

## TECHNICAL APPENDIX 9.3

# Orkney Logistics Base (Hatston)

## Technical Appendix 9.3 Construction Dust Risk Assessment



## Change list

Ver	Date	Description of the change	Reviewed	Approved by
2.0	4/5/2023	Final Issue	Jen Simpson	Damian Pawson

**Sweco UK Limited** 2888385  
**Project Name** Orkney Logistics Base (Hatston)  
**Project Number** 65208075  
**Client** Envirocentre  
**Date** May 2023  
**Document reference** \\sweco.se\gb\LDS01\Project\6533\65208075\000\_SDWQ\_&\_Hatston\_\_EIA\_&\_Planning\_Support\T-Z-0000\_Reports\AQ\Hatson\Issued to EC\_3May23\Orkney Logistics Base Hatson Technical Appendix 9.3.1 issue 2.0.docx

# Table of contents

1	Introduction .....	4
2	Construction Dust Risk Assessment .....	4
2.1	Potential Sources .....	4
2.2	Environmental Risk .....	5
2.2.1	Step 1 – Screen the need for a detailed assessment.....	6
2.3	Potential Effects .....	7
2.3.1	Step 2A: Dust emissions magnitude.....	7
2.3.2	Step 2B Define the sensitivity of the area.....	9
2.3.3	Step 3: Site Specific Mitigation .....	11
3	Summary .....	12

# 1 Introduction

Hatston Pier and Terminal (to be rebranded as Orkney Logistics Base and referred to as the Proposed Development within this report) is located on the Orkney Mainland coast to the immediate northwest of Kirkwall. It is Orkney's primary commercial terminal and gateway to Aberdeen and north to Shetland. The longest existing berth is 385m in length, offering 10.5m draft. The original pier was built in 2002, and a 160m extension was completed in 2013.

The Proposed Development's expansion comprises:

- 300m outer quay extension.
- Water depth of 10m below Chart Datum.
- 25m inner berth with linkspan and adjacent boat lift.
- 7.5 hectares of additional land close to the quay through reclamation.
- Ex-pipe fuel supply and storage, with ability to offer low or zero carbon fuels in the future.

A detailed review of the Proposed Development was undertaken by Envirocentre to support the EIA Scoping Report and the potential change in air quality as a result of it. This considered the baseline air quality, the construction phase emissions and the operational phase emissions. Based upon the predicted change in vehicle movements associated with both phases air quality was scoped out. Both Marine Scotland and OIC agreed that air quality could be scoped out.

Therefore, this Technical Appendix focuses on the assessment of dust during the construction phase.

## 2 Construction Dust Risk Assessment

Major construction sites can give rise to increasing long-term and short-term PM10 concentrations at off-site locations and may also cause annoyance due to the soiling of surfaces by dust unless the appropriate mitigation measures are implemented. The impacts of dust therefore need to be addressed.

The assessment of dust during construction has been carried out using a qualitative risk-based appraisal with reference to the Site's location in relation to sensitive locations, the planned process and site characteristics, as described in the Institute of Air Quality Management (IAQM) guidance<sup>1</sup>.

### 2.1 Potential Sources

The key potential construction air quality emission sources are:

- Excavation/demolition activities;
- Earthworks;
- Construction vehicle movement: vehicles moving on and around the site emitting exhaust particulate and re-suspending loose material on the road;
- Material transfer: spillage from transferring material around the site, wind picking up dust from material stockpiles, particulate lifted from open

<sup>1</sup> 1 The Institute of Air Quality Management (IAQM), Guidance on the assessment of dust from demolition and construction, February 2014

- container vehicles by the wind generated from the vehicle movement;
  - and
- Passing vehicles: Material tracked out on the wheels of site traffic and re-suspended by passing traffic.

The construction dust assessment comprises a qualitative risk-based appraisal of potential sources of dust and the impacts at the sensitive locations close to the site. If required, a suite of recommended mitigation measures can be used to minimise the impact of dust during the construction phase of the development. This risk assessment is based on the IAQM guidance.

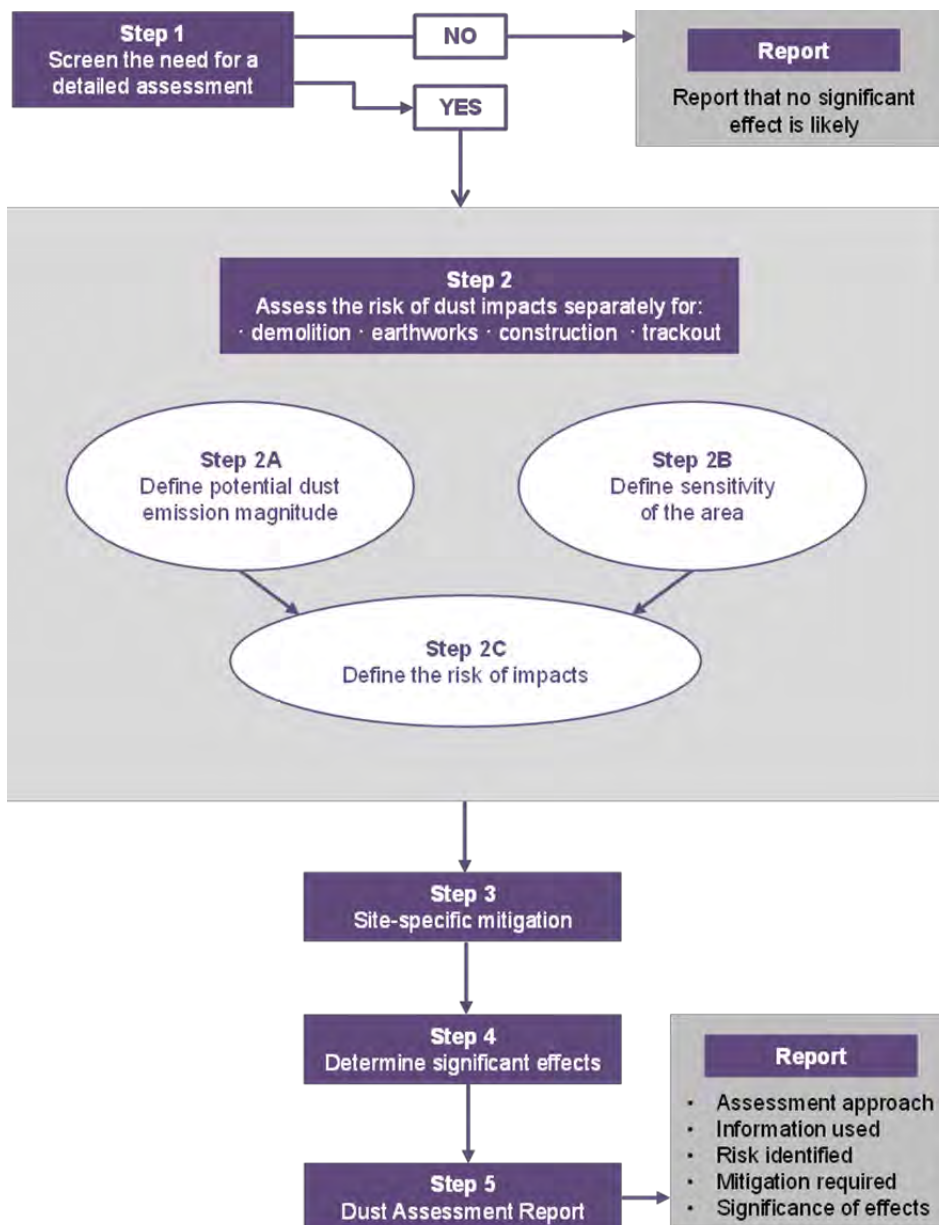
## 2.2 Environmental Risk

The methodology in the guidance provides an assessment on three separate dust effects, which are:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in exposure to PM<sub>10</sub>.

The methodology for the assessment of the construction impacts is based on a five-step approach laid out in **Diagram 1**.

Diagram 1 Construction dust risk assessment method



### 2.2.1 Step 1 – Screen the need for a detailed assessment

Based on the IAQM guidance, the need for an assessment is based on simple distance-based criteria as follows:

“An assessment will normally be required where there are:

- human receptors within 350 m of the site boundary and / or within 50 m of the access route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s); and / or

- ecological receptors within 50 m of the site boundary and / or within 50 m of the access route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

In this case, as there are receptors within the distances specified the assessment is required to proceed to Step 2 - Step 4 and the methodology and information used in each of the Steps is set out in sections below.

## 2.3 Potential Effects

In order to assess the risk of dust impacts this section considers Step 2A to 2C as outlined in Diagram 1. These steps are followed for each of the four phases associated with the Construction Phase as described within the IAQM guidance ie Demolition, Earthworks, Construction and Trackout.

### 2.3.1 Step 2A: Dust emissions magnitude

#### 2.3.1.1 Demolition

The following are descriptors for the different dust emission classes for demolition.

- **Large:** Total building volume >50,000 m<sup>3</sup>, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level;
- **Medium:** Total building volume 20,000 m<sup>3</sup> – 50,000 m<sup>3</sup>, potentially dusty construction material, demolition activities 10-20 m above ground level; and
- **Small:** Total building volume <20,000 m<sup>3</sup>, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.

There are no demolition activities scheduled to take place on the application site. On this basis, the demolition activities have been screened out from further assessment.

#### 2.3.1.2 Earthworks

The following are descriptors for the different dust emission classes for earthworks.

- **Large:** Total site area >10,000 m<sup>2</sup>, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8m in height, total material moved >100,000 tonnes;
- **Medium:** Total site area 2,500 m<sup>2</sup> – 10,000 m<sup>2</sup>, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes; and
- **Small:** Total site area <2,500 m<sup>2</sup>, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <10,000 tonnes, earthworks during wetter months.



The construction phase and associated earthworks is estimated to be 3 years in total. A summary of the associated stages is summarised below

Proposed Hatston Works	Area m2	Type 1 (m3)	Crusher Run (m3)	General Fill (m3)	Est. Total (Tonnes)	Est. Duration (months)	HGV / day	HGV/hour/ 10 hour day
Works 1 South Reclamation	29,600	8,800	30,000	159,000	394,000	10 months	66	6 to 7
Works 2 North Reclamation & Quay Works	34,000	10,500	34,000	396,000	880,000	22 months	67	6 to 7
Works 3 Boat lift & storage area	13,300	4,000	13,500	83,500	183,000	10 months	31	3 to 4
	<b>7.7 Hectares</b>	23,300 m3	77,500 m3	638,500 m3	<b>1.46M Tonnes</b>			

On the basis of the data in the table above the dust emissions magnitude for Earthworks has been classified as “**Large**”.

### 2.3.1.3 Construction

The following are descriptors for the different dust emission classes for construction.

- **Large:** Total building volume >100,000m<sup>3</sup>, piling, on site concrete batching; sandblasting;
- **Medium:** Total building volume 25,000m<sup>3</sup> – 100,000 m<sup>3</sup>, potentially dusty construction material (e.g. concrete), piling, on site concrete batching; and
- **Small:** Total building volume <25,000m<sup>3</sup>, construction material with low potential for dust release (e.g. metal cladding or timber).

A review of all construction activities has been considered for potential dust emissions. It has been confirmed that there will be no concrete batching, however there will be piling.

While its is likely that the total building volume will be between 25,000m<sup>3</sup> and 100,000 m<sup>3</sup> due to piling activities a worst case approach has been taken and therefore a dust emission class of “**Large**” has been assumed.

### 2.3.1.4 Trackout

Trackout is used to describe construction traffic accessing the proposed development and is the transport of dust and dirt from the site onto the public road network, where it may be deposited and re-suspended by other vehicles using the road network. Only receptors within 50 m of the route(s) used by vehicles on the public highway up to 500 m from the site entrance(s) are considered to be at risk.

The following are descriptors for the different dust emission classes for Trackout.

- **Large:** >50 HDV (Heavy Duty Vehicle) (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m;
- **Medium:** 10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100 m; and
- **Small/ Medium:** <10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.

On this basis, the assessment for trackout is based on a dust emission class of **“Large”**

A summary of the dust emissions magnitude assessed under Step 2A is provided in Table 1.

Table 1: Dust emission magnitude

Activity	Dust emission magnitude
Demolition	N/A
Earthworks	Large
Construction	Large
Track out	Large

### 2.3.2 Step 2B Define the sensitivity of the area

The sensitivity of the area takes account of a number of factors:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- The local background PM<sub>10</sub> concentrations; and
- Site-specific factors.

#### Human Receptors

For this assessment of sensitivities of people to dust soiling effects and health effects of PM<sub>10</sub> the receptors are residential properties that can reasonably expect an enjoyment of a high level of amenity and may be exposed for eight hours or more in a day. Therefore, the sensitivity of receptors to dust soiling effects and health effects of PM<sub>10</sub> is **“high”**

**Table 2** and Table 3 set out the selection criteria for the sensitivity of the area to dust soiling effects on people and property and the selection criteria for the sensitivity of the area to human health impacts, respectively.

**TABLE 2: SENSITIVITY OF THE DUST SOILING EFFECTS ON PEOPLE AND PROPERTY**

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

**TABLE 3: SENSITIVITY OF THE AREA TO HUMAN HEALTH**

Receptor sensitivity	Annual mean PM <sub>10</sub> conc.	Number of receptors	Distance from the source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m <sup>3</sup>	>100	High	High	High	Medium	Low
		10 – 100	High	High	Medium	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	28-32 µg/m <sup>3</sup>	>100	High	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	24-28 µg/m <sup>3</sup>	>100	High	Medium	Low	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	<24 µg/m <sup>3</sup>	>100	Medium	Low	Low	Low	Low
		10 – 100	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Medium	N/A	>10	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
Low	N/A	>1	Low	Low	Low	Low	Low

There are approximately zero residential receptors with 350m of the red line boundary for earthworks and construction. Therefore, the overall sensitivity of the area for dust soiling a **Low Sensitivity** for Dust Soiling.

However, as the HGV traffic will travel along the A965 there are between 10 to 100 properties within 50m therefore a **Medium Sensitivity** for dust soiling from trackout.

Background maps<sup>2</sup> from indicates that PM<sub>10</sub> concentrations are currently 5µg/m<sup>3</sup> Therefore, the overall sensitivity of the area for Human Health, as a result of the low background PM<sub>10</sub> concentrations, a **Low Sensitivity** has been concluded.

### Ecological Receptors

The North Orkney SPA is a designated site located within 50 m of the site boundary, as a precautionary approach we have assumed there may be species/habitats which could be sensitive to dust deposition. In line with the IAQM guidance this would indicate a Medium Sensitivity Receptor.

<sup>2</sup> <https://www.scottishairquality.scot/data/mapping/data>

In order to identify the sensitivity of the area to ecological impacts Table 4 has been used to review in terms of each of the four activities.

Table 4 Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from source	
	<20m	<50m
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Therefore, the sensitivity of the area to dust soiling, human health and ecological impacts for each activity is presented in Table 5.

**TABLE 5: SENSITIVITY OF AREA**

Road	Sensitivity of the Surrounding area			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	N/A	Low	Low	Medium
Human health	N/A	Low	Low	Low
Ecological	N/A	Medium	Medium	Low

### 2.3.3 Step 3: Site Specific Mitigation

The site has been classified as a Medium Risk Site because of the proximity of the North Orkney SPA and sensitive human receptors to the dust generating activities including the potential impacts from dust generated by HGV movements along the A965. Particularly as a result of the numbers of vehicles and their proximity to the existing residential receptors adjacent to and along the A965.

Mitigation measures inline with a Medium Risk site should be adopted. A full list of these can be found in section 8.2 of the IAQM guidance. A sample of those particularly related to track out are summarise below.

#### Measures specific to trackout

Mitigation measure	Low Risk	Medium Risk	High Risk
43. Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	D	H	H
44. Avoid dry sweeping of large areas.	D	H	H
45. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	D	H	H
46. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	N	H	H
47. Record all inspections of haul routes and any subsequent action in a site log book.	D	H	H
48. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	N	H	H
49. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	D	H	H
50. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	N	H	H
51. Access gates to be located at least 10 m from receptors where possible.	N	H	H

### 3 Summary

A construction dust risk assessment has been completed which has identified the site as a Medium Risk to dust soiling, human health impact and ecological impact.

If all mitigation measures are put in place and managed through a Construction Environmental Management Plan then this should prevent any significant effects arising from the construction phase of the Proposed Development at Hatson.