



## **Rampion Offshore Wind Farm**



## **ES Section 21 – Air Quality**

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## 21 AIR QUALITY

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### 21.1 Introduction

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21.1.1 This section of the Environmental Statement (ES) assesses the potential impacts on air quality of the onshore elements of the proposed Rampion Offshore Wind Farm (the Project), including the construction of a cable route from the offshore cable landfall to a new substation in the vicinity of the existing Bolney substation.

### 21.2 Legislation and Policy Context

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#### **The National Air Quality Strategy and Local Air Quality Management**

- 21.2.1 UK air quality policy is published under the provisions of the Environment Act 1995, (the 1995 Act). The 1995 Act required the preparation of a National Air Quality Strategy (NAQS) which sets out air quality standards and objectives for specified pollutants. The latest Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Working Together for Clean Air, published in July 2007, sets air quality standards and objectives for ten key air pollutants to be achieved between 2003 and 2020.
- 21.2.2 The EU Air Quality Framework Directive 96/62/EC established a framework under which the EU could set limit or target values for specified pollutants. The Directive identified several pollutants for which limit or target values have been, or will be set in subsequent Daughter Directives. The Framework and Daughter directives were consolidated by Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe, which retains the existing air quality standards and introduces new objectives for fine particulates (PM<sub>2.5</sub>).
- 21.2.3 UK air quality standards have been transposed from European Commission (EC) Directives via the Air Quality (England) Regulations 2000 and Air Quality (England) Amendment Regulations 2002. The Air Quality Limit Values Regulations 2003 and subsequent amendments implement the EU Air Quality Framework Directive. Directive 2008/50/EC was transposed into UK law in 2010 via the Air Quality Standards Regulations 2010. The objectives relevant to the proposed development are summarised below.

**Table 21.1: National Air Quality Objectives**

Substance	Averaging period	Exceedances allowed per year	Pollutant Concentration ( $\mu\text{g}/\text{m}^3$ )	Target date
Nitrogen dioxide ( $\text{NO}_2$ )	1 year	-	40	31.12.05
	1 hour	18	200	31.12.05
Sulphur dioxide ( $\text{SO}_2$ )	15 minute	35	266	31.12.05
	1 hour	24	350	31.12.04
	24 hours	3	125	31.12.04
Ozone ( $\text{O}_3$ )	8 hour	10	100	31.12.05
Particles ( $\text{PM}_{10}$ )	1 year	-	40	31.12.04
	24 hours	35	50	31.12.04
Particles ( $\text{PM}_{2.5}$ )	1 year <sup>(1)</sup>	-	25	2020
	1 year <sup>(1)</sup>	15% reduction in urban background concentration	N/A	2010-2020
Carbon monoxide (CO)	8 hour <sup>(2)</sup>	-	10,000	31.12.03
1,3 Butadiene	1 year <sup>(2)</sup>	-	2.25	31.12.03
Benzene	1 year	-	5	31.12.10
PAH	1 year	-	0.00025	31.12.10
Lead	1 year	-	0.25	31.12.08

Note: (1) = target; (2) = running average

21.2.4 These objectives are used in the review and assessment of air quality by local authorities under Section 82 of the Environment Act (1995). If exceedances are measured or predicted through the review and assessment process, the local authority must declare an Air Quality Management Area (AQMA) and produce an Air Quality Action Plan (AQAP) to outline how air quality is to be improved to meet the objectives.

### Dust

21.2.5 Enforcement action to control dust and odour annoyance can be taken under the Environmental Protection Act 1990. However, there are no statutory limits for odour or dust deposition/soiling, and a number of different criteria and monitoring methods have been developed to assess whether or not complaints are likely.

21.2.6 In January 2011 the Institute of Air Quality Management (IAQM) published guidance on the assessment of the effect of construction projects on local air quality. The approach is to classify sites according to the risk of effects and to identify mitigation appropriate to the risk.

## National Policy Statements

- 21.2.7 National Policy Statements (NPS) provide the basis on which the Secretary of State is required to make its decisions. The specific assessment requirements, as detailed in the relevant NPS are set out below.
- 21.2.8 The overarching NPS for Energy, EN-1 contains requirements for the assessment of impacts on air quality arising from Nationally Significant Infrastructure Projects (NSIPs) and any associated development.
- 21.2.9 Section 5.2.7 states that the following need to be considered in the ES: any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;
- the predicted absolute emission levels of the proposed project, after mitigation methods have been applied;
  - existing air quality levels and the relative change in air quality from existing levels; and
  - any potential eutrophication impacts.

## 21.3 Assessment Methodology

### Scoping

- 21.3.1 Scoping identified the potential for adverse effects on local air quality to arise from implementation of the onshore elements of the proposed development, specifically:
- emissions, principally oxides of nitrogen (NO<sub>x</sub>) from increased road traffic levels during the construction phase of the development; and,
  - emission of dust and fine particulate matter (PM<sub>10</sub>)<sup>1</sup> during the construction phase.
- 21.3.2 The information and advice received during the scoping process with regard to air quality is summarised in Table 21.2.

**Table 21.2: Relevant Scoping Responses**

Date	Consultee	Summary of issues	Where addressed
October 2011	Adur District Council	Impacts of traffic associated during the construction phase	Predicted less than 10% increase in traffic during the construction phase which is not considered 'significant' (paragraph 21.3.5).

<sup>1</sup> PM<sub>10</sub> refers to the particulate matter of aerodynamic diameter less than or equal to 10 micrometers. Other fractions like PM<sub>2.5</sub> are similarly defined. Dust comprises the airborne particulate matter of different size fractions.

Date	Consultee	Summary of issues	Where addressed
October 2011	Mid Sussex District Council	A new AQMA is going to be introduced at Stonepound Crossroads, Hassocks	The cable route is more than 5 km west of the proposed AQMA, an impact is considered unlikely.
October 2010	Natural England	Numbers of ecological sensitive sites close to the proposed development area	There are some statutory designated ecological sites within 100m of the cable route and substation (Table 21.9). Potential impacts on locally designated sites are not considered likely to be significant.

21.3.3 It was agreed at the scoping stage that the potential for air quality impacts during the operational phase would be negligible, due to the very low likely traffic generation attributable to the operational phase of the Project. Accordingly, this aspect has been scoped out of the assessment.

21.3.4 Where ‘significant’ change in traffic flows, considered to be 5% for an area in AQMA and 10% for non-AQMA, in accordance with EP-UK guidance (EP-UK – Development Control, Planning for Air Quality, 2010 update), is predicted, a quantitative (dispersion modelling) assessment of air quality impacts is normally required. Generation of additional road traffic is not anticipated to be significant by this criterion (See Section 29 – Transport) during the construction of the onshore elements of the Project (with the exception of Wineham Lane). Hence no further assessment of impacts resulting from construction traffic vehicles is undertaken.

21.3.5 A quantitative impact assessment of construction activities is virtually impossible due to the sporadic and constantly changing nature of the construction-related activities, as well as the difficulty in accurately representing the activities in predictive models. A qualitative impact assessment of the construction phase was therefore carried out and assessment outcomes are reported in this section.

#### **Pre-application Formal Consultation**

21.3.6 As detailed in Section 5 (EIA Methodology), an extensive programme of engagement has been undertaken with regard to the Project; details of which are provided in the Consultation Report (which accompanies the DCO application). This included publication of the Draft ES as part of the Section 42 and Section 48 consultation.

21.3.7 Following a review of consultee feedback on the Draft ES, the following modification was made to the Project and overall assessment scope:

- qualitative assessment of construction traffic along preferred transport routes.

21.3.8 Full details of the consultation process and associated outcomes are documented in Document 5.1 (Consultation Report).

### **Establishment of Baseline Environment**

21.3.9 Baseline NO<sub>2</sub> and PM<sub>10</sub> levels were established by way of reference to the predicted background air quality maps available from the UK-Air (DEFRA) website.

21.3.10 There is a paucity of published information concerning baseline dust levels, since these vary strongly with location, weather and activities taking place in the vicinity. Reference was made to typical dust levels, from guidance published by Building Research Establishment (BRE) Guidance document: Control of Dust from Construction & Demolition Activities, February 2003.

### **Identification and Assessment of Impacts and Mitigation Measures**

21.3.11 A qualitative impact assessment of the cable route construction phase was carried out defining the sensitivity of receptors, magnitude of impacts and significance of effects as discussed below. Mitigation measures are provided to reduce the identified effects.

#### *Construction and Demolition Significance*

21.3.12 The Institute of Air Quality Management (IAQM) has recently published a guidance document (IAQM, 2012) for the assessment of construction phase impacts. The risk category of the construction site is assessed and used to specify the level of mitigation required. Construction activities are divided into four types, as follows:

- Demolition;
- Earthworks;
- Construction; and,
- 'Trackout' of material onto local roads.

21.3.13 For each activity, the risk of dust annoyance and/or health or ecological impacts is determined using three risk categories: low, medium and high risk. The risk category is different for each of the four activities.

#### *Demolition*

21.3.14 The risk category for demolition is varied for each site in terms of timing, building type, duration and scale. Examples of the potential dust emission classes are provided in the IAQM guidance as follows:

- Large: Total building volume >50,000m<sup>3</sup>, potentially dusty construction material, on-site crushing and screening, demolition activities >20m above ground level;



- Medium: Total building volume 20,000m<sup>3</sup> – 50,000m<sup>3</sup>, potentially dusty construction material, demolition activities 10m - 20m above ground level; and,
- Small: Total building volume <20,000m<sup>3</sup>, construction material with low potential for dust release, demolition activities <10m above ground, demolition during wetter months.

21.3.15 The matrix to determine the demolition risk category based on the distance to the nearest receptors and the dust emission class is presented in Table 21.3.

**Table 21.3: Risk Category from Demolition Activities**

Distance to Nearest Receptor (m) <sup>(1)</sup>		Dust Emission Class		
Dust Soiling and PM <sub>10</sub>	Ecological	Large	Medium	Small
<20	-	High Risk Site	High Risk Site	Medium Risk Site
20 – 100	<20	High Risk Site	Medium Risk Site	Low Risk Site
100 – 200	20 – 40	Medium Risk Site	Low Risk Site	Low Risk Site
200 – 350	40 - 100	Medium Risk Site	Low Risk Site	Negligible

Note: (1) These distances are from the dust emission source. Where this is unknown, then the distance should be from the site boundary.

### *Earthworks*

21.3.16 The risk category for earthworks is varied for each site in terms of timing, geology, topography and duration. Examples of the potential dust emission classes are provided In IAQM guidance as follows:

- Large: Total site area >10,000m<sup>2</sup>, potentially dusty soil type (e.g. clay), >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 – 10,000m<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 - 8m in height, total material moved 20,000 – 100,000 tonnes; and,
- Small: Total site area < 2,500m<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 <4m in height, total material moved <10,000 tonnes, earthworks during wetter months.

21.3.17 A matrix to determine the earthworks risk category is presented in Table 21.4.

**Table 21.4: Risk Category from Earthworks Activities**

Distance to Nearest Receptor (m) <sup>(1)</sup>		Dust Emission Class		
Dust Soiling and PM <sub>10</sub>	Ecological	Large	Medium	Small
<20	-	High Risk Site	High Risk Site	Medium Risk Site
20 – 50	-	High Risk Site	Medium Risk Site	Low Risk Site
50 – 100	<20	Medium Risk Site	Low Risk Site	Low Risk Site
100 – 200	20 – 40	Medium Risk Site	Low Risk Site	Negligible
200 - 350	40 - 100	Low Risk Site	Low Risk Site	Negligible

*Construction*

21.3.18 The risk category for construction is varied for each site in terms of timing, building type, duration, and scale. Examples of the potential dust emissions classes are provided in the IAQM guidance as follows:

- Large: Total building/infrastructure volume >100,000m<sup>3</sup>, piling, on site concrete batching;
- Medium: Total building volume 25,000 – 100,000m<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).

21.3.19 The matrix to determine the construction risk category is the same as that identified in Table 21.4.

*Trackout*

21.3.20 Factors which determine the magnitude class of trackout activities (ie the transport of materials onto local roads) are vehicle size, vehicle speed, vehicle number, geology and duration. Examples of the potential dust emissions classes are provided in the guidance as follows:

- Large: >100 HGV (3.5t) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- Medium: 25 – 100 HGV (>3.5t) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100m; and,
- Small: <25 HGV (<3.5t) trips in any one day, surface material with low potential for dust release, unpaved road length <50m.

21.3.21 A matrix to determine the trackout risk category is the presented in Table 21.5.

**Table 21.5: Risk Category from Trackout**

Distance to Nearest Receptor (m) <sup>(1)</sup>		Dust Emission Class		
Dust Soiling and PM <sub>10</sub>	Ecological	Dust Soiling and PM <sub>10</sub>	Ecological	Dust Soiling and PM <sub>10</sub>
<20	-	High Risk Site	Medium Risk Site	Low Risk Site
20 – 50	<20	Medium Risk Site	Medium Risk Site	Low Risk Site
50 - 100	20 - 100	Low Risk Site	Low Risk Site	Negligible

Note: (1) For trackout the distance is from the roads used by construction traffic.

*Identification of Effects and Significance of the Construction Activities*

21.3.22 Example criteria to identify the sensitivity of the surrounding area are provided in the IAQM guidance and are summarised below.

**Table 21.6: Sensitivity of the Area Surrounding the Site**

Sensitivity of Area	Human Receptors	Ecological Receptors <sup>(1)</sup>
Very High	Very densely populated area; >100 dwellings within 20m; Local PM <sub>10</sub> concentrations exceed the objective; Contaminated building present; Very sensitive receptors (e.g. oncology units); Works continuing in one area of the site for more than 1 year	European designated site.
High	Densely populated area; 10 - 100 dwellings within 20m; Local PM <sub>10</sub> concentrations close to the objective (annual mean 36 - 40µg/m <sup>3</sup> ); Commercially sensitive horticultural land within 20m.	Nationally designated site
Medium	Suburban or edge of town area; <10 dwellings within 20m; Local PM <sub>10</sub> concentrations below the objective (annual mean 30 - 36µg/m <sup>3</sup> )	Locally designated area
Low	Rural or industrial area; No receptor within 20m; Local PM <sub>10</sub> concentrations well below the objective (<75%) Wooded area between site and receptors	No designations

Note: (1) Only if there are habitats that might be sensitive to dust.

21.3.23 The criteria for assessment of the significance of effects for each of the four construction activities, before applying mitigation measures, are summarised below

**Table 21.7: Significance of Effects for Each Activity (Before Mitigation)**

Sensitivity of surrounding area	Risk of site giving rise to dust effects		
	High	Medium	Low
Very High	Substantial adverse	Moderate adverse	Moderate adverse
High	Moderate adverse	Moderate adverse	Slight adverse
Medium	Moderate adverse	Slight adverse	Negligible
Low	Slight adverse	Negligible	Negligible

21.3.24 The criteria for significance of effects for each of the four construction activities, assuming the effective application of mitigation measures, are summarised below.

**Table 21.8: Significance of Effects for Each Activity (With Mitigation)**

Sensitivity of surrounding area	Risk of site giving rise to dust effects		
	High	Medium	Low
Very High	Slight adverse	Slight adverse	Negligible
High	Slight adverse	Negligible	Negligible
Medium	Negligible	Negligible	Negligible
Low	Negligible	Negligible	Negligible

### Uncertainty and Technical Difficulties Encountered

21.3.25 Although mitigation measures and the requirement for a construction phase Air Quality Management Plan (AQMP) have been identified as part of this assessment, more detailed mitigation measures will be specified in the AQMP once a detailed construction programme is developed.

## 21.4 Environmental Baseline

21.4.1 In the absence of measured air quality data along the cable route, estimated background data published by the UK-Air website was used in the assessment. Estimates of background concentrations of pollutants relevant to local authority air quality review and assessment (NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>) are provided at a 1km<sup>2</sup> grid resolution on the UK-AIR website.

21.4.2 The proposed cable route and substation working area crosses a total of 43 of the 1km<sup>2</sup> grid sections. The estimated pollutant background concentrations for the 1km<sup>2</sup> grid squares containing the proposed onshore cable route\substation site are presented in Figure 21.1.

- 21.4.3 A new substation is proposed to be built in the vicinity of the existing Bolney substation. The estimated pollutant background concentrations at the site are all substantially below the relevant objectives, suggesting that existing background air quality is likely to be good in the vicinity of the proposed substation.
- 21.4.4 The proposed cable route crosses the jurisdictions of four local authorities: Worthing Borough Council, Adur District Council, Horsham District Council and Mid Sussex District Council. The route does not pass through any declared AQMAs, but passes close to the Worthing Borough Council – A24 Warren Road / A27 Upper Brighton Road AQMA, located approximately 500m west of the proposed cable route. This AQMA has been declared for NO<sub>2</sub>.
- 21.4.5 Mid Sussex District Council is consulting on the declaration of an AQMA for nitrogen dioxide at the Stonepound area of Hassocks, located approximately 5km east of the proposed cable route.
- 21.4.6 Horsham District Council has declared two AQMAs and both of them are more than 2km away from the proposed cable route and substation.
- 21.4.7 The proposed cable route and substation are predominately rural in nature and hence local air quality is not expected to be influenced by urban road traffic emissions. Ambient concentrations of air pollutants are likely to approximate to the background concentrations. Concentrations of coarse fraction dust are not currently monitored in the UK; however BRE Guidance Document *Control of Dust From Construction and Demolition Activities* suggests a dust deposition rate of 39mg/m<sup>2</sup>/day would be ‘broadly typical’ for open country, whilst 59mg/m<sup>2</sup>/day would be representative of the outskirts of towns.

## 21.5 Predicted Impacts

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### Rochdale Envelope Principles

- 21.5.1 In line with the use of the “Rochdale Envelope” (see Section 5 – EIA Methodology), the assessment in this section has been based on a worst case scenario in terms of impacts on air quality. A ‘high sensitivity’ has been assumed for assessing the potential impacts of the construction of the cable route even though the cable passes through non-sensitive areas in some locations.

### Identification of Receptors

- 21.5.2 The IAQM guidance suggests a screening criterion of receptors within 350m of the construction site boundary requiring an assessment. Sensitive receptors were identified within the 350m of the proposed cable route/substation; therefore further assessment is required.

- 21.5.3 The IAQM guidance classifies sensitivity of the environs of a site on the basis of the number of human receptors within 20m of the boundary and the presence of ecological receptors. Although the majority of the cable route is through rural areas with few receptors closer than 20m, where the route passes close to Worthing and Wineham there are of the order of 10-100 receptors within 20m of the sites. Therefore, the sensitivity has been classified as 'high'. For a conservative assessment, the high sensitivity has been applied along the entirety of the cable corridor.
- 21.5.4 Minerals Policy Statement 2 (MPS2) was replaced by the National Planning Policy Framework (NPPF) but notes that '*Residents can potentially be affected by dust up to 1km from the source, although concerns about dust are most likely to be experienced near to dust sources, generally within 100m, depending on site characteristics and in the absence of appropriate mitigation*'. Receptors within 100m of the cable route are listed below with reference to the DEFRA 1km<sup>2</sup> grid squares identified in Figure 21.1. Residential receptors within 20m of the proposed cable route/substation are also identified for assessing construction dust impacts based on the IAQM guidance.

**Table 21.9: Sensitive Receptors within 100m and 20m of the Proposed Cable Route/Substation Site**

Sensitive Receptor Located Within 100m of the Proposed Cable Route/substation site	Grid Square Number (Refer to Figure 21.1)	Is Residential Receptor within 20m of the Cable Route/substation site?
Old Doctors (off Wineham Lane)	43	Yes
Sparrows (off Wineham Lane)	43	
Wineham Court Farm (off Wineham Lane)	41	
Twineham Grange (Bob Lane)	41	Yes
River Adur	40	
Great Wapses Farm (off B2116)	40	Yes
Paddock Wood ASNW	38 & 39	Yes
Residential properties (near above intersection)	38 & 39	Yes
Heatenthorn Farm (off B2116)	36	
Copse (High Cross)	36	
Blackstone Gate Farm (Blackstone Ln & B2116 intersection)	36	
Woodhouse Wood	37	
Residential (South of Brighton Road)	33	
Copse (NW of Woodmancote Place)	32	
Residential (off A281, south of Woodmancote PI)	31	
Residential (off A281, south of Woodmancote PI)	30	Yes
Residential (near Oreham Common)	29	Yes

<b>Sensitive Receptor Located Within 100m of the Proposed Cable Route/substation site</b>	<b>Grid Square Number (Refer to Figure 21.1)</b>	<b>Is Residential Receptor within 20m of the Cable Route/substation site?</b>
Residential (near Truleigh Sands)	26	
Copse (near Old Erringham Farm, off A283)	17 & 18	
Residential (Beggars Bush, Titch Hill)	11	
Commercial (off A27)	6	
Residential (The Templars)	6	Yes
Residential	5 & 6	
Lower Cokeham reedbed and ditches, Lancing SNCI	4	
East Worthing Rail	3	
Residential (St Luke's Close)	3	Yes
Water Treatment Works (off Meadow Road)	2 & 3	
Brooklands Pleasure Park	2	
Lake (off intersection of Western Road & Brighton Road)	2	
Residential (Seamill Park Crescent)	2	Yes
Bramber First School	5, 6	
Beeding Hill to Newtimber Hill SSSI	18, 21, 22 & 24	
Applesham Farm Bank SNCI	14	
Old Erringham Farm Valley and Road Cutting, Shoreham-by-Sea SNCI	18	
A283 Steyning Rd. Notable Verge (NV)	17	
Woodhouse Wood ASNW	37	
Steep Down, Lancing SNCI	10	
River Adur Meadows, Shoreham-by-Sea SNCI	17	
Blackstone Gate Wood ASNW	36	
Collins Barn Shaw ASNW	38	
Two un-named ASNW sites	18	
Priorsbush ASNW	42	
The Gill ASNW	41	

Note: SNCI = Site of Nature Conservation Importance. ASNW = Ancient Semi-Natural Woodland

### Construction Phase Impacts

21.5.5 Construction activities may impact on air quality in a number of ways, which may be broadly classified into:

- Exhaust emissions from site plant, equipment and vehicles; and,

- Fugitive dust emissions from site activities.

#### *Exhaust Emissions from Plant and Vehicles*

- 21.5.6 The operation of vehicles and equipment powered by internal combustion engines results in the emission of exhaust gases containing the pollutants NO<sub>x</sub>, PM<sub>10</sub>, volatile organic compounds (VOCs), and carbon monoxide (CO). The quantities emitted depend on factors such as engine type, service history, pattern of usage and fuel composition. The operation of site equipment, vehicles and machinery will result in emissions to atmosphere of exhaust gases, but such emissions are unlikely to be significant, particularly in comparison to levels of similar emission components from vehicle movements on the local road network surrounding the development site.
- 21.5.7 Construction traffic will comprise haulage / construction vehicles and vehicles used for workers' trips to and from the site.
- 21.5.8 Construction traffic will be directed to defined preferred transport routes, as detailed in Section 29 - Transport. The preferred transport routes utilise the A23 and A27 trunk roads as much as possible, and do not pass through any AQMA except for the Worthing AQMA, which is predicted to experience an increase in traffic of 1.1%, substantially below the threshold requiring quantitative assessment.

#### *Fugitive Dust Emissions*

- 21.5.9 Fugitive dust emissions arising from construction activities are likely to be variable in nature and will depend upon the type and extent of the activity, soil type and moisture, road surface conditions and weather conditions. Periods of dry weather combined with higher than average wind speeds have the potential to generate more dust.
- 21.5.10 Construction and activities that are considered to be the most significant potential sources of fugitive dust emissions are:
- Earth moving, due to the handling, storage and disposal of soil and subsoil materials;
  - Construction aggregate usage, due to the transport, unloading, storage and use of dry and dusty materials (such as cement and sand);
  - Movement of heavy site vehicles on dry or untreated haul routes; and,
  - Movement of vehicles over surfaces where muddy materials have been transferred off site (for example, on to public highways).



- 21.5.11 Fugitive dust arising from construction activities is in the main of a particle size greater than the PM<sub>10</sub> fraction (that which can potentially impact upon human health), however it is noted that construction activities may contribute to local PM<sub>10</sub> concentrations. Appropriate dust control measures can be highly effective for controlling emissions from potentially dust generating activities identified above, and adverse effects can be greatly reduced or eliminated.
- 21.5.12 The tendency of dust to remain airborne is determined by the particle size and weather conditions. Eventually, particles will drop from suspension as a deposit. A widely used guidance document for dust control is Minerals Policy Statement 2: Controlling and Mitigating the Environmental Effects of Minerals Extraction in England: Annex 1: Dust'. This guidance is considered to be applicable to control of dust generated by any on site activities. Residents can potentially be affected by dust up to 1km from the source, although concerns about dust are most likely to be experienced near to dust sources, generally within 100m, depending on site characteristics and in the absence of appropriate mitigation. Dust impacts are considered significant within 100m from the point of generation.

#### **Assessment of Construction Activities (Onshore Cable Route)**

- 21.5.13 With reference to the IAQM guidance criteria outlined in paragraph 21.2.6, the dust emissions classes for earthworks, construction and trackout activities for the construction of proposed cable route are summarised in the tables below.
- 21.5.14 There is one nationally designated ecological site within 100m of the cable route, the Beeding Hill to Newtimber Hill SSSI, although the route crosses or passes close to a number of locally designated sites, as listed in Table 21.9. The route also passes areas where there are between 10 and 100 dwellings within 20m of the cable route, therefore on the basis of the criteria set out in Table 21.6, the sensitivity of the receiving environment has been assessed conservatively as 'high'. For a conservative assessment, the sensitivity for the whole cable route was assessed as 'high'.
- 21.5.15 In reality, much of the route corridor passes through agricultural land more than 350m from residential or ecological receptors, where fugitive emissions from construction operations are unlikely to be significant in comparison with existing agricultural activity.
- 21.5.16 No demolition is proposed during the construction phase, so the dust impacts from demolition activity are not considered relevant.

**Table 21.10: Summary of Dust Emissions Class of Earthworks Activities (before mitigation)**

<b>Earthworks Criteria</b>	<b>Dust Emissions Class</b>	<b>Notes</b>
Total site area	Large	>10,000m <sup>2</sup>
Soil type	Large	Clay

Earthworks Criteria	Dust Emissions Class	Notes
Earth moving vehicles at any one time	Large	>10 vehicles at a time
Height of bunds	Small	<4m
Total material moved	Large	>100,000 tonnes
Work times	Medium	Works during wet and dry seasons
<b>Overall Rating</b>	<b>Large</b>	Conservative rating

**Table 21.11: Summary of Dust Emissions Class of Construction Activities (before mitigation)**

Construction Criteria	Dust Emissions Class	Notes
Total building/infrastructure volume	Large	> 100,000m <sup>3</sup>
Dust potential of construction materials	Medium	Likely use of some potentially dusty materials
<b>Overall Rating</b>	<b>Large</b>	Conservative rating

**Table 21.12: Summary of Dust Emissions Class of Trackout Activities (before mitigation)**

Construction Criteria	Dust Emissions Class	Notes
Number of HGV>3.5t per day	Small	<25 HGV per day
Length of unpaved road	Large	>100m
<b>Overall Rating</b>	<b>Large</b>	Conservative rating

21.5.17 Risk categories for the three construction activities are summarised below, which are derived from the dust emissions classes identified above.

**Table 21.13: Summary of Risk Categories of the Site (before mitigation)**

Construction Activities	Dust Emissions Class	Nearest Receptor	Evaluation of the Risk Category
Earthworks	Large	<20m	<b>High Risk Site</b>
Construction	Large	<20m	<b>High Risk Site</b>
Trackout	Large	<20m	<b>High Risk Site</b>

21.5.18 Throughout the length of the cable route, the conditions at different sections of the route will vary, therefore the above ratings are considered to be conservative and represent the worst case. Much of the route passes through land uses where agricultural activities are likely to result in greater areas and more frequent earthworks than the proposed development. Nevertheless, mitigation measures that will help reduce the impacts of the construction activities for the construction of the cable route are discussed in more detail later in this section.

### Assessment of Construction Activities (Onshore Substation)

21.5.19 No demolition is proposed during the construction phase, so the dust impacts from demolition activity are not considered relevant. The dust emissions classes for earthworks, construction and trackout activities associated with the new substation are summarised in the following tables.

21.5.20 There is an area of Ancient Semi-Natural Woodland (ASNW) within 350m of the proposed substation site (Priorsbush), however there are no nationally designated ecological sites within 350m of the proposed substation site and no residential receptors within 20m, therefore the sensitivity of the site area has been assessed according to the criteria identified in Table 21.6 as 'low'.

**Table 21.14: Summary of Dust Emissions Class of Earthworks Activities (before mitigation)**

Earthworks Criteria	Dust Emissions Class	Notes
Total site area	Large	>10,000m <sup>2</sup>
Soil type	Large	Clay
Earth moving vehicles at any one time	Large	>10 vehicles at a time
Height of bunds	Medium	6m
Total material moved	Large	>100,000 tonnes
Work times	Medium	Works during wet and dry seasons
<b>Overall Rating</b>	<b>Large</b>	Conservative rating

**Table 21.15: Summary of Dust Emissions Class of Construction Activities (before mitigation)**

Construction Criteria	Dust Emissions Class	Notes
Total building/infrastructure volume	Small	< 25,000m <sup>3</sup>
Dust potential of construction materials	Medium	Likely use of some potentially dusty materials.
<b>Overall Rating</b>	<b>Medium</b>	Conservative rating

**Table 21.16: Summary of Dust Emissions Class of Trackout Activities (before mitigation)**

Construction Criteria	Dust Emissions Class	Notes
Number of HGV >3.5t per day	Medium	40 HGV per day
Length of unpaved road	Small	<50m
<b>Overall Rating</b>	<b>Medium</b>	Conservative rating

21.5.21 Risk categories for the three construction activities are summarised below, which are derived from the dust emissions classes identified above.

**Table 21.17: Summary of Risk Categories of the Site (before mitigation)**

Construction Activities	Dust Emissions Class	Nearest Receptor	Evaluation of the Risk Category
Earthworks	Large	100-200m	<b>Medium Risk Site</b>
Construction	Medium	100-200m	<b>Low Risk Site</b>
Trackout	Medium	<20m	<b>Medium Risk Site</b>

Note: For trackout activity, the distance to the nearest receptor is assumed to be <20m, and hence the risk category is assumed as 'Medium'.

21.5.22 Mitigation measures that will reduce the impacts of the construction activities for the construction of substation are discussed in more detail in Section 21.8.

### Impacts during Decommissioning

21.5.23 Onshore cables will be left buried in situ, unless lifted to be replaced by new cables to be run along the same route as part of future developments or wind farm re-powering. It is likely that ducting will remain in place; however, the cables may be pulled out of the ducts via the jointing bays. Impacts on air quality will be limited to these specific locations.

21.5.24 No decision has been made regarding the final decommissioning policy for the proposed substation, as it is recognised that industry best practice, rules and legislation change over time. The onshore substation may continue to be used as a substation site after the Project has been decommissioned. However, if it was to be dismantled the dust emissions class of potential decommissioning stage demolition are as set out in Table 21.18 below.

**Table 21.18: Summary of Dust Emissions Class of Demolitions Activities (before Mitigation)**

Demolition Criteria	Dust Emissions Class	Evaluation of the Effects
Total volume of buildings to be demolished	Small	<20,000m <sup>3</sup>
On-site crushing and screening	Large	Yes (assumed)
Height of demolition activities above ground	Small	<10m

Demolition Criteria	Dust Emissions Class	Evaluation of the Effects
Dust potential of demolition materials	Medium	Minimal dusty materials
<b>Overall Rating</b>	<b>Large</b>	Conservative rating

21.5.25 The risk category for the potential decommissioning stage demolition is summarised in Table 21.19, below.

**Table 21.19: Summary of Risk Categories of the Site (before mitigation)**

Construction Activities	Dust Emissions Class	Nearest Receptor	Evaluation of the Risk Category
Demolition	Large	100-200m	<b>Medium Risk Site</b>

## 21.6 Significance of Construction Phases Effects, Without Mitigation

21.6.1 As discussed above, the significance of effect of construction activities of the cable route and the substation before mitigation have been evaluated based on the risk categories (Table 21.13 and Table 21.17). From the risk categories and the sensitivity of the area ('high' sensitivity area for the cable route and 'low' sensitivity area for substation), the significance of construction phase effects before mitigation has been assessed as identified below.

21.6.2 Mitigation measures to reduce construction phase effects are discussed in Section 21.8.

**Table 21.20: Significance of Effects of the Construction Activities of Cable Route (before mitigation)**

Source	Evaluation of Impacts	Significance of Effects
Earthworks	High Risk Site, and High sensitivity of surrounding area	Moderate adverse
Construction	High Risk Site, and High sensitivity of surrounding area	Moderate adverse
Trackout	High Risk Site, and High sensitivity of surrounding area	Moderate adverse

**Table 21.21: Significance of Effects of the Construction Activities of Substation (before mitigation)**

Source	Evaluation of Impacts	Significance of Effects
Earthworks	Medium Risk Site, and Low sensitivity of surrounding area	Negligible
Construction	Low Risk site, and Low sensitivity of surrounding area	Negligible
Trackout	Medium Risk site and Low sensitivity of surrounding area	Negligible

## 21.7 Significance of Decommissioning Activities, Without Mitigation

21.7.1 It is assumed that the decommissioning process is likely to be the reverse of the construction process except for the demolition of the substation buildings described in Section 2b Project Description (onshore). The significance of the substation decommissioning including demolition is included in Table 21.22.

**Table 21.22: Significance of Effects of the Decommissioning Activities of Substation (before mitigation)**

Source	Evaluation of Impacts	Significance of Effects
Demolition	Medium Risk Site and Low sensitivity of surrounding area	Negligible
Earthworks	Medium Risk Site, and Low sensitivity of surrounding area	Negligible
Construction	Low Risk Site , and Low sensitivity of surrounding area	Negligible
Trackout	Medium, and Low sensitivity of surrounding area	Negligible

## 21.8 Mitigation Measures

### Construction Phase

21.8.1 Fugitive emissions from construction and similar activities can be effectively managed by the adoption of appropriate mitigation measures, set out in a Construction Phase Air Quality Management Plan (AQMP), as part of the Construction Environmental Management Plan.

21.8.2 The Greater London Authority and London Councils have published Best Practice Guidance on The Control of Dust and Emissions from Construction and Demolition, 2006. The London Councils' best practice guidance suggests a hierarchical strategy to control emissions from construction sites based on the principal of 'best practicable means' in the following order of preference:

1. Prevention
2. Suppression
3. Containment.

21.8.3 The detailed specification of mitigation measures in the Construction Phase AQMP will depend on the selection of construction techniques and programme; however typical recommended mitigation measures for construction phase impacts are likely to include:

#### Site Planning

- No bonfires on site;

- Plan site layout – plant/vehicles/dust-generating activities should be located away from sensitive receptors as far as practicable;
- All site personnel to be trained in awareness of site environmental controls; and
- Trained and responsible manager on site during working hours to maintain logbook and carry out site inspections.

#### Construction Plant and Traffic Emissions

- No idling vehicles on site;
- Vehicle wheel washing facilities to be provided at site exit;
- All loads/vehicles-entering site to be covered;
- Prevention of site runoff of mud and water;
- On-road vehicles to comply with emissions standards;
- All non road mobile machinery to use ultra low sulphur diesel where available and be fitted with exhaust after-treatment, where appropriate; and,
- Minimise vehicle speeds and movements on site.

#### Site Activities

- Use water as a dust suppressant as appropriate;
- Cover, seed or fence stockpiles to prevent wind whipping;
- Re-vegetate exposed earthworks and exposed areas;
- Minimise dust-generating activities as far as is practicable; and
- Ensure any cutting equipment has water suppression or suitable local exhaust ventilation system.

#### **During Decommissioning**

- 21.8.4 It is assumed that onshore cables will be left buried in situ, unless lifted to be replaced by new cables to be run along the same route as part of future developments or wind farm re-powering. It is likely that ducting will remain in place; however, the cables may be pulled out of the ducts via the jointing bays. Impacts on air quality will be limited to these specific locations and similar mitigation measures to those during construction are proposed.

- 21.8.5 Fugitive emissions from demolition activities at the substation can be effectively managed by the adoption of appropriate mitigation measures, set out in an Air Quality Management Plan (AQMP).

## 21.9 Significance of Residual Effects

- 21.9.1 With the proposed mitigation measures as described in Section 21.7 in place, the following residual effects of the onshore cable route and substation will arise.

**Table 21.23: Summary of Air Quality Effects of the Proposed Onshore Cable Route**

Phases	Significance of Effects (before mitigation)	Mitigation	Significance of Effects (after mitigation)
Construction Phase	Moderate Adverse	Dust control	Slight Adverse

**Table 21.24: Summary of Air Quality Effect of the Proposed Onshore Substation**

Phases	Significance of Effects (before mitigation)	Mitigation	Significance of Effects (after mitigation)
Construction Phase	Negligible	Dust control	Negligible
Decommissioning Phase	Negligible	Dust control	Negligible

## 21.10 Cumulative Impacts

- 21.10.1 Cumulative impacts of the proposed development during construction along with the following five developments have been assessed.

1. Redevelopment of redundant land and buildings to provide 197 dwellings (Planning Reference: ADC/0287/09; Status: Permitted;)
2. 13 employment units (Planning Reference: ADC/0191/08; Status: Permitted);
3. Alterations and change of use of existing office buildings (Planning Reference: AWDM/0364/11; Status: Pending); and,
4. Construction of a training ground and football academy for Brighton and Hove Albion Football Club (Planning Reference: AWDM/0205/12; Status: Pending).
5. Teville Stream Restoration involving construction of new cut bypass channel through open agricultural land to channel Teville Stream around the historic Decoy Farm landfill site, and the construction of a reed bed downstream of GlaxoSmithKline pharmaceutical works outfall.



6. Modifications to the existing National Grid Bolney substation (associated with Rampion connection).
7. Modifications to the existing National Grid Bolney substation (not associated with Rampion).

21.10.2 In a worst-case scenario, the Teville Stream Restoration project works may coincide with the construction of the cable route. Air quality impacts during construction works, dust impacts in particular, tend to be local and temporarily to the respective sites. Furthermore, the Teville Stream Restoration project works are expected to be undertaken by applying mitigation measures to control air quality impacts under a permit/application issued by the regulatory authorities. With the proposed mitigation measures for the cable construction works in place, interaction of pollutants generated by these two projects is considered unlikely. In order to avoid any such interaction of pollutants, further mitigation measures will be included in a Construction Environmental Management Plan (CEMP) for the cable construction works.

21.10.3 Similarly, in a worst-case scenario, the National Grid Bolney substation modifications works may coincide with the construction of the Rampion substation. The substation modifications works are expected to be undertaken by applying mitigation measures to control air quality impacts under a permit/application issued by the regulatory authorities. With the proposed mitigation measures for the Rampion substation construction works in place, interaction of pollutants generated by these two projects is considered unlikely. In order to avoid any such interaction of pollutants, further mitigation measures will be included in a Construction Environmental Management Plan (CEMP) for the substation construction works.

21.10.4 The remaining above mentioned developments are located some distance away from the proposed cable routes/substation. Interaction of pollutants released as a result of these developments and the proposed cable route development (along with the substation) is considered unlikely. Cumulative impacts of the proposed development are considered negligible.

## 21.11 References

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UK-AIR website: <http://uk-air.defra.gov.uk>

Worthing Borough Council website: <http://www.worthing.gov.uk/>



## **Rampion Offshore Wind Farm**



### **ES Section 21 – Air Quality**

#### **Figure 21.1**

**RSK Environmental Ltd**

**Document 6.2.21**

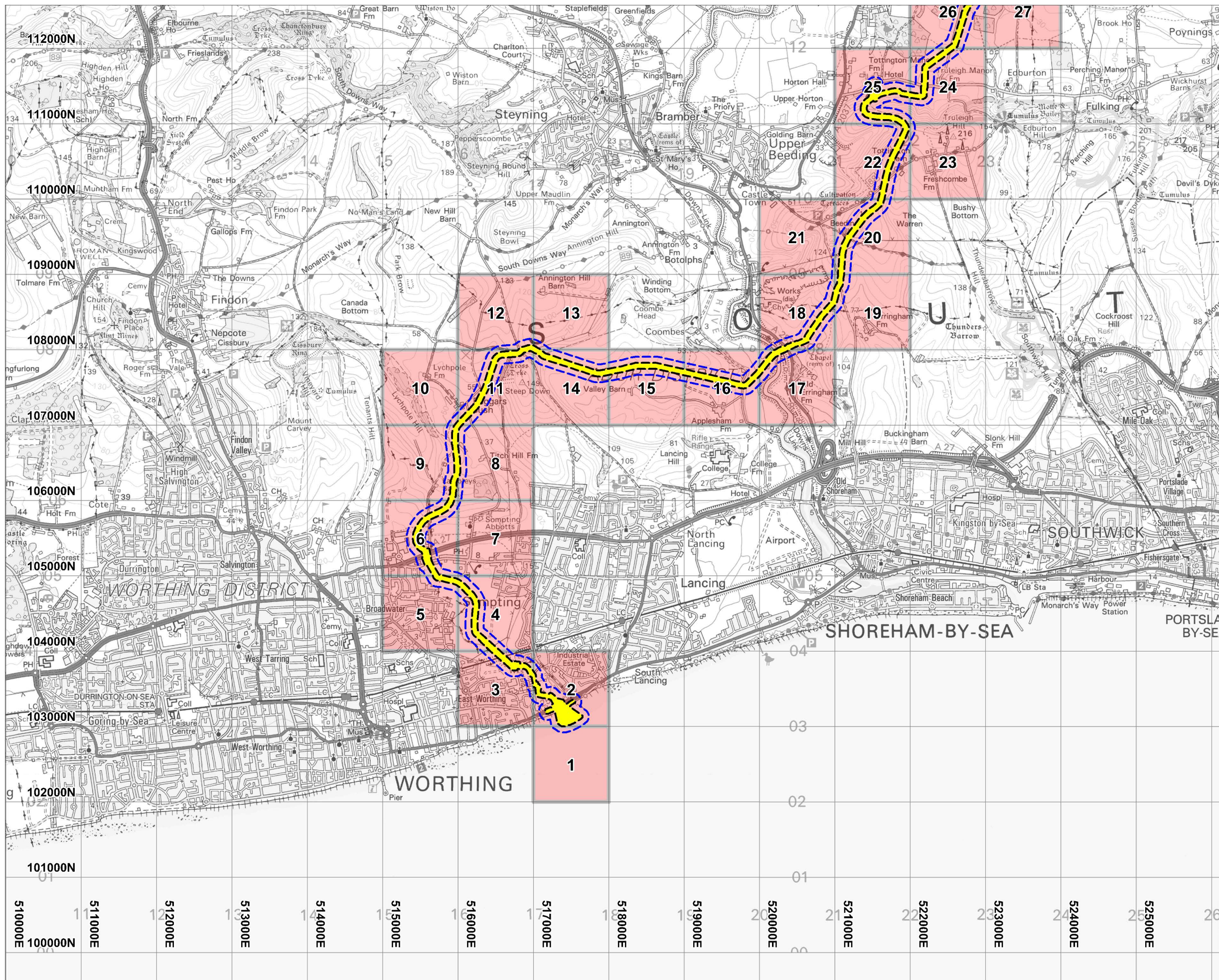
**December 2012**

**APFP Regulation 5(2)(a)**

**Revision A**

**E.ON Climate & Renewables UK Rampion Offshore Wind Limited**





**Legend**

-  20m Buffer
-  100m Buffer
-  1km x 1km Grid



Rev	Date	Description	Drn	Chk	App
02	27.11.12	New Development Area	AJ	KB	DW
01	01.11.12	Updated Development Area	CS	SS	KB
00	14.10.11	First Draft	CS	SS	KB

**Rampion Wind Farm**

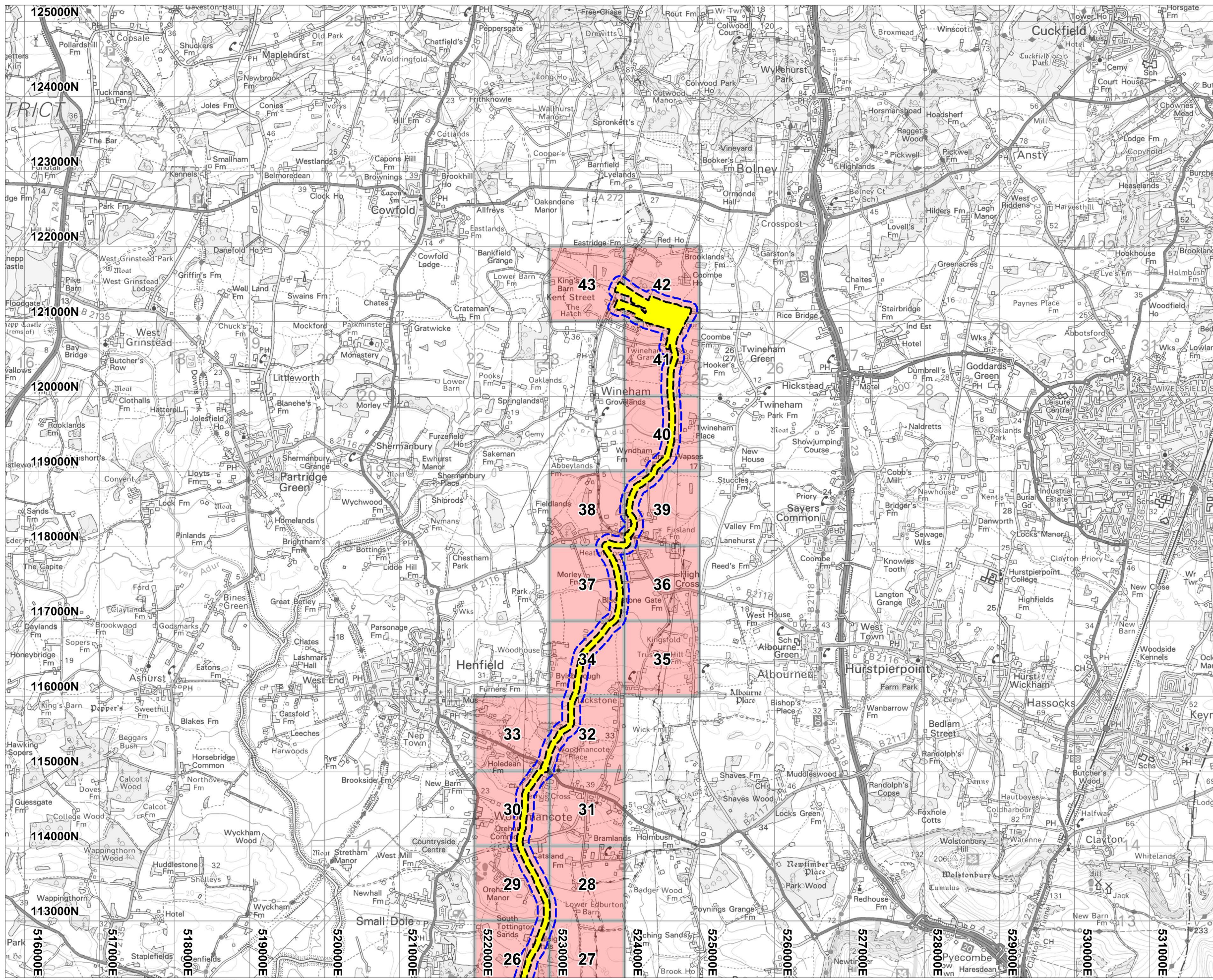


TITLE: Figure 21.1 - Estimated Background Pollutant Concentrations along the Cable Route (Source: UK-AIR website) (Map 1 of 2)

SCALE: 1:50,000 @ A3

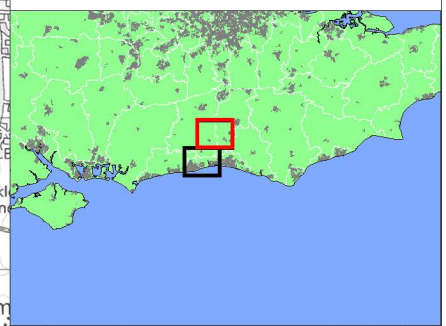
REV 02





**Legend**

-  20m Buffer
-  100m Buffer
-  1km x 1km Grid



Rev	Date	Description	Drn	Chk	App
02	27.11.12	New Development Area	AJ	KB	DW
01	01.11.12	Updated Development Area	CS	SS	KB
00	14.10.11	First Draft	CS	SS	KB

**Rampion Wind Farm**



TITLE: Figure 21.1 - Estimated Background Pollutant Concentrations along the Cable Route (Source: UK-AIR website) (Map 2 of 2)

SCALE: 1:50,000 @ A3

REV 02