

Alba Power Station 5 Block 4 Supplementary ESIA Construction Dust Risk Assessment

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Table of abbreviations

ACOP	Alba Code of Practice
Alba	Aluminium Bahrain BSC
CCGT	Combined Cycle Gas Turbine
CESMP	Construction Environmental and Social Management Plan
Citrus	Citrus Advisors Ltd.
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
EACS	Environment Arabia Consultancy Services WLL
EPAP	Equator Principles Action Plan
EPC	Engineering Procurement and Construction
ESIA	Environmental and Social Impact Assessment
EWA	Electricity and Water Authority
GE	General Electric
IAQM	Institute of Air Quality Management
IWPP	Integrated Water and Power Project
KBSP	Khalifa Bin Salman Port
kV	Kilovolt
MPW	Mitsubishi Power Ltd.
MW	Mega Watts
PM _{2.5}	Particulate Matter <2.5 Microns
PM10	Particulate Matter <10 Microns
SCE	Supreme Council for Environment
SEPCO III	SEPCO III Bahrain Construction Company W.L.L.
SHE	Safety Health and Environment
SOP	Standard Operating Procedure



1 INTRODUCTION

This Construction Dust Risk Assessment is the part of a suite of documents prepared as supplementary reports to the Environmental and Social Impact Assessment (ESIA) undertaken for the Alba Power Station 5 (PS5) Block 4 project.

1.1 **Project description**

Aluminium Bahrain B.S.C. (Alba) consistently ranks as one of the largest and most modern Aluminium smelters in the world. Known for its technological strength and innovative policies, Alba enforces strict environmental guidelines, maintains a high track record for safety, and is widely regarded as one of the top performers on a global scale.

Alba PS 5 Block 4 Combined Cycle Power Plant is an expansion of the existing Power Station 5, which was commissioned in 2019 – 2020 and consists of 3 x CCGT Blocks of 1:1:1 configuration, with H class gas turbine technology, GE A650 steam turbine, GE (Alstom legacy) heat recovery steam generator, GE Mark VIe distribute control system. PS5 power is exported to the Alba islanded grid through a recently completed (2019) Siemens 220kV indoor gas insulated switchgear Substation.

PS5 Block 4 Project is the addition of a fourth Block of similar 1:1:1 configuration with Jclass gas turbine technology with a minimum nominal ISO rating of 680.8 MW and it also includes tie into the existing 220kV Substation. A Consortium of Mitsubishi Power Ltd. (MPW) and SEPCO III Electric Power Construction Co. Ltd. (SEPCO III) will execute PS5 Block 4 as the Engineering, Procurement and Construction (EPC) Contractors for the Project.

PS5 capacity will increase from 1,800 MW to 2,481 MW. Block 4 Gas turbine unit will have the capability to operate on 100% Khuff gas, 100% Residual will also have the capability to operate on any proportionate mixture of Khuff-residual gas. Generally, the concept for the new Block 4 is similar to the existing Blocks 1 to 3, with services provided from common facilities existing at PS5 or other plants within the Alba complex.

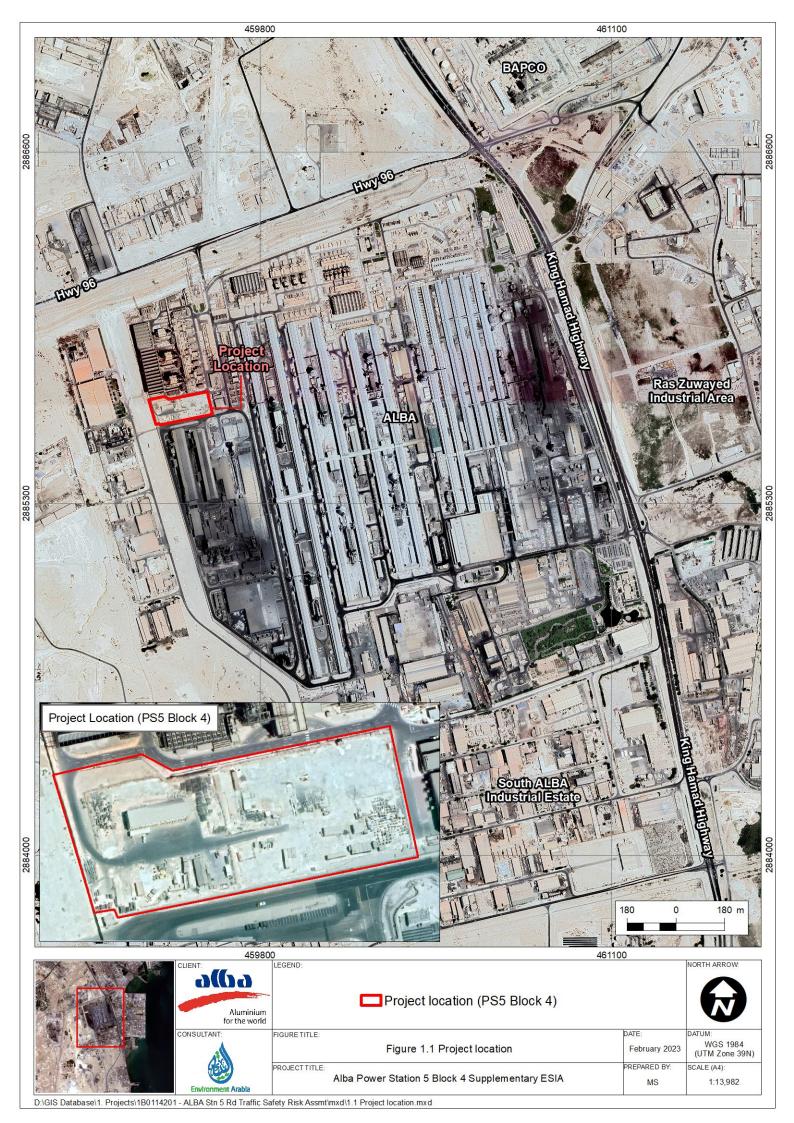
The rationale behind the expansion of PS5 Block 4 is that the efficiency of this combined cycle power plant is much higher than combined cycle power plants of PS 3 and PS 4. Power Station 3, which is operating on a low load, will be shut down and will be kept as emergency standby. Power station 4 will be running partially.

An ESIA report was submitted to the Supreme Council for Environment on 06 January 2022 and environmental clearance was issued. Alba forwarded the approved ESIA report to BNP Paribas – the coordinator of project finance. BNP Paribas appointed Citrus advisors Ltd. (Citrus) to conduct a review on the report for compliance with Equator Principles 4. Citrus then prepared a report that highlighted some gaps and an Equator Principles Action Plan (EPAP) to address them.

Alba commissioned Environment Arabia Consultancy Services (EACS) to address the gaps in the ESIA in accordance with the EPAP.

1

Project location is presented in Figure 1.1.





1.2 Scope of the assessment

The overall objective of the assessment is to determine the nature and magnitude of risks due to construction dust generation. The assessment will:

- Identify any sensitive receptors (people/businesses) along the construction traffic route(s) and those who work near the SEPCO III site offices, gates to the AI Dur Construction Laydown Area and gates to the Block 4 project site.
- Using the information presented in the ESIA, consider how Block 4 construction dust generation poses specific risks to the specific identified receptors.
- Evaluate whether existing Alba and EPC Contractor systems, procedures and requirements are specific enough and sufficient to manage and monitor these specific risks on sensitive receptors (including Construction Environment and Social Management Plan (CESMP) and management controls).
- Identify any additional project-specific mitigations or monitoring requirements required to be implemented by Alba and the EPC Contractor to manage these risks. Specifically consider publicizing and providing access to a direct grievance channel for the public.

1.3 Documents reviewed

Table 1.1 shows the list of documents reviewed during the preparation of this risk assessment.

SI. No.	Document description
1	ACOP-006- Control of Physical Hazard and Ergonomics
2	ACOP-052-Performance Measurement and Monitoring
3	ACOP-056-Environmental Monitoring
4	AGLC 001 Monthly Safety Health and Environment Report Guideline (Scanned)
5	PS5 Block 4 Excavation Procedure PS5-B4-01-YDC-GGP-SEP-00040
6	PS5 Block 4 Health Safety Environmental Management Plan PS5-B4-01-YDC-GGP-SEP-00002
7	PS5 Block 4 Pollution Prevention Procedure PS5-B4-01-YDC-GGP-SEP-00018
8	PS5 Block 4 Respiratory Protection Procedure PS5-B4-01-YDC-GGP-SEP-00009
9	PS5 Block 4 Traffic Management Plan PS5-B4-01-YDC-GGP-SEP-00034 V0.4
10	SOP (75.18) Ambient Air Sampling
11	ESIA_Report_of_PS5_Block_4_Expansion_Project
12	Addendum to the ESIA study
13	1B0114201 Alba Power Station 5 Block 4 Construction Traffic Risk Assessment, Rev 01

Table 1.1List if documents reviewed



2 LEGISLATION AND GUIDANCE

Air quality standards are established to protect human health and the environment. In Bahrain, national standards are set out in Ministerial Order No. 2 of 2021, which updated the previous relevant Ministerial Order No. 10 of 1999 with respect to Environmental Standards (air and water). Ministerial Order No. 2 of 2021 includes updated ambient air quality and industry emission standards. The existing Bahraini national air quality standards relevant to particulate matter are shown in **Table 2.1**.

Pollutant	Averaging period	Bahrain (µg/m³)	UK / EU (µg/m³)	WHO (µg/m³)	IFC (μg/m³)
PM ₁₀	24-hour	340 ⁽¹⁾	50 ⁽²⁾	45 ^(3,4)	50 ⁽⁸⁾
	Annual	80	40	15 ⁽⁵⁾	20 ⁽⁹⁾
PM _{2.5}	24-hour	50	-	15 ^(3,6)	25 ⁽¹⁰⁾
	Annual	25	25	5 ⁽⁷⁾	10 ⁽¹¹⁾

Table 2.1 Air quality standards – particulate matter

Notes:

- 1. Article 8 of Ministerial Order 2 of 2021 that 'Exceedance of the ambient air quality particulate matter standard (24 hours measurement) is not considered an exceedance of the standard if measured during unusual circumstances such as dust storms.
- 2. Not to be exceeded more than 35 times a year.
- 3. 99th percentile (i.e. 3-4 exceedance days per year).
- 4. WHO also proposed interim targets of 150µg/m³, 100µg/m³, 75µg/m³ and 50µg/m³, which are the same as the 2005 interim targets with the introduction of a fourth interim target at the level of the 2005 air quality guideline (50µg/m³).
- 5. WHO also proposed interim targets of 70µg/m³, 50µg/m³, 30µg/m³ and 20µg/m³, which are the same as the 2005 interim targets with the introduction of a fourth interim target at the level of the 2005 air quality guideline (20µg/m³).
- 6. WHO also proposed interim targets of 75μg/m³, 50μg/m³, 37.5μg/m³ and 25μg/m³, which are the same as the 2005 interim targets with the introduction of a fourth interim target at the level of the 2005 air quality guideline (25μg/m³).
- 7. WHO also proposed interim targets of 35µg/m³, 25µg/m³, 15µg/m³ and 10µg/m³, which are the same as the 2005 interim targets with the introduction of a fourth interim target at the level of the 2005 air quality guideline (10µg/m³).
- 8. IFC also proposed interim targets of 150µg/m³, 100µg/m³ and 75µg/m³.
- 9. IFC also proposed interim targets of 70µg/m³, 50µg/m³ and 30µg/m³.
- 10. IFC also proposed interim targets of $75\mu g/m^3$, $50\mu g/m^3$ and $37.5\mu g/m^3$.
- 11. IFC also proposed interim targets of 35µg/m³, 25µg/m³ and 15µg/m³.



3 RISK ASSESSMENT APPROACH AND METHODOLOGY

3.1 Temporal scope

The construction phase of the project commenced in July 2022 and is expected to continue until 2025. Impacts during construction would occur within this period.

3.2 Area of Influence (Aol)

According to the UK Institute of Air Quality Management (IAQM), emissions of dust and fine particulate matter generated as a result of construction works would have the greatest effect on receptors within 350 m of the site boundary (IAQM, 2014, 2016)^{1,2} beyond this distance, impacts are not anticipated to be significant.

3.3 Methodology

Dust impacts may occur during construction as a result of dust generation and exhaust emissions from construction plant and vehicles. The UK IAQM guidance document (IAQM, 2014) on the assessment of dust from demolition and construction provides a framework for the assessment of construction dust risk.

A qualitative dust assessment has been undertaken using the IAQM methodology. IAQM guidance sets out the methodology for establishing project related dust generation risk by taking into account the dust emission magnitude derived using information on the activities to be undertaken and their scale, and potential impacts based on the proximity and number of sensitive receptors in the area of activity. Based on the calculated risk, commensurate mitigation measures are recommended that when implemented would be considered to be sufficient to mitigate significant dust impacts. Details of the assessment steps are as follows:

3.3.1 Step 1: Screen the need for a detailed assessment

An assessment will normally be required where there is a human receptor within:

- 350 m of the boundary of the site; or
- 50 m of the route(s) used by construction vehicles on the public highway and up to 500 m from the site entrance(s).

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is "negligible".

3.3.2 Step 2: Assess the risk of dust impacts

The risk of dust arising in sufficient quantities to cause annoyance and/or health and/or ecological impacts will be determined using four risk categories: negligible, low, medium, and high risk. A site is allocated to a risk category based on two factors:

- The scale and nature of the works, which determines the potential dust emission magnitude as small, medium, or large (STEP 2A); and
- the sensitivity of the area to dust impacts (STEP 2B), which is defined as low, medium, or high sensitivity.

¹ IAQM (2014) Guidance on the assessment of dust from demolition and construction. Institute of Air Quality Management, London

² IAQM (2016) Guidance on the Assessment of Mineral Dust Impacts for Planning. Institute of Air Quality Management, London.



These two factors are combined in STEP 2C to determine the risk of dust impacts with no mitigation applied. The risk category assigned to the site can be different for each of the four potential activities (demolition, earthworks, construction and trackout). There was not anticipated to be any demolition required during Project construction, therefore, demolition was not assessed.

3.3.3 Step 2A: Define the potential dust emission magnitude

The dust emission magnitude is based on the scale of the anticipated works and is classified as Small, Medium, or Large. **Table 3.1** describes potential dust emission magnitude for various activities.

Activity	Criteria used to determine dust emission class		
Activity	Small	Medium	Large
Earthworks	 Total site area <2,500 m²; <5 heavy moving earth vehicles active at any one time. 	 Total site area 2,500 – 10,000 m²; 5 – 10 heavy moving earth moving vehicles active at any one time. 	 Total site area >10,000 m², >10 heavy earth moving vehicles active at any one time.
Construction	 Total building volume <25,000 m³; Construction material with low potential for dust release. 	 Total building volume 25,000 – 100,000 m³; Potentially dusty construction material (e.g. concrete). 	 Total building volume >100,000 m³; On site concrete batching.
Trackout	 <10 outward HGV trips in any one day; Unpaved road length <50 m. 	 10 – 50 outward HGV trips in any one day. Unpaved road length 50 – 100 m. 	 >50 outward HGV trips in any one day; Unpaved road length >100 m.

Table 3.1 Dust emission magnitude criteria

Step 2B: Define 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;
- in the case of PM₁₀, the local background concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table 3.2 outlines the criteria used for determining the sensitivity of receptors.



Sensitivity	Criteria for determining sensitivity			
of receptor	Dust soiling effects	Health effects of PM ₁₀		
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms	Residential properties, hospitals, schools and residential care homes		
Medium	Parks, places of work	Office and shop workers not occupationally exposed to PM ₁₀		
Low	Playing fields, farmland, footpaths, short-term car parks and roads	Public footpaths, playing fields, parks and shopping streets		

Table 3.2 Criteria for determining the sensitivity of the receptors

Table 3.3 and **Table 3.4** presents the criteria used to determine the sensitivity of the area to dust soiling effects and human health impacts respectively.

Table 3.3	Sensitivity of the area to dust soiling effects on people and property
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Receptor	Number of	Distance from source (m)				
sensitivity	receptors	<20	<50	<100	<350	
	>100	High	High	Medium	Low	
High	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 3.4

Sensitivity of the area to human health impacts

Receptor	Annual Mean	Number		Distance fr	om the sou	urce (m)	
sensitivity	PM ₁₀ Concentrations	of receptors	<20	<50	<100	<200	<350
		>100	High	High	High	Medium	Low
	>32µg/m ³ High >28-32µg/m ³ >24-28µg/m ³	10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
		>100	High	High	Medium	Low	Low
High		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
		>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low

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Boostor	Annual Mean	Number		Distance fr	om the sou	ırce (m)	
Receptor sensitivity	PM ₁₀ Concentrations	of receptors	<20	<50	<100	<200	<350
		>100	Medium	Low	Low	Low	Low
	<24µg/m³	10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	>32µg/m³ >28-32µg/m³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
		>10	Medium	Low	Low	Low	Low
Madium		1-10	Low	Low	Low	Low	Low
Medium	> 24 28 4 27 23	>10	Low	Low	Low	Low	Low
	>24-28µg/m³	1-10	Low	Low	Low	Low	Low
	10 A	>10	Low	Low	Low	Low	Low
	<24µg/m³	1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

3.3.4 Step 2C: Define the risk of impacts

Table 3.5, **Table 3.6** and **Table 3.7** (IAQM 2014) assigns a level of risk for each activity allowing risk levels to be prioritised and the level of mitigation to be applied.

Table 3.5Risk of dust impacts – earth works

Detential impact	Dust emission magnitude				
Potential impact	Large	Medium	Small		
High	High risk	Medium risk	Low risk		
Medium	Medium risk	Medium risk	Low risk		
Low	Low risk	Low risk	Negligible		

Table 3.6 Risk of dust impacts – construction

Detential immed	D	ust emission magnitud	le
Potential impact	Large	Medium	Small
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible



Table 3.7 Risk of dust impacts – trackout

Dotontial impost	Dust emission magnitude				
Potential impact	Large	Medium	Small		
High	High risk	Medium risk	Low risk		
Medium	Medium risk	Low risk	Negligible		
Low	Low risk	Low Risk	Negligible		

3.3.5 Step 3: Site specific mitigation

Step three of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to whether the site is a low, medium or high-risk site.

Available dust management measures contained in Alba and EPC contractor management processes and procedures as well as in the CESMP were evaluated for activities where dust generation is of high risk to receptors.

3.3.6 Step 4: Determine significant effects

With the implementation of the relevant mitigation, the residual impacts from the construction will be determined in accordance with IAQM guidance.

3.3.7 Sensitive receptors

The sensitive receptor locations are identified in accordance with the distance criteria of human receptor (IAQM, 2014):

- 350 m of the boundary of the site; and
- 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

The receptor locations are provided in **Table 3.8** and locations are presented in **Figure 3.1** to **Figure 3.5**.

Zone	Recept	Description	Coord	inates
or ID		Description	Easting	Northing
	1	Naval Support Activity (NSA)	0461360	2898671
	2	General Organization for Youth and Sports	0460043	2898162
	3	Hana Apartment Building	0459928	2898104
	4	King Khalid Grand Mosque	0459754	2898006
Constructi	5	Diamond 1 Apartment Building	0459629	2897934
on traffic 6	6	KIMS Health Hospital	0459607	2897907
route	route 7	Zohal Accommodation	0459337	2897798
	8	Private Property	0460464	2893601
9	Private Property	0460570	2893278	
10		Civil Defence School	0459370	2889558
	11	Labour Accommodation	0462672	2884944

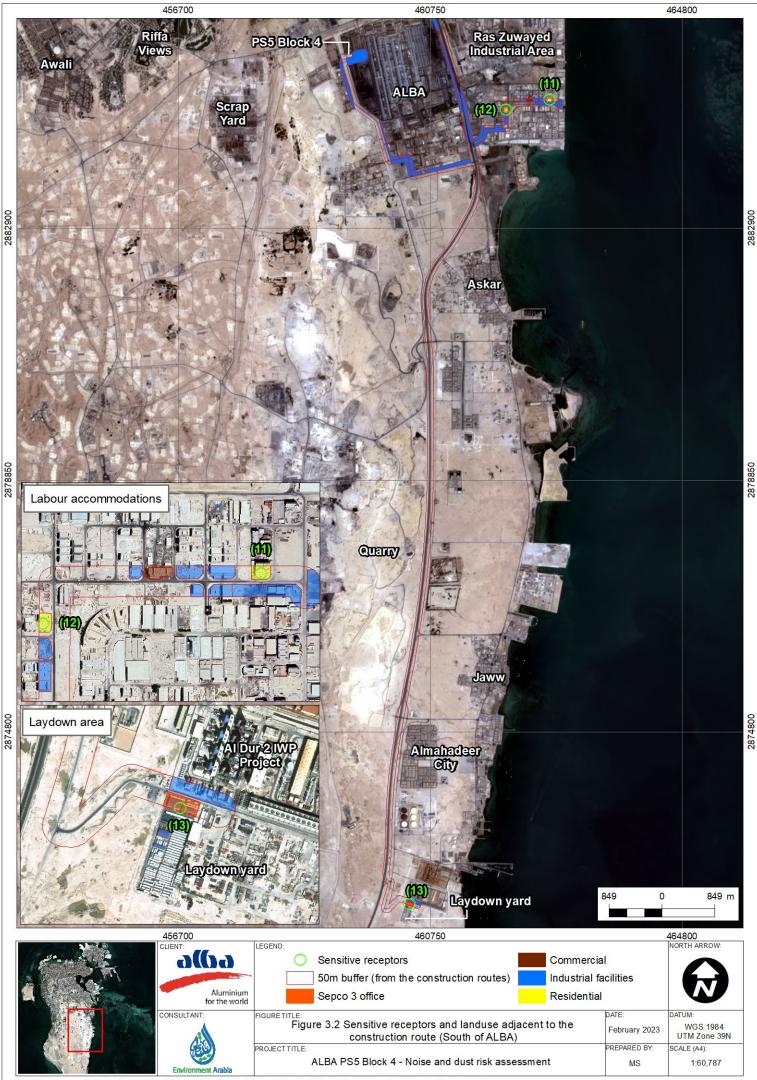


7	Recept	Deceriation	Coord	inates
Zone	or ID	Description	Easting	Northing
	12	Downtown Labour Camp	0461988	2884785
Al Dur	13	Sepco 3 Office ³	0460370	2872043
laydown yard	14	Sepco 3 Staff Accommodation	0460351	2871977
	15	WestPoint Home Bahrain WLL	0459198	2885713
	16	Middle East Recycling Company (MERCO)	0459310	2885575
	17	Bahrain Pipeline Construction Co.	0459066	2885459
	18	Kingdom Oil Company	0459335	2885454
	19	GB Asphalt & Concrete	0459266	2885398
	20	Al Salam Furniture Industries	0459317	2885415
PS5 Block	21	Justa Star Kitchens	0459276	2885286
4 Area	22	Doma Tissue	0459354	2885308
	23	Tylos Plastic Industries	0459340	2885203
	24	Polycon Bahrain WLL	0459420	2885098
	25	Security Cabin	0459413	2885586
	26	Site Entrance Gate for Vehicles	0459417	2885574
	27	First Aid Centre	0459420	2885537
	28	Site Office	0459430	2885508

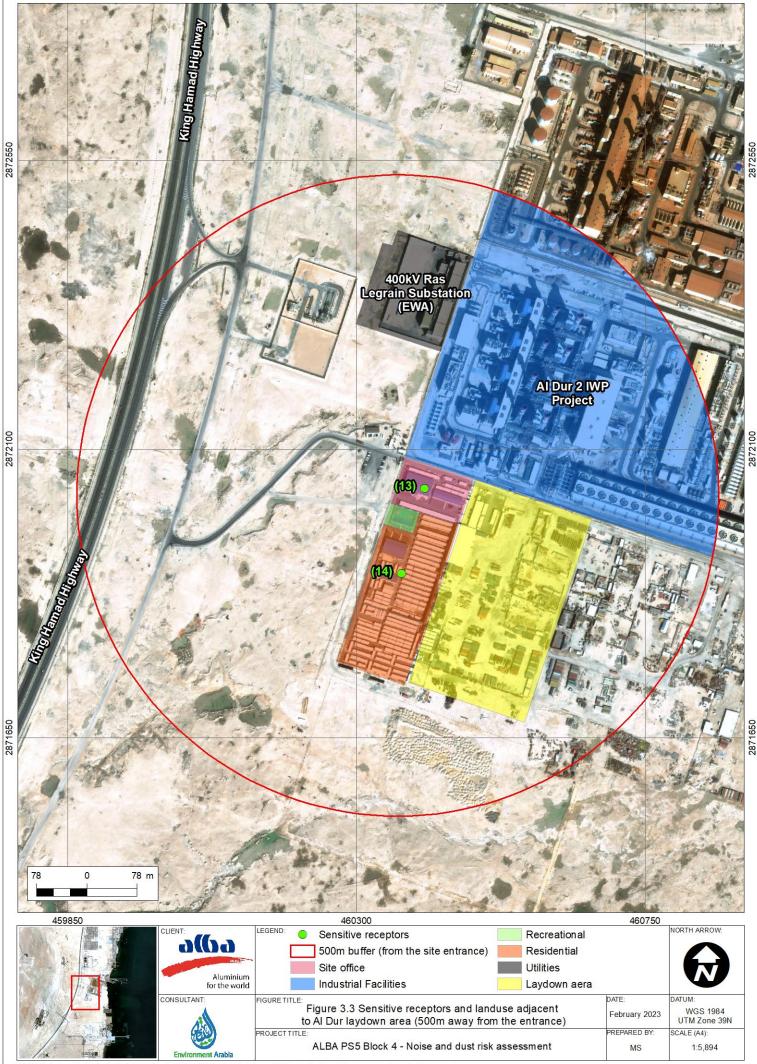
 ³ This receptor also falls within the construction traffic routes as well as the Al Dur Laydown area.
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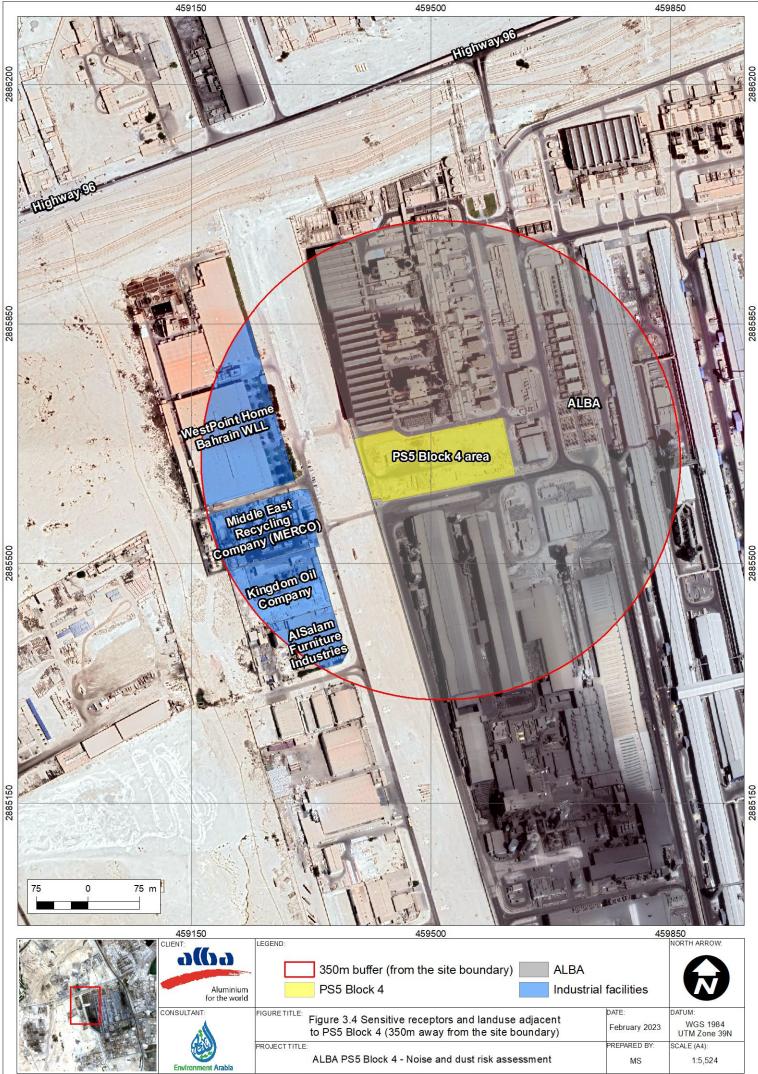
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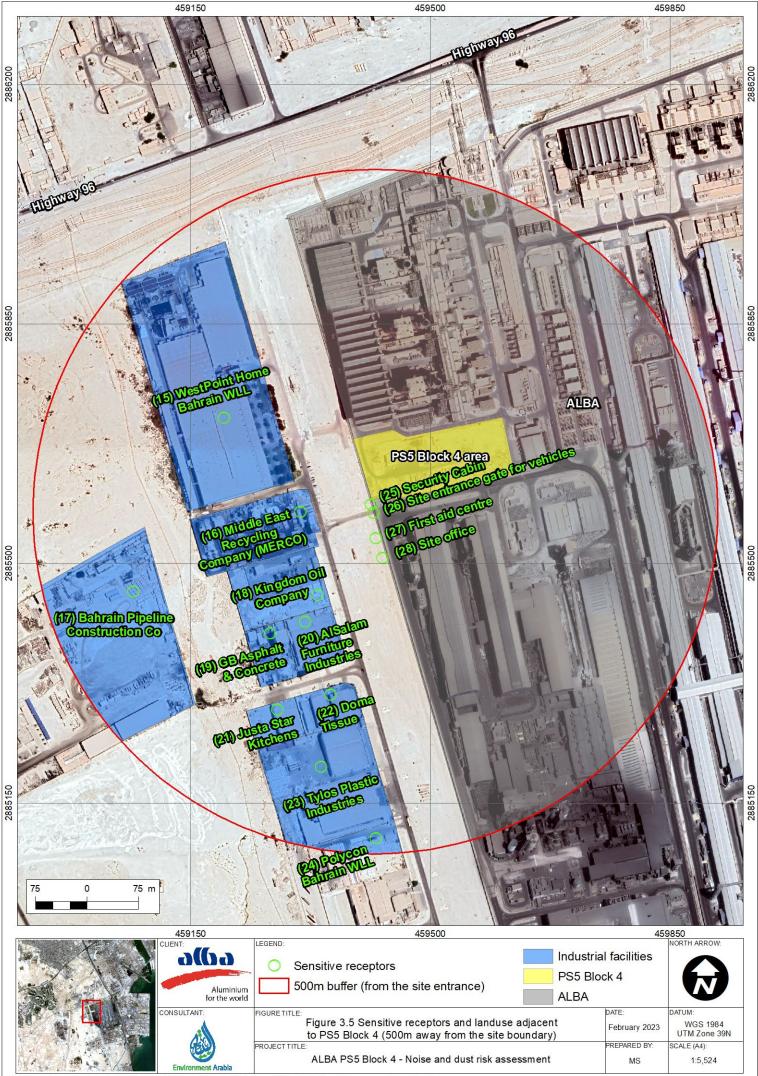
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4 CONSTRUCTION DUST RISK ASSESSMENT

Project construction works with the potential to generate emissions of dust include ground levelling, excavation for foundations and structures, stockpiling and concrete works as well as the transportation of materials, equipment, and the workforce to and from the construction site

A qualitative assessment of dust impacts was undertaken in accordance with methodology provided in IAQM guidance¹, as described in **Section 3** of this report and is further detailed in the following subsections.

Step 1 of the guidance requires the identification of human receptors within 350m of the boundary of the site and / or 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

There are businesses / industries located within 500m of the Block 4 site entrance, 350m from the site boundary and within 50m of the construction traffic route (**Table 3.8**). Eight (8) industrial facilities which include West Point Home, Middle East Recycling Co., Kingdom Oil Company, Al Salam Furniture Industries, GB Asphalt and Concrete, Kitchen Supply Store and Dona Tissues are located within 350m of the Block 4 site boundary. Al Dur Phase II IWPP and SEPCO III accommodation facilities are located within 500m of the construction laydown yard entrance.

4.1.1 Determining impact magnitude and sensitivity

Step 2A of the assessment (**Table 3.1**) requires the determination of potential dust emission magnitude from construction works. The dust emission magnitude was determined using IAQM guidelines and is detailed in **Table 4.1**.

Activity	Dust emission magnitude	Rationale
Earthworks	Large	Site area is >10,000 m ² . Rock breaking and excavations are required.
Construction	Large	Total building volume >100,000 m ³ . Potentially dusty construction material will be used (e.g., concreting, backfilling).
Trackout	Medium	10 - 50 HGV trips in any one day. Access road up to the site entrance is paved.

Table 4.1Magnitude of dust emissions

Step 2B defined of the sensitivity of the area. As described earlier, the Block 4 Project site is located within an industrial area surrounded by small to heavy industries. Since the industries follow an 8-hour, 3 shift work policy, it is anticipated that the workers will not be exposed to dust levels over a time period relevant to the air quality objective of PM₁₀ (i.e. 24 hours air quality objective of 340 μ g/m³ or annual objective of 80 μ g/m³). Open desert space and quarry constitute ~27% of the land use within the area whereas industries constitute ~13.5%. Given the nature of industries and potential dust generating activities located in an upwind direction, the receptors are considered to be **medium** sensitivity type based on IAQM criteria (**Table 3.2**).



Based on a medium sensitivity type for the receptors and the distance of the receptors from the Project construction site the receptors the sensitivity of the area to dust soiling and human health effects from PM_{10} are considered to be low as per IAQM criteria (**Table 3.3** and **Table 3.4**).

Outcome of Step 2B analysis based on the criteria listed in **Table 3.3** and **Table 3.4** is presented in **Table 4.2** below.

Potential	Receptor sensitivity	Number of		of the area (recept source is 100 - 3	
impact	Sensitivity	receptors	Earthwork	Construction	Trackout
Dust soiling	Medium	>1	Low	Low	Low
Human health	Medium	>10	Low	Low	Low

Table 4.2 Outcome of defining sensitivity of the area

4.1.2 Impact risk definition

Step 2C determines the risk of dust impacts as a combination of the dust emission magnitude and sensitivity of the area and based on IAQM risk levels (**Table 3.5**), Table 3.6. and Table 3.7, the assessment found that dust risk during earthworks, construction and trackout for Power Station 5 Block 4 were low (**Table 4.3**).

Table 4.3	Summary of dust impact risk
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Potential impact	Risk		
	Earthworks	Construction	Trackout
Dust soiling	Low risk	Low risk	Low risk
Human health	Low risk	Low risk	Low risk

In any case, given the arid, desert environment, it is considered unlikely that effects of dust soiling could be specifically attributed to the earthworks, construction works or trackout related to the Power Station 5 Block 4 Project.

4.1.3 Construction Traffic

As described earlier, the majority of construction traffic routes to the Project site will be along major highways. Human receptors within 350m of the site boundary, 50m of the traffic routes used by construction vehicles and up to 500m from the site and laydown yard entrances were identified and are listed in **Table 3.8**. Analysis of all receptors in proximity to the transportation routes that will be used for construction traffic found that once leaving the main highways, the routes are through industrial and commercial areas and no receptors that would be sensitive to traffic movements such as residential areas, settlements, labour accommodation sites, hospitals, schools, or other public amenities are present. As such, no increased risk to sensitive receptors is expected from dust generation due to construction related traffic.

Al Dur Phase II IWPP and SEPCO III accommodation facility is located within 500m of the construction laydown yard entrance. To the west and south of the laydown are vacant desert land. Accommodation facility is located on the eastern boundary line of the laydown yard. Given the low number of receptors in proximity to the laydown during daytime when most of the material transport occurs, the sensitivity of the area is considered to be **low**.



4.2 Dust Management Plan

The EPC contractor and Alba have the following procedures in place in relation to managing dust emissions from the Block 4 Project construction site and construction traffic:

- Relevant EPC Contractor documents:
 - Pollution Prevention Procedure;
 - Respiratory Protection Procedure;
 - Traffic Management Plan;
 - Excavation Procedure; and
 - Health, Safety and Environmental Management Plan.
- The Alba Code of Practice (ACOP) which contains the following:
 - Control of Physical Hazard and Ergonomics;
 - Performance Measurement and Monitoring;
 - Environmental Monitoring;
 - Monthly Safety Health and Environment report guideline;
 - CESMP; and
 - Ambient Air sampling.

The risk assessment indicates that impacts to receptors outside the Project construction site due to construction dust is low.

The EPC contractor has included air quality management measures in the CESMP and the management approaches included in IFC's General EHS guidelines into their pollution prevention procedure. The CESMP recommends that the EPC Contractor shall implement a more detailed construction dust minimization plan. The locations for regular dust monitoring inspections and frequency of inspection should be included in this plan. An outline of the dust monitoring program is provided in **Section 4.3**.

The EPC contractor implemented the following dust suppression measures:

- Water spraying during excavations, earth moving and in unpaved site roads;
- the roads located at the west and south of the site are regularly cleaned and maintained;
- the paved road outside the site is inspected regularly for cleanliness;
- security team is regularly inspecting the dump trucks leaving the site to ensure that the trucks are covered to prevent material falling off and tires are clean before entering public roads;
- the site speed limit is set at 10 km/hr;
- dump trucks are properly covered during transportation of construction material to prevent material falling off along public roads; and
- daily visual inspection of dust levels from construction works and stockpiles.

Recommended additional best practice measures to be considered for the reduction of dust generation includes:

- Develop, implement, and publicise the project stakeholder engagement plan that includes channel for direct communication with the project in the instance of any complaint;
- individuals can access site personnel immediately and raise a complaint by contacting the name and contact details of person(s) accountable for environmental issues prominently displayed on the site boundary. This may be the HSE Manager or the Site Manager;



- Alba and the EPC Contractor ensure that the mechanism for making complaints including contact details and numbers to call are fully publicised across all neighbouring receptors;
- complaints received from external parties in relation to dust generated and dust disturbance shall be responded to and addressed. All complaints shall be investigated by the site manager with support from the construction team to identify site activities that may be the cause of the issue raised and instruct actions to be taken to reduce the disturbance;
- dust complaints will be dealt with promptly and action taken in a timely manner to reduce the source of dust emissions Complaints will be recorded in the complaints register including the cause of the complaint and the actions taken to resolve the issue to the satisfaction of the complainant;
- wind conditions shall be monitored and dust generating activities reduced where
 practical or further dust suppression shall be adopted. Dust levels shall be
 monitored through regular on-site and off-site inspections, including regular dust
 soiling checks of surfaces such as roads, industrial or office buildings, cars, and
 windows and sills within 100m of site boundary. On site haul routes will also be
 regularly inspected for integrity and to expedite necessary repairs to the surface
 to reduce dust generation from transportation along these routes;
- the inspection frequency shall be increased when activities with high potential to produce dust are being carried out and during prolonged periods of windy conditions;
- cleaning and washing down dusty areas shall be carried out if necessary. Inspection results shall be recorded along with any actions taken to resolve a dust incident. Any exceptional dust generating incidents shall be communicated to the site manager and additional dust suppression actions taken as required, including reducing the level of activity until dust generation can be better controlled;
- keep site fencing, barriers and scaffolding clean;
- agree dust monitoring locations and include these in the CESMP; and
- inspect on-site haul route for integrity and instigate necessary repairs to the surface as soon as reasonably practical.

4.3 Dust Monitoring Program

The following monitoring plans were reviewed during the risk assessment process:

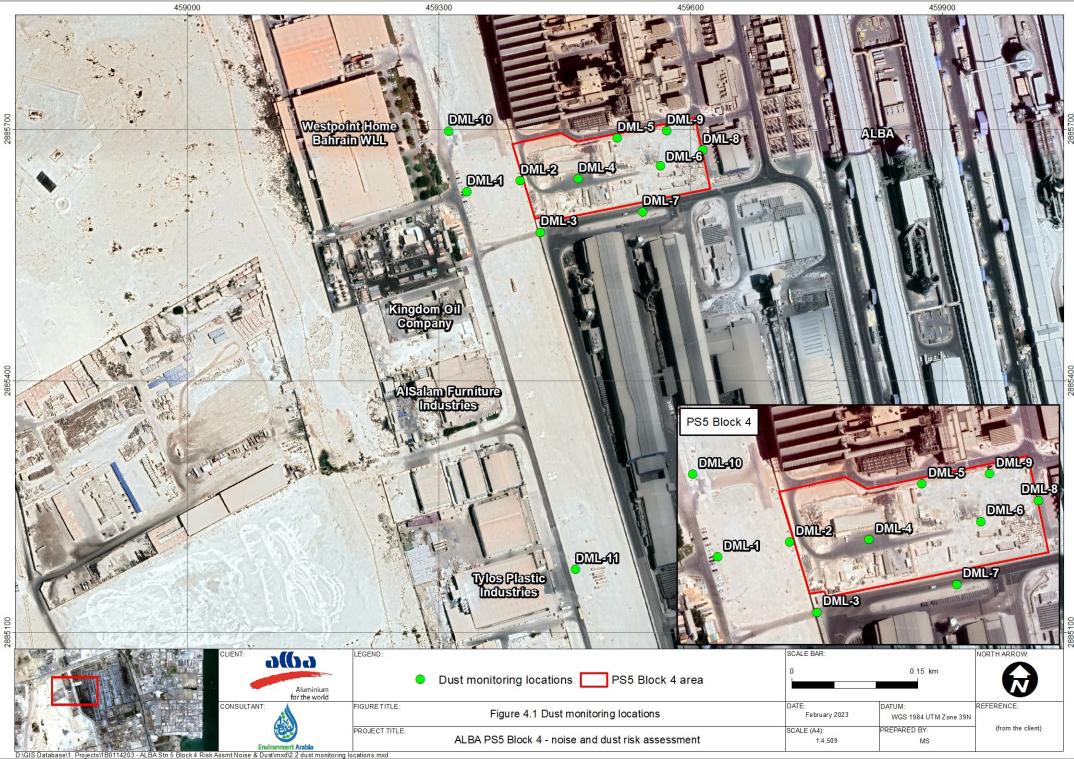
- ACOP-052-Performance Measurement and Monitoring;
- ACOP-056-Environmental Monitoring;
- AGLC 001 Monthly Safety Health and Environment Report Guideline; and
- SOP (75.18) Ambient Air Sampling.

The EPC contractor has a dust monitoring program in place and undertaking regular dust monitoring at 9 locations as shown in **Figure 4.1**. The monitoring locations include site boundary, construction areas and adjacent road. It is recommended to implement the following additional requirements:

- Include entrance of West Point Home and Tylos Plastics as 2 additional monitoring locations (refer Figure 4.1) as:
 - West Point Home manufactures textile products which are sensitive dust pollution;
 - Tylos Plastics manufactures plastic products and store the final products outside the plant premises prior to shipping.



• dust monitoring results shall be included in the monthly SHE reports to Alba and shall be made available to CESMP audit team to include in the monthly audit reports.





5 **REFERENCES**

- 1. IAQM Guidance on the assessment of dust from demolition and construction, 2014.
- 2. IAQM Guidance on Monitoring in the Vicinity of Demolition and Construction Sites, October 2018.
- 3. IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning, May 2016.
- 4. IAQM Guidance on Monitoring in the Vicinity of Demolition and Construction Sites, October 2018.