions. In England and Wales, the Environment Agency (EA, 2003) states that particles of 30-50 µm in diameter tend to be deposited quickly and as such this particle size approximates to annoyance, or nuisance dust. Such settled particles may show up as a deposit on clean surfaces such as cars and window ledges.

Dust formation is initiated by the disturbance of particles through mechanical action, such as blasting, handling, transporting, in combination with air movement. Where particles are small and light, with a high surface area relative to their mass, the upward forces exerted on particles by air movement may exceed downward gravitational forces, leading to the dust becoming airborne. Consequently the potential for dust formation during construction activities is difficult to quantify and will be dependent on the type of activity to be undertaken, soil and substrata type, topographical features, the number of preceding dry days, prevailing wind speed and direction as well as the shape, size, density and moisture content of dust particles.

In addition, soft friable materials break easily producing a greater number of dust particles for a given degree of handling. In contrast, hard minerals, such as granite, require more energy to break into smaller pieces and are therefore less likely to form dust.

For dust to become airborne, energy is required to overcome the gravitational and cohesive forces binding dust particles to the surface. In general terms, emissions can be seen to occur through two related but distinct processes:

- Saltation (jumping) of particles across a surface; and
- Suspension of particles and their entrainment in airflow.

Dust is dispersed by wind. Smaller dust particles remain airborne for longer, dispersing widely and depositing more slowly over a wider area. Research has shown that large dust particles (greater than 30 µm) will largely deposit within 100 m of sources. Intermediate sized particles (10 - 30 µm) are likely to travel up to 200 - 500 m. Smaller particles (less than 10 µm) which only make up a small proportion of dust emitted from most workings can travel up to 1 km from sources.

The deposition of dust on buildings, windows, cars and street furniture is the most likely reason for people to make a complaint regarding dust. The ‘custom and practice’ dust deposition limit (refer to the following section) is intended to represent the level at which dust deposition becomes a ‘serious nuisance’. It is recognised that people’s perception of when deposited dust becomes a serious nuisance varies considerably.

Dust deposition on windows, on the outside of the house and on cars are the most frequently mentioned reasons for concern. The following factors may be used to determine whether surface soiling by dust is considered a nuisance:

- Deposition on a surface which is usually expected to remain free from dust;
- The colour contrast between the deposited dust and the surface upon which it settles;
- The nature of the illumination of the surface - "dinginess";
- The presence of a nearby clean 'reference' surface against which comparison may be made;
- The rate of change in the visual properties of a surface;
- The identity of the area and the composition of the local community;
- Social factors, such as lifestyle and patterns of working;
- The personal experiences and expectations of the observer; and
- Adverse publicity influencing the expectations of the observer.

7.1.2 Dust Legislation and Guidance

Although coarse dust is not regarded as a threat to health as it is not readily inhaled into the lungs, it can create a nuisance by depositing on surfaces. No statutory or official air quality criterion for dust annoyance has been set at a UK, European or WHO level. However, in England and Wales there is a 'custom and practice' dust deposition limit of 200 mg/m^2/day, over the course of a year, for measurements with dust deposition gauges (EA, 2003). This guideline has been used widely in environmental assessments in the UK, and is similar to criteria in other countries:

- In the USA, Washington has set a state standard of 187 mg/m2/day for residential areas;
- The German TA Luft criteria for 'possible nuisance' and 'very likely nuisance' are 350 mg/m2/day and 650 mg/m2/day respectively, over the course of a month;
- Western Australia also sets a two-stage standard, with 'loss of amenity first perceived' at 133 mg/m2/day and 'unacceptable reduction in air quality' at 333 mg/m2/day, both over the course of a month; and
- Swedish limits promoted by the Stockholm Environment Institute, and used regularly in Scotland, range from 140 mg/m2/day for rural areas to 260 mg/m2/day for town centres.

Due to the greater likelihood of particles below 10 µm in diameter reaching the lungs and having an adverse impact on health, there are UK Air Quality Objectives for particulate matter of less than 10 and 2.5 µm in diameter (PM_{10} and $PM_{2.5}$).

7.2 METHODS

7.2.1 Construction Dust Assessment Methodology

The impacts of the airborne dust generated during the various stages of construction were assessed qualitatively.

Dust impacts from construction operations may be found up to 500 metres from active construction sites (Bate *et al*., 1990) and may include visual impacts such as reduced visibility, the coating and soiling of surfaces, i.e. cars, windows etc., (in addition to physical and/or chemical contamination and corrosion of artefacts), coating of vegetation, contamination of soils and surface waters and most importantly health effects due to inhalation and deposition on the skin (construction and post construction).

Due to the technical difficulties in quantifying meaningful dust emission levels and dispersion, emphasis is generally placed on identifying those particular activities which give rise to the greatest dust emissions and then formulating suitable control strategies. Premises and occupants within 100 m of construction site are generally considered to experience the most significant impacts from construction dust.

Sensitivity to the impact of construction will be dependent on the proximity of potentially sensitive receptors to the development, the perception of the need for the development by the local community, and the scale and duration of the construction phases. Activities and processes with the potential to give rise to dust emissions are likely to be as follows:

- Blasting;
- Surface stripping;
- Crushing and grading;
- Wind-blow from materials storage;
- Mechanical materials handling, processing and transport;
- Vehicle/plant movements on haul/access routes;
- Vehicle/plant movements over construction site;
- Surface soil restoration;
- Wind blown materials from disturbed areas with no natural crusting or local vegetative cover; and
- Concrete batching and finishing.

The criteria in Table 7.1 are drawn from professional experience of many different types of project, discussions with practitioners in the field and published reports. Together with a consideration of the scale and duration of construction activities close to sensitive receptors, these criteria form the basis of the evaluation of significance and severity of effects.

Table 7.1 Assessment Criteria for Construction Dust

Source			Potential distance for significant effects (distance from source)	
Description	**Scale**	**Duration** [(a)]	**Soiling**	**Effects on vegetation**
No Mitigation				
Large construction sites, with high use of haul routes	Major	Year or more	500 m	100 m
Moderate sized construction sites, with moderate use of haul routes	Moderate	Months	200 m	50 m
Minor Construction sites, with limited use of haul routes	Minor	Weeks	100 m	25 m
With Mitigation Implemented				
Large construction sites, with high use of haul routes	Major	Year or more	100 m	25 m
Moderate sized construction sites, with moderate use of haul routes	Moderate	Months	50 m	15 m
Minor Construction sites, with limited use of haul routes	Minor	Weeks	25 m	10 m

Notes: (a) – duration applies to time near to a particular receptor;

For the purpose of this study, taking account the range of dust generating activities, the magnitude of the impacts have been defined as either High, Medium or Low:

- **High:** Major construction activities, over a year or more in close proximity to receptors;
- **Medium:** Moderate construction activities, over a year or more in close proximity to receptors; and
- **Low:** Minor construction activities, over a period of months, not in close proximity to receptors.

In order to determine the significance of the impact of the proposals it is necessary to identify receptors and facilities most likely to be affected. Emphasis is generally placed on locations where both the public and the wider environment might be exposed to pollutants for substantial periods. Examples of dust-sensitive receptors to be considered in this part of the assessment are listed in Table 7.2. These have been taken from Minerals Policy Statement 2: Controlling and Mitigating the Environmental Effects of Mineral Extraction in England (ODPM, 2005).

Table 7.2 Examples of Dust-Sensitive Facilities

High Sensitivity	Medium Sensitivity	Low Sensitivity
Hospitals and clinics	Schools	Farms
Retirement homes	Residential areas	Light and heavy industry
Hi-tech industries	Food retailers	Outdoor storage
Painting and furnishing	Greenhouses and nurseries	
Food processing	Horticultural land	
	Offices	

The types of locations where exposure needs to be evaluated on St. Helena include:

- Residential properties;
- Recreational facilities;
- Medical facilities;
- Agricultural areas;
- Sensitive ecological habitats;
- Bottom Woods Meteorological Station; and
- Commercial properties including the 'Argos' fish processing facilities at Rupert's Bay.

Receptors with the potential to be affected by one or more aspects of the proposals will fall within all the categories displayed in Table 7.2.

The significance of the adverse impacts have been defined as major, moderate or minor, taking into account the magnitude of the impact and the sensitivity of the receptor. Where no significant impacts are predicted, the activity/process is described to be of negligible significance. Significance of the impacts has been assigned using Table 7.3.

Table 7.3 Significance Matrix

		Impact Magnitude (Defined Above)		
		High	**Medium**	**Low**
Receptor Sensitivity (Table 7.3)	**High**	Major Adverse	Moderate Adverse	Minor Adverse
	Medium	Moderate Adverse	Moderate Adverse	Minor Adverse
	Low	Minor Adverse	Minor Adverse	Negligible

7.2.2 Construction Vehicle Emissions Assessment Methodology

In the context of this project, the emission of pollutants from the exhausts of construction vehicles and plant machinery is likely to be a less significant issue than the generation of dust. The impact of these emissions has been assessed quantitatively according to the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 1, (UK Highways Agency, 2007). The pollutants of most concern due to exhaust emissions are nitrogen dioxide (NO_2) and PM_{10}.

7.3 EXISTING CONDITIONS

7.3.1 Overview

St. Helena is the eroded summit of a volcano rising from the sea floor. The valley sides and cliffs reveal a succession of lava flows with interbedded ash and pyroclastic deposits. The exposed rocks are of the alkali olivine basalt-trachyte-phonolite assemblage. The basalts account for the greatest volume of the exposed rocks. Basalt is an igneous rock occurring as lavas and dykes. It is a fine-grained, crystalline, dark and heavy. Examination of valley rock structures reveals a history of numerous eruptions, each identifiable by a lava flow ranging in thickness from 1 to 30 metres, commonly with an overlying ash layer of varying thickness and colour. The ash layers are responsible for much of the structural instability in the cliffs and valley sides since they are easily eroded by rain, wind and waves and compressed by the weight of overlying rocks.

The island has a varied topography, local microclimates and local vegetation, dependent on the climatic conditions, in particular rainfall.

Given its location and lack of industrial, transport or domestic pollution sources, air quality across the island is currently very good. The arid nature of parts of the island, including Prosperous Bay Plain, will however mean that given local topography and meteorology, local dust generation is commonplace. With the exception of some short-term dust monitoring, conducted during a site visit as part of this study (Section 7.3.8), no air quality monitoring has been undertaken on St Helena.

A number of site visits were undertaken during October 2005, November 2005 and August 2006 along the proposed haul/access routes and on the proposed airport site. Observations of relevance to air quality and dust were recorded, such as the locations of sensitive receptors and the degree of vegetation. These observations are presented in the following text. In addition, some short-term dust measurements which were taken are also presented.

7.3.2 Rupert's Bay

Rupert's Bay will be the location of the temporary and permanent wharf. Receptors located at Rupert's Bay, relevant in terms of air quality, include a cannery (which currently has no sealed windows), the 'Argos' fish processing plant, the existing bulk fuel installation, and various commercial properties.

7.3.3 Rupert's Valley

There are various residential properties located in the narrow valley bottom of Rupert's Valley, either side of the existing single track road. Trees are mainly restricted to the valley bottom; the sides of the valley are generally bare and exposed, with the upper slopes interspersed by scattered vegetation. Eroded gullies along the upper slopes are dominated by bare soil and rock substrates. Due to the arid nature of the valley and the minimal vegetative cover, dust may easily be generated.

The new bulk fuel installation is to be located in Rupert's Valley, beyond the power station and quarantine building. A Contractor's compound is also proposed in the valley.

The temporary quarry is to be located in Rupert's Valley; there are currently two options, one is near to the mid-valley BFI and Quarantine Station, and the second option is approximately 1 km further up the valley; further from the residential properties in the valley and Rupert's Bay.

7.3.4 Rupert's Bay to Prosperous Bay Plain

The proposed haul/permanent access road will run from the new/temporary wharf facility in Rupert's Bay to the proposed airport site via Deadwood (see Figures 2.1, 2.16 and 2.17 in Volume 3 of the ES). The route will pass the fish processing plant and cannery in

Rupert's Bay, the existing residential properties within Rupert's Valley, before climbing up the rocky and unstable valley sides.

The road will them progress to Deadwood Plain, an elevated plateau area. It is an exposed and windswept area, with vegetation comprising mixed grass pasture. The road will pass existing residential properties in the Deadwood area, and will also pass through or near several sensitive Wirebird habitats.

The road then drops down to Mulberry Gut, Longwood, Bilberry Gut and Bottom Woods, where much of the land is arable and vegetated. The road then passes Government Garage before descending to the land at Bradleys on the approach to Prosperous Bay Plain.

The final leg of the haul/access route will traverse the arid and exposed sparsely vegetated area of Prosperous Bay Plain, which is one of the driest areas on the island.

7.3.5 Prosperous Bay Plain

The proposed airport will be constructed in a north south alignment on Prosperous Bay Plain. The area between Prosperous Bay and Prosperous Bay Plain is dry with scarce vegetation. The soil is both rocky and dusty. Wind travels across the area almost constantly from the south and south east.

Site visits noted some degree of dust blow across Prosperous Bay and Prosperous Bay Plain (see Photograph 7.1 View east across Prosperous Bay Plain with wind-blown dust arising from the plain – November 2006). However, the degree of dust blown is to some extent mitigated by the undulating terrain which provides some sheltered areas, and by the crusting of the dusty soils. This crusting may be associated with the likely high saline content of the soil from ocean derived aerosols. Breaking the crust of the dusty soil gave rise to the immediate generation of dust from the disturbed area (refer to the study described in Section 7.3.8).

Soil samples from the currently relatively sheltered Central Basin area were taken for particle size and shape analysis during a site visit undertaken in August 2006. Three samples were submitted to Leeds University for Scanning Electron Microscope (SEM) analysis. A summary of the results of the analysis is provided in Table 7.4.

Table 7.4 Summary of Particle Shape Analysis

Sample location	Sample Width, Mean (µm)	Sample Length, Mean (µm)	Sample Diameter, Mean (µm)	Sample Roundness, Mean (µm)
Central Basin 1	96.0	127.7	106.5	0.71
Central Basin 2	77.5	102.4	85.4	0.71
Central Basin 3	73.0	96.7	80.9	0.71

Three separate samples were taken from the central basin, so as to give an indication of the range of material naturally present. When left undisturbed, a natural crust forms, binding the particles together, minimising the likelihood of them becoming airborne or being blown across the surface. However, if the crusted surface is disturbed, the particles have the potential to become airborne. Repeated disturbance, by vehicles and machinery, will not only expose the particles, but the particles will be crushed and broken into smaller sizes. Their likelihood of becoming airborne will greatly increase, and the wind speed required to move and transport the particles will decrease.

7.3.6 Government Garage and Prosperous Bay Plain

Construction compounds are planned for an area next to Government Garage at Bradleys, overlooking Prosperous Bay Plain, and also a larger area directly west of the airport, to include the possible temporary runway. The landscape here is exposed, sparsely vegetated and arid.

7.3.7 Meteorological Data

St Helena has a tropical climate with no great extremes of temperature. The southeast trade winds deliver the heaviest rainfall to the south coast and to the higher ground (750-1,000 mm/year). The meteorological station at Bottom Woods (Met Office, 2006) has measured an average of 466 mm of rain per annum over the last 20 years. However, the area around Prosperous Bay Plain is much drier: an average of 195 mm of rain per annum was recorded for 2004-5. Jamestown is similarly dry: an average of 218 mm per annum was recorded in 2006.

The prevailing winds tend to blow all year. The strength of the wind is to some extent dependent on location on the island in terms of height and local shelter. The meteorological station at Bottom Woods has measured an annual average wind speed of 6.6 m/s over the last 20 years. However, depending on local topography, wind speeds and direction can vary considerably, providing areas of high turbulence and areas which are relatively sheltered. For example an average wind speed of 3.4 m/s was recorded during 2004-2005 at Prosperous Bay Plain.

7.3.8 Dust and Particle Study

The arid and exposed nature of parts of the island, and the lack of vegetation, means that local dust generation is commonplace. This is particularly relevant for Prosperous Bay Plain, Rupert's Hill, and Rupert's Valley.

Short-term suspended particulate monitoring using a hand-held light scattering device was undertaken along the alignment of the proposed haul/access routes, and in proximity to potentially sensitive receptors nearest to the proposed airport construction site (See Table 7.5.). The sampling locations are illustrated in Figure 6.1 in Volume 3 of this ES.

Table 7.5 Measured Ambient Dust Results

Location	Date	Time	Wind Speed m/s	Wind Direction (from)	Temperature °C	Conditions	Total Suspended particulate (TSP) µg/m^3	PM_{10} µg/m^3	$PM_{2.5}$ µg/m^3	$PM_{1.0}$ µg/m^3
Rupert's Valley	15/11/2005	12:49	2.3	S	30.1	Sunny, dry	46.7	38.8	9.7	1.03
Deadwood	15/11/2005	13:41	1.6	SE	26.8	Sun/cloud, dry	34.3	27.9	7.5	0.75
Mulberry Gut (Longwood)	15/11/2005	14:35	1.2	SE	25.8	Sunny, dry	50.9	38.5	8.0	0.78
Bilberry Field Gut (Longwood)	15/11/2005	15:30	0.8	SW	27.5	Cloudy, dry	100.2	60.1	9.0	0.95
Government Garage (Bradleys)	15/11/2005	16:01	3.6	SE	21.8	Cloudy, dry	56.7	45.2	7.7	0.7
Government Garage (Bradleys)	23/11/2005	9:15	3.4	S	18.8	Cloudy, dry	70.6	57.6	10.3	0.88
Longwood (5 mins)	23/11/2005	9:50	2.8	S	18.6	Cloudy, dry	80.6	56.7	9.0	0.8
Longwood (15 mins)	23/11/2005	10:45	2.8	S	18.6	Cloudy, dry	80.3	55.4	9.6	0.84

In the exposed and arid areas there was evidence of localised dust generation compared with areas which have maintained a vegetative cover. This dust generation was also likely to be dependent on wind exposure and moisture content. There was little evidence of dust cover on local vegetation in either the more fertile or arid areas of the proposed haul/access routes. The lack of dusting in the arid locations may be as a result of the soil surface crusting mitigating wind-blown dust, or natural adaptation to prevailing climatic conditions.

To illustrate the impact of disturbing the surface, a trial was carried out whereby a vehicle was driven back and forth along an unsurfaced track. Dust monitoring was carried out at various distances perpendicular and downwind of the track. The results of the study are illustrated in Table 7.6. Despite the vehicle being driven at just 15 km/h, a highly visible cloud of dust was produced. This observation was reinforced by the high particulate concentrations measured; it can also be clearly seen that the concentrations decreased with distance from the track. However, even at 50 metres from the track, high concentrations were recorded. It should be noted that the values provided in the table are averaged values based on four 'trials'.

Table 7.6 Track Trial Dust Generation

		Distance from unsurfaced track				
		3 m	**5 m**	**10 m**	**20 m**	**50 m**
TSP	µg/m³	2269	1391	1016	842	243
PM_{10}	µg/m³	2152	1271	715	591	138
$PM_{2.5}$	µg/m³	93	70	36	50	14
$PM_{1.0}$	µg/m³	6.0	5.6	2.3	3.6	1.2
Wind Speed	m/s	4.1				
Temperature	°C	21.8				
Conditions	Dry, cloudy					
Vehicle speed	km/h	15				

7.4 CONSTRUCTION EFFECTS

7.4.1 Potential Effects

There are two categories of effects to consider during construction:

- The most significant impacts will be associated with the generation of dust due to construction activities, heavy vehicle movements and quarrying; and
- A potentially less significant issue will be exhaust emissions from construction vehicles, and plant machinery.

The construction period has been estimated to run over four years, with construction of the haul road and temporary wharf estimated to take 26 weeks and other aspects of the proposals taking 200 weeks, based on working 6 day weeks.

Construction traffic estimates are provided below, followed by a review of the potential impacts for each area, in the order described above in Section 7.1.

7.4.1.1 Construction Traffic

Construction traffic estimates on the haul road have been provided by WS Atkins plc, and are detailed in the Transport Statement. Those figures and details of relevance to this chapter are summarised below:

Jamestown

During the four year period of the construction of the airport, it is estimated that there will be 5-30 trips daily between Jamestown and the airport (5,500 in total). These trips will be due to the movement of site personnel and visitors, and will not include HGVs. They will leave the haul road west of Longwood and will result in a negligible impact on air quality.

Rupert's Bay
During the four year period of the construction of the airport, it is estimated that there will be 7-20 trips daily between Rupert's Bay and the airport (8,250 in total, an average of 7 per day). These trips would be fuel bowsers, flat beds, low beds, lorries and tippers.

During the 16 week period of the construction of the temporary wharf, it is estimated that there will be 40-80 trips daily between Rupert's Bay and the quarry (6,000 in total, an average of 40 per day). These trips would be mainly dump trucks carrying material from the quarry.

Haul Road
During the 26 week period of the construction of the haul road, it is estimated that there will be 37-50 trips daily (5,820 in total, an average of 37 per day). These trips would be mainly fuel bowsers and dump trucks.

Airport Accommodation Facility
During the four year period of the construction of the airport, it is estimated that there will be 15-30 trips daily between the camp and the airport in either light vehicles or crew buses (18,000 in total, an average of 15 per day). The camp would be located either near to Government Garage or closer to the airport.

Total Trips
During the construction of the temporary wharf and haul road, between 77-130 trips per day are predicted; the most trips per day will be between the quarry and Rupert's Bay.

During the construction of the airport 27-80 trips per day would be expected; most trips would be between the airport and Government Garage; only 7-20 would be expected between Longwood and Rupert's Bay.

Exhaust Emissions
Construction vehicle and plant exhaust emissions have the potential to impact on local air quality. These sources would include: site preparation vehicles and equipment, site vehicles, vehicles carrying materials to and from the construction site, mobilisation of plant, site visits, and worker journeys.

Based upon the predicted traffic movements, the greatest impacts are likely at the residential properties in Rupert's Valley, between the quarry and Rupert's Bay, during the initial 6-month mobilisation period. The DMRB has been used to predict worst-case increases in pollutant concentrations at these properties. At a distance of 15 metres from the road centre, assuming a speed of 20 km/hr, a nominal year of 2008, and that all the vehicles are HGVs, a contribution of 0.65 and 0.15 $\mu g/m^3$ to the annual mean concentrations of NO_2 and PM_{10} respectively were predicted. These concentrations are very small in magnitude, and considering the current very good air quality, the impact of vehicle emissions on local air quality during construction can be assumed to be of negligible significance.

7.4.1.2 Rupert's Bay

The construction of the temporary wharf at Rupert's Bay will allow the landing of the heavy equipment necessary for the construction of the permanent wharf and the haul/access road. The permanent wharf will be constructed outside the footprint of the temporary wharf.

The temporary wharf is to be located on the western side of Rupert's Bay, and will be a promontory constructed from quarry fill covered in a layer of protective rock armour. This may require a quay wall to be formed from sheet piles or block work.

The material to construct the core and armour of the permanent wharf will be sourced from the proposed quarry in Rupert's Valley or using rock fill from the cut material excavated from the access route as it is constructed up to Rupert's Hill Trig. Material from the temporary wharf may also be used.

There is the potential for dust emissions during construction of the wharf, and during the removal or break-up any temporary wharf (depending on the Contractor's construction methods). Relevant nearby receptors include the fish processing plant. Depending upon the methods chosen by the Contractor, dust emissions will arise from activities such as:

- Cutting, crushing and grading;
- Wind-blow from materials storage;
- Materials handling, processing and transport;
- Vehicle/plant movements to and from the site; and
- Concrete batching and finishing.

With no mitigation in place, dust impacts of moderate adverse significance may be expected, due to the proximity and sensitivity of the fish processing plant (vehicle movements to and from the quarry are considered separately: see Section 7.4.1.4).

7.4.1.3 Rupert's Valley

Contractor office and compound areas have been identified and are displayed in Figure 2.1 in Volume 3 of this ES. These compounds will consist of offices, set down and storage areas. Stockpiles in these areas will not generally exceed 2 metres in height and side slopes will not be steeper than 1 in 1.5. The tops of the stock piles will be profiled to shed rainwater and material will not be stored closer than 2 metres to the crest of any slope or temporary cutting. These measures will reduce the potential for dust emissions. Nevertheless there will be the potential for emissions due to:

- Wind-blow from materials storage; and
- Materials handling, processing and transport.

With no mitigation in place, dust impacts of minor to moderate adverse significance may be expected, depending upon the compound and the activities undertaken within.

The new BFI will be located in Rupert's Valley beyond the power station and the quarantine station building (see Figure 2.15 of Volume 3 of the ES). This will replace the existing BFI on the shore of Rupert's Bay. It is likely that once the new BFI is up and running the old BFI site will be used as a set down area. Due to its location away from sensitive receptors, dust impacts associated with the construction of the BFI will be minimal, and of negligible significance.

The temporary quarry will be located within Rupert's Valley to provide rock armour for Rupert's Bay Wharf, rock fill for the core of Rupert's Bay Wharf, fine and course aggregate for concrete (for the Wharf, Upper Rupert's Valley Bulk Fuel Installation, and the Airport Access Road), road base and road surfacing aggregate for the Airport Access Road and other roads, and aggregate for special uses in construction (e.g. drainage).

There are currently two options, one is near to the proposed BFI and Quarantine Station (mid-valley option), and the second option is approximately 1 km further up the valley; further from the residential properties in the valley and Rupert's Bay (upper-valley option). Both options would require a quarry haul road to be cleared and graded to allow access to the main airport haul road.

Surface mineral sites producing aggregate products are potentially significant sources of dust. Dust may be generated at mineral sites during a range of site preparation, excavation, transportation and minerals processing operations. The potential for the generation of dust at surface mineral sites is largely related to the hardness of the materials being handled, the extent and degree of handling necessary, and the size of the mineral product(s) being produced.

A significant cause of dust emission at mineral workings is wind-blow. Wind has the potential to lift dust from surfaces, depending on the speed of the wind, the condition of the surface and the size of the dust particles. Dust emissions from surface mineral workings will arise from:

- Vehicle movements;
- Emissions from stockpiles;
- Mechanical handling operations, including crushing and grading processes; and
- Excavation (blasting, hammer breaking, ripping and digging; the processes employed would be dependent on nature of the rock to be won).

Both quarry options would be worked principally by blasting to develop faces and to loosen and fragment the rock to be extracted. Hammer breaking, ripping and digging may also be used in weaker areas of rock. Blasts would be designed to yield the sizes and relative proportions of materials needed, which would range from blocks of rock for armour to highly fragmented rock for feeding into the crushing and screening plant.

The dust generated by the quarry may potentially impact on local residents, environmental quality and the water course running along the valley bottom. Sensitive receptors can be potentially affected by dust up to 1km from the dust source, although concerns regarding dust are more likely to be experienced near to source generally 100m depending on site characterisation and the mitigation employed.

Should the upper-valley option be chosen the potential for dust impacts would be of lesser significance than if the mid-valley option were chosen. This is due to the remoteness of the upper-valley site with respect to the residential properties in Rupert's Valley. Also it is further from the proposed BFI and Quarantine Station. Minor adverse unmitigated impacts would be predicted for the upper-valley option; moderate adverse unmitigated impacts would be predicted for the mid-valley option.

7.4.1.4 Rupert's Bay to Prosperous Bay Plain

The proposed haul/permanent access road will run from the new/temporary wharf facility in Rupert's Bay to the proposed airport site via Deadwood (see Figures 2.1, 2.16 and 2.17 in Volume 3 of this ES). A new road will be constructed to connect the wharf to the existing road in Rupert's Bay, which will also be upgraded. The route will climb out of Rupert's Valley, over Rupert's Hill, before passing through Deadwood Plain, Mulberry Gut, Longwood, Billberry Gut, Bottom Woods, before reaching Prosperous Bay Plain. The road will link with the existing road network at Longwood.

There is the potential for impacts associated with:

- The generation of dust during the construction of the road;
- The generation of dust during the use of the road by construction vehicles and associated vehicles; and
- Exhaust emissions from construction vehicles, and plant machinery.

A general description of the key features of the road is described below, followed by an analysis of the potential impacts for each section of the route. The most significant impacts are likely at sensitive receptors in the dry areas of Rupert's Bay and Valley, and at sensitive receptors in Deadwood and Prosperous Bay Plain. A summary of the construction traffic predictions are provided in Section 7.4.1.1, which also quantified the worst case estimate for the impact of exhaust emissions from construction vehicles, on sensitive receptors. It was concluded that the impact of exhaust emissions would be of negligible significance.

Haul/Access Road

The haul/access road will be sealed on most sections prior to its use for haulage (a sealed road has a hard smooth surface of bitumen or tar). Table 7.7 below displays the chainages of road which will be sealed and the reason for sealing. The only section of road that will not be sealed is the section between the Power Station in Rupert's Valley to the edge of Deadwood Plain. This is because there are no sensitive receptors near to this section of road.

Table 7.7 Sections of Road which will be Sealed and the Reason for Sealing

Chainage	Section description	Reason for sealing
0 m – 50 m	Wharf Access Road	To protect residents and the coastal amenity area
50 m – 600 m	The existing road in Rupert's Valley (to be upgraded)	Existing sealed road
600 m – 850 m	New road to the north of the existing fuel farm	To protect residents
5350 m – 6170 m	Deadwood Plain: from the Pipe path to residential properties in Deadwood	To protect residents
6170 m – 7100 m	Deadwood: the existing road past residential properties, to Foxys Garage. (to be upgraded)	Existing sealed road
7100 m – 8300 m	From Deadwood to Longwood	To protect residents

Chainage	Section description	Reason for sealing
8300 m – 8750 m	Arable land at Longwood	To protect arable land
8750 m – 9450 m	Bilberry Field Gut to Bottom Woods	To protect residents
9450 m – 10950 m	Bottom woods to Government Garage (to be upgraded)	Existing sealed road
10950 m – 14048 m	From Government Garage to Airport	To protect the habitat for endemic invertebrates and wirebirds and indigenous and endemic plants

The alignment of the haul/access road has been chosen to avoid, as far as possible, sensitive receptors including residential properties and sensitive ecological sites. The design and the implementation of construction will be such that there will be minimal disturbance caused when working within sensitive areas.

The haul road, once no longer needed for construction traffic, will subsequently be upgraded to form the permanent access road. This will entail a general re-grading of the haul road surface, construction of a final basecourse overlay and applying a sprayed bitumen and chippings surface. Other finishing works will also be completed at this time, such as architectural facings to bridge abutments and walls and crash barriers.

Construction methods for the haul/access road will change according to the steepness of the incline. For steep sections there will be a need to prevent material from the excavations being scattered down the hillside. To minimise this, it is proposed that retaining walls of local rock are placed in galvanised steel mesh baskets (i.e. gabions) on the outside of the road.

It is anticipated that excavation for the reinforced fill and gabions will be performed by an excavator capable of digging out weathered rock. Stronger rock will have to be excavated with a hydraulic breaker attached to the excavator or, if larger volumes are encountered, small scale blasting may be considered. The excavated fill will have to be transported to a screen / crusher to produce suitably grade backfill for the reinforced fill sections. However, materials will be excavated and deposited locally to minimise vehicle movements.

The construction of flatter sections of the access road is likely to use graders, bulldozers, motorised shovels and dump trucks. Compaction will be with self propelled vibrating rollers. Water will be brought to the road construction in bowsers to assist compaction of fill material and to lessen the amount of dust disturbed by the construction plant.

The construction of the haul/access routes will require extensive excavation, materials movements and materials storage. All these activities will have the potential for dust generation if not managed appropriately.

In addition to construction of the haul/access routes, the traversing of those routes will have the potential for dust generation and transfer. The extent of that generation will depend on local topography, climate (wind and rainfall), the types of vehicles, vehicle speeds, road surfacing and soil type. Without appropriate mitigation measures there will be the potential for dust generation and dispersion. The significance of any impacts will be dependent on the proximity of receptors, and the sensitivity of those receptors. The sensitivity of local flora and fauna is discussed further in Chapter 9.

Each section of the route is discussed in further detail below:

Rupert's Bay
In Rupert's Bay, the important sensitive receptors are the fish processing plant and cannery. Dust impacts are likely here both during the construction/upgrading of the road, and then from its use during the whole construction period (approximately 230 weeks). Food processing is particularly sensitive to the impacts of dust, and these receptors are classified as high sensitivity (MPS2, 2005). Considering the scale and duration of the dust generating activities, the sensitivity of the receptors (including the fact the cannery does not have sealed windows) the likely impact without mitigation is considered to be of major adverse significance.

Rupert's Valley
The existing road will be upgraded past the residential properties in Rupert's Valley, before climbing out of the valley, past the power station, and past the proposed quarry. Dust impacts are likely here both during the construction/upgrading of the road, and then from its use during the whole construction period (approximately 230 weeks). Potential dust impacts will arise due to the large number of vehicle movements and the typically dry conditions. Initially, many of the vehicles will be carrying potentially dusty loads, between the quarry, Rupert's Bay, and the haul road. The impacts are predicted to be of moderate adverse significance, without mitigation, at the residential properties and their gardens in Rupert's Valley.

The route does not pass any other dust sensitive receptors in Rupert's Valley. However, due to the lack of vegetation and the unstable nature of the valley sides, and the dry conditions, it will be desirable to minimise dust generation elsewhere in the valley.

Deadwood
The route will then progress to Deadwood Plain, an elevated plateau area. It is an exposed and windswept area, with vegetation comprising mixed grass pasture. The route will pass by existing residential properties in the Deadwood area (existing road will be upgraded here), and will also pass through or near several sensitive Wirebird habitats.

Whilst there is more vegetation in this area than in Rupert's Valley, dust emissions are likely due to the predominantly windy conditions and the nature of the works, including major earthworks. Potential dust impacts will arise due to the clearance on vegetation and exposure of soil, and the large number of vehicle movements. The impacts are predicted to be of moderate adverse significance, without mitigation, at the residential properties alongside the route in Deadwood.

Mulberry Gut, Longwood, Bilberry Field Gut and Bottom Woods
The road then drops down to Mulberry Gut, Longwood, Bilberry Gut and Bottom Woods, where much of the land is arable and vegetated. Part of the route will follow an existing road, which will need to be upgraded. Sensitive receptors here fall into the low sensitivity category. Considering the sensitivity of the receptors, and the meteorological conditions, the impacts are predicted to be of minor adverse significance, without mitigation.

Prosperous Bay Plain, including Government Garage

The road then passes within approximately 200 metres of Government Garage before descending to the land at Bradleys on the approach to Prosperous Bay Plain.

The final leg of the haul/access route will traverse the arid, exposed and sparsely vegetated area of Prosperous Bay Plain, which is one of the driest areas on the island. There is the potential for dust generation on all disturbed soils in this area. The lack of vegetative cover, prevailing winds and low rainfall in this undulating area will also allow the continual lifting and re-deposition of dusts following surface disturbance, unless mitigation measures are implemented.

7.4.1.5 Prosperous Bay Plain

There are no existing residential properties within 900 metres of the proposed airport development site; the only sensitive receptors of relevance are the flora and fauna of the Central Basin. However, the Contractor's compound, where many Contractors will live, is downwind of the main site and should therefore be considered as a sensitive receptor. Further details regarding the species present in the Central Basin are provided in the Ecology Chapter. Dust will be generated during the various aspects of the construction of the airport and this will impact upon the flora and fauna of the Central Basin.

Airport

In order to construct the runway a significant area of graded land is required to the south of Prosperous Bay Plain to provide sufficient runway length. This will require the filling of Dry Gut and the construction of an embankment to support the runway, and runway end safety area (RESA). The excavation and levelling of Prosperous Bay Plain for the runway, taxiway, access road and terminal area will provide material to fill Dry Gut and construct the embankment.

Prior to the filling of Dry Gut culverts are required to allow the existing stream to pass beneath the proposed fill. The culverts are proposed as being cast in place concrete arch culverts. Concrete will be delivered to the valley by truck mixer and placed using chutes, concrete skips and/or by an excavators suitably adapted.

Generally the earthworks will achieve a cut and fill balance within the airport site, therefore minimising the amount of imported material required. It has been estimated that up to 8,000,000 cubic metres of material will required to be cut and filled in order to construct the airport site. It has been assumed that when constructing the airport and undertaking landside civil works all excavated material will be acceptable for re-use. Excavated material will be suitable for bulk fill and excavated rock will be suitable for the production of concrete aggregates. The grading of bulk fill material and structural fill will be achieved by hard ripping or blasting followed by crushing. It is estimated that the percentage of rock requiring crushing will be 20% and the percentage of rock requiring blasting will be 60%. Excavated rock will also be suitable for the production of pavement layers and surface chip.

The area to be used as fill will be ripped using 40 to 60 tonne bulldozers. Where the rock is hard enough to slow progress to uneconomic levels the ground will be quarried using explosives.

Of the excavated ground, most will have to be carried to fill zones using dump trucks but with careful planning, considerable amounts of ground may be dozed (or ripped and then dozed) directly from cut to fill. The excavated fill may, where necessary, be damped down to minimise dust and assist compaction.

During the excavation, some 200,000 cubic metres of fill will be selected for screening and crushing on site. Such material will be used in concrete and the base courses for pavements. The material for crushing will be handled by the plant used for the access road construction, augmented as required.

The finished surface of all areas affected by these works will be graded and finished with topsoil and/or appropriate vegetation for the area.

The airport pavements will be constructed from pavement quality concrete with a brushed surface finish and will include the runway turn pads, runway strip, landing thresholds, taxiway and apron.

Associated Infrastructure

An emergency runway will be constructed to be used in the event of a blocked main runway. The runway will be a cleared and graded area. Airport roads will either be sealed pavement quality concrete or granular materials sealed with two coats of tar spray and chipping. Airport roads will include routes between the following facilities:

- Apron.
- Terminal building.
- Combined building.
- Water tanks.
- Fuel installation at the airport site.
- Generator compound.
- Vehicle check point.
- Storage compound fire training rig.

Access tracks to the security fence, access gates, drainage retention ponds, navigation aids, remote obstacle lights and water supply equipment will be constructed from a graded crushed granular material that can be readily rolled and compacted and will bind into a dense durable surface. However, it is likely that these airport roads will have approximately four vehicle movements per day ranging from 4x4 utility vehicles to ambulances.

Airside facilities will be provided to serve all aspects of the airport's operational requirements and are shown in Figures 2.2 and 2.5 of Volume 3 of the ES. The combined building will contain the ATC Tower, airport fire service, administrative offices, potable water treatment plant, power generation control, AGL control, and the airline secure storage rooms.

Landside facilities will consist of the terminal building, car parking and drop off areas and the vehicle control point. There will be dust emissions, especially associated with the construction of the terminal building.

During construction there is also potential for a temporary runway to be used, this will be a gravel unsealed runway. It is likely to be located in the Contractor's compound to the west of the main site. There will be dust emissions during its preparation and use.

Whilst there are no existing residential properties within 900 metres of the proposed airport development site, dust generated will have the potential to impact on the Contractor's compound, which is downwind of the main site, as well as local flora and fauna.

There are a large number of activities detailed above with the potential to generate dust. Due to the dry and windy conditions, the scale and duration of the works and the sensitivity of the local flora and fauna, adverse significance are predicted in the area. Due to the re-shaping of the landscape it is likely that these impacts will, to some extent, be permanent. This is discussed in greater detail in the Permanent and Operational Effects Section of this chapter.

7.4.1.6 Government Garage and Prosperous Bay Plain

A construction compound will be located near to the government garages as shown in Figure 2.1 in Volume 3 of the ES. This compound may include offices, workshops, accommodation and welfare facilities for the Contractor's personnel. The potential for dust emissions from the Contractor's compound would be dependent up on the activities carried out there. However, the main potential impact is likely to arise from dust generation due to vehicle movements to and from the compound, past Government Garage at Bradleys.

With no mitigation in place, impacts of minor adverse significance may be expected, due to the generation of dust, and deposition at Government Garage at Bradleys.

7.4.1.7 Water Supply

No significant dust or air quality impacts are predicted as a result of the permanent water abstraction works at Sharks Valley, the use of Dry Gut as a temporary storage reservoir, or the extraction of sea water from Gill Point. Whilst there will be dust generated, it is unlikely to impact upon sensitive receptors.

7.4.1.8 Ancillary Components

ROL sites will encompass areas of approximately 10m by 10m centred on both the obstacle light and the power source. There will also be an access corridor up to 3m wide between the power source and light.

During the construction of electrical services including AGL and Navigational Aids the Contractor will work within the narrowest corridor possible, use light plant, vehicles and plant which have rubber tyres and /or hand digging.

No significant dust or air quality impacts are predicted arising from the construction of these ancillary components.

7.4.2 Mitigation

Dust is best controlled at source by the use of appropriate plant operation and material handling techniques, good maintenance and housekeeping. Therefore the Contractor will implement measures to minimise the generation and dispersion of dust. These measures will be agreed with SHG prior to commencement of any work. The measures employed will be dependent on the Contractor's final schedule of works.

Based on the information provided thus far, the following dust suppression and control measures will be adopted during construction works. Site and activity specific mitigation measures are discussed in the sub-sections following this list:

Haul Roads and Vehicle Movements

1. The haul roads that are will be sealed will be sealed as early as is possible so as to reduce dust emissions and to reduce the demand for water for use in dust suppression.

2. Sealed haul roads will be mechanically cleaned and sprayed to suppress dust, where necessary. Care will be taken to prevent the emission of dust from the air outlets on vacuum road sweepers.

3. Areas affected by the construction of the haul/access routes will be re-vegetated appropriately and promptly in consultation with the project ecologists.

4. A speed limit of 10 mph on unpaved haul roads within and outside the Contractor's compounds will be enforced and such limits will be displayed on appropriately designed signs. A speed limit of 15 mph will be enforced for construction traffic passing along sections of the haul/access road through residential and commercial areas and ecologically sensitive areas.

5. Vehicle movements on unmade roads will be limited wherever possible.

6. Vehicles carrying dusty materials within and outwith construction sites will be sheeted.

7. Vehicle wheel and body washing stations will be installed at exit points from the Contractor's site and upon leaving unsurfaced roads, where necessary and practical.

Contractor's Compounds and Stockpiles

8. Potentially dusty Contractor's compounds (and areas within these compounds) within and in close proximity to sensitive areas will be enclosed with solid hoardings to a height of at least 2 metres where appropriate.

9. Material stockpiles will be compacted and profiled where appropriate and possible to reduce wind blown dust.

10. The surfaces of stockpiles or exposed surface within the site will be sprayed regularly to maintain surface moisture, especially during dry windy conditions. A 'crust' is likely to form, after which spraying will be less important. Crusted surfaces will be protected from unnecessary disruption.

11. Where appropriate, re-vegetation of the surface of long-term soil stockpiles will be undertaken, depending on the end use of the material.

12. Cement and other dust generating materials will be stored in bags or silos with appropriate filters and overfill alarms.

General

13. Where feasible, construction plant and dust generating activities will be positioned at the maximum possible distances from sensitive receptors such as residential areas. Where appropriate such activities will be carried out in shelters.

14. Activities will be planned and controlled to minimise the area of land disturbed within all the working areas at all times during the works to limit the area from which dust can be generated.

15. Where conveyors are used, they will be fitted with drop chutes. The surface of the material on the conveyor will be sprayed with water after deposit onto the conveyor if practicable, where there is a likelihood of a dust problem.

16. The potential for dust generation associated with the transfer of materials to/from vehicles will be controlled by the enclosure of materials transfer equipment, the wetting of materials where practicable, the minimisation of drop height, and the protection of loading areas from winds.

17. Cutting or grinding equipment will be fitted with dust suppression where practicable.

18. Equipment type and construction techniques will be suitable for working in arid environments for the construction of the haul/access route airport and quarry activities.

19. The programme will be designed to minimise unnecessary materials movements, by consideration of the locations of storage areas and by re-using materials wherever possible.

20. The use of dust suppressants on both haul/access route alignments and the large open areas of the proposed airport will be consistent with ecological mitigation requirements presented in Chapter 9.

21. All open fires will be prohibited, including fires for the disposal of vegetation, packaging, or any other material.

22. Construction vehicles and plant equipment will not be left operating unnecessarily, so as to minimise exhaust emissions.

23. Ageing equipment with poor emissions standards will not be used. Vehicles of Euro II emissions standard or equivalent will be used wherever possible.

24. Sea water and other dust suppressants will not generally be used, particularly for areas to be re-instated so as to support natural ecological communities as their use is

likely to render conditions unsuitable for plant and animal re-colonisation. Nevertheless at times of major dust generation potential (dry windy weather) it may be appropriate for additives and binders to be added to water for dust suppression in less sensitive areas.

The EMP requires that daily visual site inspections will be carried out to ensure that the agreed measures are being adhered to. This will prevent the build up of materials with the potential to generate dust on site; if necessary monitoring will be undertaken. Control of dust will be effected by strict supervision and staff empowerment to curtail operations at any time that dust cannot be satisfactorily controlled. Activities identified as generating significant quantities of dust will be stopped until that dust can be controlled.

7.4.2.1 Rupert's Bay

Measures of particular relevance to minimise dust emissions associated with the construction of the wharf will depend on the methods chosen by the Contractor. However, those measures listed above that would militate against dust generation from the following activities should be adopted:

- Cutting, crushing and grading;
- Wind-blow from materials storage;
- Materials handling, processing and transport;
- Vehicle/plant movements to and from the site; and
- Concrete batching and finishing.

7.4.2.2 Rupert's Valley

Several Contractor's compounds are proposed for Rupert's Valley. The use of each compound will depend on the Contractor's detailed plans. The mitigation measures listed above, relating to the Contractor's compounds, storage areas, and any activities that may occur within should be followed. Particular attention will be made to the location of the Contractor's compounds in relation to the sensitive receptors, namely the residential properties in the Valley, the cannery, and the fish processing plant. Activities with the potential to create dust will be located in compounds further from these receptors.

Due to its location away from sensitive receptors, dust impacts associated with the construction of the BFI will be minimal, and of negligible significance. Nevertheless, appropriate measures will be undertaken to minimise dust emissions where appropriate.

There are various specific methods for reducing and controlling dust from mineral operations at the proposed temporary quarry, such as:

- Minimising the creation of dust by appropriate planning and design, for example by:
- The use of conveyors rather than haul roads;
- Locating haul roads, tips and stockpiles away and downwind from sensitive receptors;
- Creating 'sensitive zones' within which dust-generating activities are limited;
- Planning layout and constructing stockpiles, tips and mounds to minimise dust creation;
- The use of a crushing and screening plant within its design capacity;
- Reducing the height of fall material and the use of appropriate chippings for stemming; and
- Controlling the escape of dust and remove dust where appropriate, for example.

by:

- Enclosing conveyors, chutes, process plant, stockpiles;
- Providing dust-removal processing for plant and loading areas;
- Using sprays and mists;
- Fitting outlets with cyclones, wet scrubbers or filters;
- Insisting on good maintenance of all plant and equipment;
- Ensuring compaction, grading, surfacing and maintenance of haul roads;
- Fitting dust extractors, filters and collectors on drilling rigs;
- Restricting dust-generating activities to sheltered areas;
- Using windbreaks/netting screens/semi-permeable fences, tress and shrubs;
- Limiting drop heights in stockpiling, processing and loading operations;
- Fitting windboards/hoods to conveyors/transfer points;
- Reducing speeds and limit movement of vehicles, and/or using upswept exhausts;
- Using water bowsers, road sweepers, sprays and vapour masts as necessary;
- Vegetating exposed surfaces (e.g. overburden mounds) appropriately in consultation with the project ecologists;
- Limiting spillage and facilitating its removal by the use of hard surfaces;
- Sweeping haul roads and other dusty surfaces;
- Shaking-off dirt from vehicles and/or providing vehicle-washing facilities;
- Providing a surfaced road between washing facilities and site exit;
- Using linings (in loading chutes and lorries);
- Using closed or sheeted vehicles carrying dry material; and
- The temporary suspension of activities if unacceptable levels of dust cannot be avoided.

The number of vehicles accessing the quarry will be carefully controlled. On site parking will be provided for site operations staff. Trucks entering and leaving the development sites will be well maintained in accordance with the manufacturers' specifications and comply with all relevant regulations.

7.4.2.3 Rupert's Bay to Prosperous Bay Plain

The haul/access road has been routed as far as possible to avoid sensitive receptors including residential properties and sensitive ecological sites. The design and the implementation of construction will be such that there will be minimal disturbance caused when working within sensitive areas.

In addition, as discussed in the potential effects section, the haul road will be sealed where it passes sensitive locations. This will have a significant effect in reducing emissions. The mitigation measures relevant to the construction and use of the haul road, listed at the start of the section, will need to be adhered to.

Measures of particular relevance to minimise dust emissions associated with the construction of the wharfs will depend on the methods chosen by the Contractor. However, in addition to the measures listed in Table 7.11. Regular inspections will be carried out to confirm the effectiveness of the measures. If necessary further measures would be identified and implemented to prevent the ingress of dust into the fish processing plant in consultation with the operators of the businesses concerned.

7.4.2.4 Prosperous Bay Plain

The primary concern in this area is the potential detrimental impact that dust emissions may have on the local flora and fauna. Due to the range of activities likely to take place during the construction of the airport and infrastructure and the construction and use of any temporary runway, all of the measures listed at the start of the section will need to be implemented.

The strong prevailing winds will carry the dust towards the Central Basin area, potentially affecting habitats there. In addition to the measures listed at the start of the section, it may be appropriate to use a series of high barriers to trap dust. These barriers will be particularly effective at trapping the larger fractions of dust. Due to the large areas, and the scarcity of water available for dust suppression (assuming sea water cannot be used in such an ecologically sensitive area) these barriers have the potential to be an effective form of mitigation, assuming they are appropriately positioned. Due to regulations regarding the height of obstacles around an airport, these barriers will need to be removed before the airport is operational.

7.4.2.5 Government Garage and Prosperous Bay Plain

The use of each compound would depend upon the Contractor's detailed plans. The mitigation measures listed above, relating to the Contractor's compounds, storage areas, and any activities that may occur within should be followed. Particular attention will be made to the location of the Contractor's compounds, and their access, in relation to the sensitive receptors, namely the residential properties at Government Garage at Bradleys. The link road between the compound and the haul road will be sealed.

7.4.2.6 Water Supply

No significant dust or air quality impacts are predicted as a result of the permanent water abstraction works at Sharks Valley, the use of Dry Gut as a temporary storage reservoir, or the extraction of sea water from Gill Point. Whilst there will be dust generated, it is unlikely to impact upon sensitive receptors. Nevertheless suitable measures will be undertaken to minimise dust emissions where appropriate.

7.4.2.7 Ancillary Components

Due to their location away from sensitive receptors, dust impacts associated with the construction of the ancillary components will be minimal. Nevertheless suitable measures will be undertaken to minimise dust emissions where appropriate.

7.4.3 Residual Effects

7.4.3.1 Rupert's Bay

Assuming that appropriate mitigation is employed, as described, the residual dust impacts would be reduced to **minor adverse** significance overall.

7.4.3.2 Rupert's Valley

Assuming that appropriate mitigation is employed, as described, the residual dust impacts associated with the Contractor's compounds would be reduced to **minor adverse** significance.

Due to its location away from sensitive receptors, dust impacts associated with the construction of the BFI will be minimal, and of **negligible** significance.

Assuming appropriate mitigation is employed, the residual impacts associated with the upper-valley quarry option would be of **negligible** significance and the residual impacts associated with the mid-valley quarry option would be of **minor adverse** significance.

7.4.3.3 Rupert's Bay to Prosperous Bay Plain

Due to the construction of the haul road and its subsequent use the following residual impacts are predicted:

- Dust impacts of **minor** adverse significance are predicted in Rupert's Bay, especially during the initial 26 week mobilisation period. The sensitivity of the fish processing plant and the cannery with respect to dust emissions contributes towards the proposed mitigation measures and need for regular inspections;
- Dust impacts of **minor** adverse significance are predicted at residential properties in Rupert's Valley, due to the large number of construction vehicle movements to and from the quarry;
- Dust impacts of **minor** adverse significance are predicted at residential properties in Deadwood, particularly during construction/upgrading of the road;
- Dust impacts through Mulberry Gut, Longwood, Bilberry Field Gut and Bottom Woods are predicted to be of **negligible** significance;
- Dust impacts at Government Garage at Bradleys are predicted to be of **negligible** significance; and
- Dust impacts on the fauna and flora of the Central Basin are discussed in Chapter 9.

7.4.3.4 Prosperous Bay Plain

The primary issue is the detrimental impact that dust emissions will have on sensitive flora and fauna. Temporary effects are predicted, largely as a result of the ecological sensitivity of the area and the potential shortage of water for dust suppression, considering the size of the area affected and the dry and windy conditions. The strong prevailing winds will carry construction dust towards the Central Basin area, affecting habitats there. The effects on ecology are discussed in Chapter 9.

There will also be permanent effects; these are discussed in the Permanent Effects section.

7.4.3.5 Government Garage and Prosperous Bay Plain

Even with appropriate mitigation in place, there are likely to be significant dust impacts at Government Garage at Bradleys, primarily due to vehicle movements to and from the Contractor's compound. However, these residual impacts are likely to be temporary and of **minor adverse** significance.

7.4.3.6 Water Supply

No significant dust impacts are predicted arising from the construction (and use during construction) of infrastructure associated with permanent water abstraction works at Sharks Valley, the use of Dry Gut as a temporary storage reservoir, or the extraction of sea water from Gill Point.

7.4.3.7 Ancillary Components

No significant dust impacts are predicted arising from the construction of the ancillary components.

7.5 PERMANENT AND OPERATIONAL EFFECTS

7.5.1 Potential Effects

There are two categories of effects to consider:

- The potential for the construction of the airport (particularly the permanent changes to the topography) to have a permanent impact in terms of the dispersion and deposition of dust in Prosperous Bay Plain; and
- Once operational, there will be emissions of pollutants from aircraft, associated airport operations, and from vehicles travelling to and from the airport.

7.5.1.1 Rupert's Bay

The construction of the temporary wharf and its use will have no permanent impact with regard to air quality.

The permanent wharf will accommodate a wide range of commercial shipping handling a range of cargoes including dry and liquid bulks, general cargo, containers and petroleum products. It is proposed that in the long term the new facilities will replace Jamestown as the commercial port of entry for St. Helena, although foot passengers will continue to land at the Jamestown Wharf as at present. Therefore, there will be an increase in vehicular movements to and from the wharf, and therefore an increase in pollutant emissions. However, vehicle numbers are likely to be low, and considering the air quality is currently good, the increase in vehicle emissions is likely to be of **negligible** significance.

7.5.1.2 Rupert's Valley

The Contractor's lay down and compound will have no permanent impact with regard to air quality. Assuming appropriate mitigation is employed, as discussed in the Construction

Effects Section, the temporary quarry will have no permanent impact with regard to air quality.

The existing fuel facilities on the island will be replaced by a new combined fuel facility serving existing fuel requirements for the island, and the Airport. The facilities will comprise a BFI at Rupert's Bay and an AFF at the Airport.

The Airport will be served by the BFI, which shall also replace the existing ground fuel facilities at the Beach Site (BS) and the Mid-Valley Site (MVS) at Rupert's Bay.

The fuels will be received from ocean-going tankers (provisionally at six monthly intervals) and transferred into specific bulk storage tanks at the BFI by ship-to-shore floating hose and pipeline.

Aviation fuel will be delivered from the BFI to the AFF by road tanker (bridger). The following road tanker movements between the BFI and the AFF are anticipated:

- Gas Oil – 8 trips per week likely to occur over a two-day period.
- Aviation Fuel – 10 trips per week likely to occur over a two-day period.

This is based on two aircraft rotations per week and would increase proportionately. It is anticipated that a pipeline will be constructed over the island after year 20 of operation, thereby removing the need for road tanker deliveries for Aviation Fuel.

The predicted tanker movements will not have a significant impact on air quality. The cumulative impact of all predicted vehicle movements to and from the airport is discussed in the following section. Additionally, the proposed location of the BFI is further from the residential properties in Rupert's Valley, than the current facilities.

7.5.1.3 Rupert's Bay to Prosperous Bay Plain

Once the airport is operational, there will be an increase in vehicular movements throughout the island. The majority of these vehicle movements will be between Jamestown and the airport, and so will have a **negligible** impact on pollutant concentrations at sensitive receptors in Rupert's Bay and Rupert's Valley.

However, sensitive receptors alongside roads between the airport and Jamestown have the potential to be affected by an increase in vehicle emissions.

Estimated total daily vehicular trips associated with the operation of the proposed airport are provided in Table 7.8., these have been prepared by WS Atkins.

Table 7.8 Total Daily Vehicular Trips

	Year				
	2011	**2015**	**2025**	**2035**	**2045**
Average airport trip generation	220	220	230	450	450
Maximum airport trip generation	370	380	400	600	600
Cumulative tourist trip generation	30	110	360	690	730
Average total	250	330	590	1140	1180
Maximum total	400	490	760	1290	1330

Averaged across a 12 hour period, the number of operational vehicular trips across the island (including the cumulative effect of visiting tourists) could range from approx. 20-35 trips an hour in 2011, to approx. 100-115 per hour in 2045. It is assumed that the majority of these trips would be between Jamestown and the airport, but clearly there would be trips to other sites of interest and residences on the island. The detail underlying the operational traffic generation is included in the Transport Statement.

Given its location and lack of industrial, transport or domestic pollution sources, air quality across the vast majority of the island is currently very good. Whilst the predicted vehicle movements represent a significant increase on existing movements, the potential impacts of the operational traffic on local air quality, and the health of the islanders, will be negligible.

Based on the predicted traffic flows and the current good air quality, the operational impact of the access road on local air quality is likely to be of **negligible** significance.

7.5.1.4 Prosperous Bay Plain

The construction of the airport is likely to have a permanent impact in terms of the dispersion and deposition of dust. In addition there will be potential air quality impacts due to aircraft emissions, and emissions from other activities at the airport. These activities will lead to increased emissions and, potentially increased pollutant concentrations at sensitive receptors in Prosperous Bay Plain.

Permanent Construction Impacts

Despite adherence to the mitigation measures, as detailed in the Temporary Effects Section, the new landscape profile at the airport will have the potential to impact on wind patterns in the long term, which may disturb areas previously sheltered from the prevailing winds. The removal of vegetation and flattening of the area will also have the potential for long term wind-blown dust generation.

The current landscape has been shaped over some 14 million years. The lowering of the Eastern Plateau, which currently provides shelter to the Central Basin will disturb the balance that has been achieved. Computational fluid dynamics (CFD) modelling of the impact this will have on wind speeds in the area reveals that the currently sheltered Central Basin, will experience significantly greater wind speeds in the future. At present the Eastern Plateau acts as a windbreak for habitats that have developed upon fine sand and dust deposits within the Central Basin.

The particle shape analysis (Section 7.3.5) revealed that the particles have a mean diameter of between approximately 80-105 µm, and a mean roundness of 0.71 (where 1 would be perfectly round). These particles are of a size and shape which militates against them becoming airborne. However, the Central Basin is predicted to be subjected to stronger winds in the future, and the stronger gusts are likely to be capable of lifting the particles. Due to the particle sizes, the process of saltation (jumping) of particles across a surface will be of greater importance than the entrainment of particles in the airflow.

It is likely that without any mitigation, the fine particles and sands within the Central Basin will be transported, predominantly through saltation, and deposited in less exposed areas. This may have an impact on the ecology of the Central Basin (refer to Chapter 9 Ecology).

Emissions from Aircraft

The potential impacts on air quality in Prosperous Bay Plain associated with the operation of the airport are likely to occur due to aircraft emissions and emissions from other activities at the airport. Emissions associated with the Access Road in the Plain were discussed in the previous sub-section, and were concluded to be of **negligible** significance.

Forecasts of scheduled passenger and aircraft movements for the proposed St. Helena airport have been made (Table 7.9). In addition there will also be fisheries protection aircraft, charter flights, small business jets, and occasional air cargo aircraft.

Table 7.9 Forecasted Passenger and Aircraft Movements

Year	Total passengers per year	Aircraft per week
2011	7023	1
2012	7196	1
2013	8080	1
2014	9791	1
2015	12463	2
2016	13813	2
2017	15623	2
2018	17069	2
2019	18876	2
2020	20945	3
2021	23328	3
2022	26049	3
2023	29164	4
2024	32683	4
2025	36770	5
2030	56990	7
2035	78790	9
2040	80801	10

Year	Total passengers per year	Aircraft per week
2045	82584	10

Source: St Helena Access Feasibility Study (WS Atkins, 2004)

The operational impact of these flights on local air quality will be **negligible**. Studies undertaken elsewhere have shown that aircraft emissions above 100m make a negligible contribution to ground level pollution concentrations. Coupled with the lack of sensitive receptors near to the airport or under the flight path, and the relatively low numbers of flights (even in the future), the potential impacts are likely to be of **negligible** significance.

7.5.1.5 Government Garage and Prosperous Bay Plain

There will be no permanent impact with regard to air quality as a result of the construction compounds.

7.5.1.6 Water Supply

There will be no permanent impact with regard to air quality as a result of the permanent water abstraction works at Sharks Valley, the use of Dry Gut as a temporary storage reservoir, or the extraction of sea water from Gill Point.

7.5.1.7 Ancillary Components

There will be no operational vehicle access to the ROLs, which are to be powered by self-contained units. Therefore the ROLs will have no operational impact on air quality. The navigational aids will also have no operational impact on air quality.

7.5.2 Mitigation

7.5.2.1 Permanent Dust Impacts

The construction of the airport is likely to have a permanent or irreversible impact in terms of the dispersion and deposition of dust on Prosperous Bay Plain, particularly within the Central Basin.

During construction high wind breaks may be used to minimise the dispersion of dust. However, due to regulations regarding the height of obstacles around an airport, these barriers will need to be removed before the airport is operational.

Post construction all areas affected in Prosperous Bay Plain will be re-vegetated in accordance with the appropriate landscape and ecological requirements.

7.5.2.2 Operational Emissions

The access road has been routed as far as possible to avoid sensitive receptors including residential properties and sensitive ecological sites. Once operational, there will be emissions of pollutants from vehicles travelling to and from the airport. Whilst the impacts are deemed to be of negligible significance, it is still important that there is public awareness regarding the effect of emissions from their vehicles. The following will be encouraged for users of the airport and associated roads:

- Minimisation of vehicle trips as far as is practicable;
- Use of public transport, where available;
- Regular vehicle maintenance to help minimise exhaust emissions;
- Adherence to speed limits, especially during dry and dusty conditions; this will reduce dust emissions should the road become dusty;
- Ensuring that vehicles do not leave the paved road;
- Avoidance of sudden braking and acceleration in addition to correct selection of gears on steep slopes, etc, to minimise fuel consumption and emissions; and
- Consideration given to the use of more fuel efficient vehicles, with improved emissions characteristics.

7.5.3 Permanent and Operational Residual Effects

The residual permanent or operational effects of the following are predicted to be of **negligible** significance:

- **Rupert's Bay**:
  - Temporary and permanent wharf
- **Rupert's Valley:**
  - Contractors lay down and compound areas
  - Bulk fuel installation
  - Temporary quarry
- **Rupert's Bay to Prosperous Bay Plain Access/haul road:**
  - Rupert's Bay
  - Rupert's Valley
  - Deadwood
  - Mulberry Gut and Bilberry Field Gut
  - Bottom Woods
  - Prosperous Bay Plain including Government Garage and Bradleys
- **Government Garage & Prosperous Bay Plain**
  - Construction compounds
- **Water Supply**
  - Sharks Valley water abstraction
  - Dry Gut temporary storage reservoir
  - Gill Point temporary sea water abstraction
- **Ancillary components**
  - Remote obstacle lights
  - Navigation aids

The lowering of the Eastern plateau, which currently provides shelter to the Central Basin, will result in a long-term impact in terms of dust emissions. Wind speeds on Prosperous Bay Plain, especially within the Central Basin will be affected, and areas which are currently sheltered will become exposed. Particles in these areas are predicted to be moved gradually and deposited in more sheltered areas. See Chapter 9 for assessment of impacts on ecology.

7.6 SUMMARY

The assessment of the air quality and dust impacts of the proposed airport and associated infrastructure are presented in tabular form, in Table 7.10. The mitigation measures which are applicable to many elements of the works, and referenced in Table 7.10, are listed in Table 7.11.

Effective measures for activities elsewhere are predicted to be capable of minimising the predicted impacts to negligible or minor adverse in most instances. The activities on Prosperous Bay Plain will be of a very large scale and duration: the area is dry and dusty with little vegetation, the sensitive ecosystem are dust-sensitive, it is exposed to strong to the prevailing south-easterly winds, and the water required for dust suppression may be scarce. See Chapter 9 for effects on ecology of area.

Table 7.10 Summary of Impacts

Area and Activity	Potential Impacts	Approach to Mitigation	Possible Residual Impact after Mitigation
Temporary Construction Effects			
Rupert's Bay (temporary and permanent wharf)	Moderate Adverse dust impact possible at the fish processing plant during wharf construction.	Refer to Table 7.11 below, and the measures relating to the contractors' compounds.	**Minor Adverse** dust impact
Rupert's Valley (Contractor offices and compound areas; bulk fuel installation; and temporary quarry)	Moderate Adverse dust impact due to emissions from the contractor's compounds. Relevant receptors include the fish processing plant and residential receptors in the valley.	Refer to Table 7.11 below. Activities with the potential to create dust will be located in compounds further from the sensitive receptors.	**Minor Adverse** dust impact
	Negligible impact associated with the construction of the BFI.	Refer to Table 7.11 below.	**Negligible** impact
	Minor adverse dust impact associated with emissions from the upper-valley quarry option; moderate adverse impacts associated with emissions from the mid-valley quarry option	Various measures to minimise emissions from vehicles, stockpiles, material processing and excavation.	**Negligible** dust impact associated with the upper-valley quarry option; **minor adverse** impacts associated with the mid-valley quarry option
Rupert's Bay to Prosperous Bay Plain (access/haul road)	Rupert's Bay: Moderate to Major adverse dust impact, primarily due to the sensitivity of food processing receptors.	Refer to Table 7.11 below, and the mitigation measures relevant to the construction and use of the haul road. The haul/access road has been routed as far as possible to avoid sensitive receptors. The design and implementation of construction will be such that there will be minimal	**Minor adverse** dust impact
	Rupert's Valley: Moderate Adverse dust impact due to emissions primarily from construction vehicles.		**Minor adverse** dust impact
	Deadwood: Moderate Adverse dust impact due to emissions during construction and during use, and the proximity of residential properties.		**Minor adverse** dust impact

Area and Activity	Potential Impacts	Approach to Mitigation	Possible Residual Impact after Mitigation
	Mulberry Gut to Bottom Woods: Minor Adverse dust impacts due to presence of arable land.	disturbance caused. The haul road is to be sealed where it passes sensitive locations. Preventing the ingress of dust into the cannery.	**Negligible** impact
	Prosperous Bay Plain & Government Garage: Potential adverse dust impacts primarily due to the ecological sensitivity of the area		See Chapter 9 for effects on Central Basin
	Negligible impacts associated with exhaust emissions during construction and use of the access/haul road.	Refer to Table 7.11 below.	**Negligible** impacts associated with exhaust emissions during construction and use of the access/haul road
Prosperous Bay Plain (airport and associated infrastructure, any temporary runway)	Potential adverse dust impacts due to the scale and extent of the works.	Refer to Table 7.11 below. In addition to these measures a series of high barriers to trap dust and reduce wind speeds.	See Chapter 9 for effects on Ecology.
Government Garage & Prosperous Bay Plain (construction compounds)	Minor to Moderate Adverse dust impacts at the receptors at Government Garage due to activities within the compound and vehicle movements to and from the compound.	Refer to Table 7.11 and the measures relating to the contractors' compounds. Possible sealing of the link road between the compound and the haul road.	**Minor adverse** dust impact
Water Supply (Sharks Valley intake, Dry Gut reservoir, and Gill Point sea water abstraction)	Negligible impacts	Refer to Table 7.11 below. Best practice will be adopted.	**Negligible** impacts
Ancillary Components	Negligible impacts	Refer to Table 7.11 below. Best practice will be adopted.	**Negligible** impacts
Permanent and Operational Effects			
Rupert's Bay (temporary and permanent wharf)	Negligible impacts	No mitigation required.	**Negligible** impacts
Rupert's Valley (Contractor offices and compound areas; bulk fuel installation; and temporary quarry)	Negligible impacts associated with the contractors' compounds.	No mitigation required.	**Negligible** impact
	Negligible impact associated with the construction of the BFI.	No mitigation required.	**Negligible** impact
	Negligible impacts associated with either quarry	The quarry area will be restored after use.	**Negligible** impact
Rupert's Bay to Prosperous Bay Plain (access road)	Negligible impacts	No mitigation required.	**Negligible** impacts

Area and Activity	Potential Impacts	Approach to Mitigation	Possible Residual Impact after Mitigation
Prosperous Bay Plain (airport and associated infrastructure, any temporary runway)	Negligible impacts associated with vehicle and aircraft emissions at the airport once operational.	Provision of public transport to the airport. Adherence to speed limits.	**Negligible** impacts associated with vehicle and aircraft emissions at the airport once operational
Government Garage & Prosperous Bay Plain (construction compounds)	Negligible impacts	No mitigation required.	**Negligible** impacts
Water Supply (Sharks Valley intake, Dry Gut reservoir, and Gill Point sea water abstraction)	Negligible impacts	No mitigation required.	**Negligible** impacts
Ancillary Components	Negligible impacts	No mitigation required.	**Negligible** impacts

7.6.1 Summary of Dust Monitoring and Mitigation

Dust and particulate monitoring will be conducted prior to the commencement of any dust generating activities. Monitoring locations at receptors downwind of the source of dust generating activities will be chosen. Comparison will be made with monitoring upwind of the source. When certain activities produce unacceptable levels of dust, measures will be implemented to reduce the levels. Should the measures prove incapable of reducing dust to acceptable levels, the activity will be required to cease until meteorological conditions improve. A summary of mitigation measures and monitoring are provided in Table 7.11.

Table 7.11 General Mitigation Measures and Monitoring

General Mitigation Measures During Construction
Haul Roads and Vehicle Movements
1. The haul roads that are intended to be sealed will be sealed as early as is possible so as to reduce dust emissions and the greater demand for water for use in dust suppression;
2. Sealed haul roads will be mechanically cleaned and sprayed to suppress dust, where necessary. Care will be taken to prevent the emission of dust from the air outlets on vacuum road sweepers.
3. Areas affected by the construction of the haul/access routes will be re-vegetated appropriately and promptly in consultation with the project ecologists.
4. A speed limit of 10 mph on unpaved haul roads within and outside the Contractor's compounds will be enforced and such limits will be displayed on appropriately designed signs. A speed limit of 15 mph will be enforced for construction traffic passing along sections of the haul/access road through residential and commercial areas and ecologically sensitive areas.
5. Vehicle movements on unmade roads will be limited wherever possible.
6. Vehicles carrying dusty materials within and outside of construction sites will be sheeted.
7. Vehicle wheel and body washing stations will be installed at exit points from the Contractor's site and upon leaving unsurfaced roads, where necessary and practical.
Contractor's Compounds and Stockpiles
8. Potentially dusty Contractors compounds (and areas within these compounds) within and in close proximity to sensitive areas will be enclosed with solid hoardings to a height of at least 2 metres where appropriate.
9. Material stockpiles will be compacted and profiled where appropriate and possible to reduce wind blown dust.
10. The surfaces of stockpiles or exposed surface within the site will be sprayed regularly to maintain surface moisture, especially during dry windy conditions. A 'crust' is likely to form, after which spraying will be less important. Crusted surfaces will be protected from unnecessary disruption.

General Mitigation Measures During Construction
11. Where appropriate, re-vegetation of the surface of long-term soil stockpiles will be undertaken, depending on the end use of the material.
12. Cement and other dust generating materials will be stored in bags or silos with appropriate filters and overfill alarms.
General
13. Where feasible, construction plant and dust generating activities will be positioned at the maximum possible distances from sensitive receptors such as residential areas. Where appropriate such activities will be carried out in shelters.
14. Activities to minimise the area of land disturbed within all the working areas will be planned and controlled at all times during the works to limit the area from which dust can be generated.
15. Where conveyors are used they will be fitted with drop chutes. The surface of the material on the conveyor will be sprayed with water after deposit onto the conveyor if practicable, where there is a likelihood of a dust problem.
16. The potential for dust generation associated with the transfer of materials to/from vehicles will be controlled by the enclosure of materials transfer equipment, the wetting of materials where practicable, the minimisation of drop height, and loading areas to be protected from winds.
17. Cutting or grinding equipment will be fitted with dust suppression where practicable.
18. Equipment type and construction techniques will be suitable for working in arid environments for the construction of the haul/access route airport and quarry activities.
19. The programme will be designed to minimise unnecessary materials movements, by consideration of the locations of storage areas and by re-using materials wherever possible.
20. The use of dust suppressants will be used on both haul/access route alignments and the large open areas of the proposed airport, consistent with ecological mitigation requirements presented in Chapter 9.
21. All open fires will be prohibited: this includes fires for the disposal of vegetation, packaging, or any other material.
22. Construction vehicles and plant equipment will not be left operating unnecessarily, so as to minimise exhaust emissions.
23. Ageing equipment with poor emissions standards will not be used. Vehicles of Euro II emissions standard or equivalent should be used wherever possible.
24. Sea water and other dust suppressants will not generally be used, particularly for areas to be reinstated so as to support natural ecological communities as their use is likely to render conditions unsuitable for plant and animal re-colonisation. Nevertheless at times of major dust generation potential (dry windy weather) it may be appropriate for additives and binders to be added to water for dust suppression in less sensitive areas.