



Application for Licence

Division 3, Part V *Environmental Protection Act 1986*

Applicant:	Roy Hill Infrastructure Pty Ltd
ACN:	130 249 633
Licence Number:	L8967/2016/1
File Number:	DWER2016/000615
Premises:	Roy Hill Port Bulk Handling Facility and Screening Plant Part of Lot 370 on Deposited Plan 35619 Certificate of Title Volume LR3118 Folio 753 Part of Lot 372 on Deposited Plan 35620 Certificate of Title Volume LR3118 Folio 755 Reserve 50892 within coordinates as defined in Schedule 1 of the Issued Licence
Date of report:	Monday, 3 December 2018
Status of Report	Final

Table of Contents

Definitions of terms and acronyms	v
1. Purpose and scope of assessment	1
1.1 Amendment application – throughput increased to 60 Mtpa	1
2. Background	2
3. Overview of Premises	2
3.1 Infrastructure	2
3.2 Operational aspects	3
3.3 Exclusions to the Premises	7
4. Legislative context	7
4.1 Part IV of the EP Act	7
4.1.1 Background	7
4.1.2 Ministerial Statement 858	7
4.1.3 Ministerial Statement 978	9
4.2 Contaminated sites	9
4.3 Planning	9
4.4 Port Hedland Dust Management Taskforce	9
4.4.1 2016 Report to Government	10
4.4.2 Health Risk Assessment (HRA)	11
4.5 Applicable regulations, standards and guidelines	13
4.6 Part V of the EP Act	14
4.6.1 Works Approvals	14
4.6.2 Amendment Notice – 8 February 2017	14
4.6.3 Compliance history check	14
4.6.4 Site visit October 2018	15
4.7 Noise modelling	15
4.8 Dust modelling and monitoring	16
4.8.1 Air quality modelling	16
4.8.2 Ambient air quality monitoring	20
4.8.3 Light Detection and Ranging (LiDAR) monitoring	22
4.8.4 Dust levels and throughput increases	23
4.9 Air quality and amenity	24
5. Consultation	25
5.1 Reviewed Licence – September 2016	25
5.1.1 Department of Health	26
5.1.2 Pilbara Development Commission	26
5.2 Amendment application – throughput increased to 60 Mtpa	26
5.2.1 Department of Health	27

5.2.2	Town of Port Hedland.....	28
6.	Location and siting.....	28
6.1	Meteorology	28
6.2	Siting context.....	30
6.3	Residential and sensitive receptors	30
6.4	Specified ecosystems.....	32
6.5	Groundwater and water sources.....	32
6.6	Soil type	33
6.7	Other site characteristics	33
7.	Risk assessment.....	34
7.1	Determination of emission, pathway and receptor	34
7.2	Risk Criteria.....	36
7.3	Acceptability and treatment of Risk Event.....	37
7.4	Risk assessment – dust.....	37
7.4.1	Description of Risk Event	37
7.4.2	Identification and general characterisation of emission.....	37
7.4.3	Description of potential adverse impact from the emission	38
7.4.4	Criteria for assessment.....	38
7.4.5	Licence Holder controls	38
7.4.6	Key findings.....	41
7.4.7	Consequence	42
7.4.8	Likelihood of Risk Event	42
7.4.9	Overall rating of dust impacts	43
7.5	Risk assessment – noise.....	43
7.5.1	Description of Risk Event	43
7.5.2	Identification and general characterisation of emission.....	43
7.5.3	Description of potential adverse impact from the emission	43
7.5.4	Criteria for assessment.....	43
7.5.5	Licence Holder controls	43
7.5.6	Key findings.....	44
7.5.7	Consequence	44
7.5.8	Likelihood of Risk Event	44
7.5.9	Overall rating of noise emissions.....	44
7.6	Risk assessment - discharge to land, groundwater and marine waters.....	44
7.6.1	Description of Risk Event	44
7.6.2	Identification and general characterisation of emission.....	45
7.6.3	Description of potential adverse impact from the emission	45
7.6.4	Criteria for assessment.....	45
7.6.5	Licence Holder controls	45

7.6.6	Key findings.....	47
7.6.7	Consequence	47
7.6.8	Likelihood of Risk Event	48
7.6.9	Overall rating washdown water discharges and spills	48
7.7	Summary of risk assessment and acceptability	48
8.	Determined regulatory controls	49
8.1	Summary of controls	49
8.2	Alternative regulatory strategy for noise	49
8.3	Infrastructure and equipment controls	50
8.3.1	Dust management.....	50
8.3.2	Stormwater and wash down water control infrastructure.....	50
8.3.3	Spill control infrastructure	51
8.4	Limits.....	51
8.4.1	Discharge to land	51
8.5	Monitoring requirements.....	51
8.5.1	Dust monitoring	51
8.5.2	Discharges to land monitoring	51
8.6	Specified actions	52
8.6.1	Dust monitoring and trigger actions	52
8.6.2	Spill control actions	53
8.7	Amendments to Licence – December 2018.....	53
8.7.1	Bulk granular material specifications	53
8.7.2	Improvement requirements.....	53
8.7.3	Moisture Content.....	54
8.7.4	Stockpile restrictions	54
8.7.5	Removal of Material Change conditions	55
8.7.6	Quarterly event reporting.....	55
9.	Setting conditions.....	56
10.	Applicant’s comments on Risk Assessment.....	56
11.	Conclusion	56
Appendix 1: Key documents		
Appendix 2: Summary of submissions on the proposal for increased throughputs to 60 Mtpa		
Appendix 3: Summary of Applicant’s Comments on Amended Licence and Decision Report		
Appendix 4: Summary of Applicant’s Comments on Draft Reviewed Licence and Decision Report from September 2016		
Appendix 5: Licence amendments from 15 September 2016 to present		
Attachment 1: Issued Licence L8967/2016/1		

Definitions of terms and acronyms

Term	Definition
Amendment Application	the application submitted to DWER by Roy Hill Infrastructure Pty Ltd consisting of the reference documents Roy Hill 2017 in Appendix 1
Amended Licence	means Reviewed Licence L8967/2016/1 as amended 3 December 2018 under Part V, Division 3 of the EP Act following the finalisation of this Decision Report.
Annual Period	the 12 month period commencing from 1 July until 30 June in the following year (as defined in the Amended Licence).
Applicant	Roy Hill Infrastructure Pty Ltd
AS4156.6	Australian Standard AS 4156.6 – 2000: Determination of Dust/moisture Relationship for Coal.
Category	as used in Schedule 1 of the EP Regulations
Category Threshold	the production or design capacity threshold for the prescribed premises category as defined under Schedule 1 of the EP Regulations.
dB	decibel, a unit of measurement of sound level
Delegated Officer	An officer under section 20 of the EP Act.
DEM	Dust extinction moisture
DJTSI	Department of Jobs, Tourism, Science and Innovation
DoH	Department of Health
DWER	Department of Water and Environmental Regulation As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the Public Sector Management Act 1994 and is responsible for the administration of the <i>Environmental Protection Act 1986</i> along with other legislation.
EP Act	<i>Environmental Protection Act 1986</i>
EP Regulations	<i>Environmental Protection Regulations 1987</i>
HRA	Port Hedland Air Quality Health Risk Assessment for Particulate Matter (published by DoH, January 2016)
ICMS	Incident and Complaints Management System
Issued Licence	the licence issued under Part V, Division 3 of the EP Act following the

	finalisation of this assessment
L _{A10}	A sound level exceeded for 10% of the time period over which the level is determined.
Licence Holder	Roy Hill Infrastructure Pty Ltd
m ³	cubic metres
mg/L	milligrams per litre
Minister	the Minister responsible for the EP Act and associated regulations
MS	Ministerial Statement
Mtpa	Million tonnes per annum
NATA	National Association of Testing Authorities
NEPM	National Environmental Protection Measure
Noise	unwanted sound and is defined in the EP Act to include vibration of any frequency, whether transmitted through air or any other physical medium
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
Original Licence	the licence issued under Part V, Division 3 of the EP Act on 15 September 2016
PHIC	Port Hedland Industries Council
PM	Particulate Matter
PM ₁₀	describes particulate matter that is equal to or smaller than 10µm in diameter.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	the Roy Hill Port Bulk Handling Facility and Screening Plant as listed on the cover page of the Licence as the Premises
PPA	Pilbara Ports Authority
Prescribed premises	is defined in the EP Act to mean premises prescribed for the purposes of Part V
Primary Activities	is defined in DWER's <i>Guidance Statement: Risk Assessments</i> to include the primary activities which fall within the description of the category of prescribed premises in Schedule 1 to the EP Regulations.
Reviewed	the Licence L8967/2016/1 issued under Part V, Division 3 of the EP Act

Licence	on 15 September 2016 and following a risk-based review of the Premises.
Risk Event	As described in <i>Guidance Statement: Risk Assessment</i>
TRH	Total recoverable hydrocarbons
TSP	Total suspended particulates
$\mu\text{g}/\text{m}^3$	micrograms per cubic metre
$\mu\text{g}/\text{L}$	micrograms per litre
WHIMS	refers to the wet, high intensity magnetic separator located at the Roy Hill mine site

1. Purpose and scope of assessment

Roy Hill Infrastructure Pty Ltd (the Licence Holder) operates the Roy Hill Port Bulk Handling Facility and Screening Plant (the Premises), which is a Prescribed Premises under the *Environmental Protection Act 1986* (EP Act).

Environmental risks associated with the Premises were previously assessed and Licence L8967/2016/1 issued on 15 September 2016 by the Department of Environment Regulation (now Department of Water and Environmental Regulation, or DWER¹) as part of a wider review of Category 58 Premises within the Port Hedland port area (Reviewed Licence). The purpose of this wider review to apply a risk-based assessment approach consistent with DWER's *Guidance Statement: Regulatory Principles*.

1.1 Amendment application – throughput increased to 60 Mtpa

On 25 October 2017, the Licence Holder submitted an application to increase the volumes of iron products handled at the Premises from 55 Mtpa to 60 Mtpa. The increase is expected to be accommodated by the existing infrastructure through greater utilisation, and no construction activities are required. The Licence Holder's request to increase tonnages at the Port are also in part the result of improvements to ore recovery processes at the mine site following the installation of a wet high intensity magnetic separator (WHIMS).

The WHIMS is designed to receive rejected fines iron ore product from wet fines screens and remove unwanted impurities, leaving behind a concentrate of predominantly haematite. The WHIMS concentrate produced will then be mixed into the existing fines product at the mine site at a concentration between 13% and 17% WHIMS concentrate, depending on the recovery rate of the WHIMS.

The Licence Holder has also advised that there is the potential for existing waste fines to be reprocessed through the WHIMS plant although the fines/WHIMS concentrate blend will remain the same. Section 7.4 of this Decision Report investigates the potential change to the risk of dust emissions from increasing throughputs and modifying the particle size distribution of the fines product stream.

Through the initial review in 2016 DWER did not assess the risks associated with dust emissions from the Premises on the grounds of unnecessary duplication with EP Act Part IV Ministerial Statement (MS) 858. At the time of issuing the Licence MS 858 was the primary regulatory instrument to regulate dust from the Premises. The Licence Holder has since submitted a section 45C to initiate amendments to the key characteristics listed under MS 858 for an increase in production capacity to 60 Mtpa. Subsequent to the section 45C application, on 24 January 2018, the Minister for Environment requested that the Environmental Protection Authority (EPA) inquire into removing dust management condition 6 of MS858 to allow for regulation of dust under the Part V Licence (L8967/2016/1).

Therefore the purpose of this Decision Report is to assess the risk of dust from proposed and existing Premises activities. This assessment has considered the product, activities and infrastructure at the Premises which fall within the definition of Primary Activities – Categories 5 and 58 in Schedule 1 to the *Environmental Protection Regulations 1987* (EP Regulations). Other supporting infrastructure, not directly related to Primary Activities, have been excluded from the Decision Report (see section 3.3).

The assessment has resulted in DWER amending Licence L8967/2016/1 (Amended Licence).

¹ DWER was formed on 1 July 2017, through the amalgamation of the Department of Water (DoW), Department of Environment Regulation (DER) and the Office of the Environmental Protection Authority (OEPA). DER is only referred to in this Decision Report when discussing correspondence and reference documents issued by, or to the former department.

2. Background

The Licence Holder is a subsidiary of Roy Hill Holdings Pty Ltd and is the legal entity responsible for the construction and operation of the Premises. The Roy Hill mine site is located approximately 277 kilometres (km) south of Port Hedland and is at the eastern end of the Chichester Range in the Pilbara region of Western Australia. The Roy Hill mine, rail and port facilities are currently operating at a throughput rate of up to 55 mtpa of hematite ore as lump and fines under the Reviewed Licence.

The Decision Report assesses the environmental risks of operating the prescribed premises categories at the throughput increases identified in Table 1 below.

Table 1: Prescribed Premises Categories

Classification of Premises	Description	Approved premises production or design capacity ¹
Category 58	Bulk material loading or unloading: premises on which clinker, coal, ore, ore concentrate or any other bulk granular material (other than salt) is loaded onto or unloaded from vessels by an open materials loading system.	60 000 000 tonnes per annum
Category 5	Processing or beneficiation of metallic or non-metallic ore: premises on which — (a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed; or (b) tailings from metallic or non-metallic ore are reprocessed; or (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam.	33 000 000 tonnes per annum

Note 1: Refers to the premises production capacity approved under the Amended Licence

3. Overview of Premises

The Premises includes the operation of a stockyard facility, rail loop, conveyor, wharf and ship loading facility located at the Boodarie Multi-user Stockyard Area, within the locality of the Port Hedland Inner Harbour.

3.1 Infrastructure

The Premises infrastructure, relating to Categories 58 and 5 activities, as well as infrastructure outside the scope of this assessment but within the Premises, is listed in Table 2 with reference to Figures 1, 2 and 3.

Table 2: Premises facility Categories 5 and 58 infrastructure

	Category 5 and 58 infrastructure	Figure reference
1.	Rail loop surrounding stockyard area – raised upon an embankment designed to withstand 1:100 year flood event	Figure 1 – Rail Alignment
2.	Enclosed rail car rotary dumper	Figure 2 - Car Dumper
3.	Travelling stackers (2)	Figure 2 – Stacker

4.	Reclaimer	Figure 2 – Reclaimer
5.	Screening plant with baghouse	Figure 2 - Re-screening Plant –
6.	Conveyor System including transfer stations, overland conveyor transport and berth conveyors	Figures 2 and 3 - Transfer Station, Conveyor and Elevated Conveyor
7.	Stockpiles	Figure 2 - Stockpiles
8.	Ship Loader	Figure 3 - Ship Loader
9.	Workshop and maintenance area	Figure 2 - Maintenance Workshop
10.	Sedimentation ponds (SB1-01 and SB1-02)	Figure 1 - Sedimentation ponds SB1-01 and SB1-02
11.	Oily water separators (4)	Figure 1 - Car Dumper OWS, Screening Plant OWS (North & South), Workshop OWS
12.	One way culvert discharge points	Figure 1 – Culvert Drain 1-7
13.	Roads	N/A
14.	Boundary dust monitors	Figure 1 – DM1-DM6
	Other infrastructure	Figure reference
15.	Wastewater treatment plants (2)	Figure 1 - Administration WWTP and Lab WWTP
16.	Reverse osmosis plant	Figure 1 – RO Plant
17.	Temporary Power Station (now decommissioned following connection to the grid)	Figure 1 – Power Station Prescribed Premises

3.2 Operational aspects

Ore is transported from the Roy Hill mine by trains which travel through the car dumper embedded in the rail loop embankment. Ore is dumped into hoppers and transferred to the ore stockpiles by conveyors. The ore is deposited into stockpiles using two rail mounted stackers with water sprays on the boom.

A bucket wheel reclaimer removes ore and delivers it to the screening plant (Lump Re-Screening Bins) which removes fines from the lump prior to export.

An elevated overland conveyor transports the ore approximately 4 km to the berths at the South West Creek Wharf. The wharf has two berths that are serviced by a rail mounted ship loader moving up and down the wharf to load ships.

Material movements are shown in Figure 4.

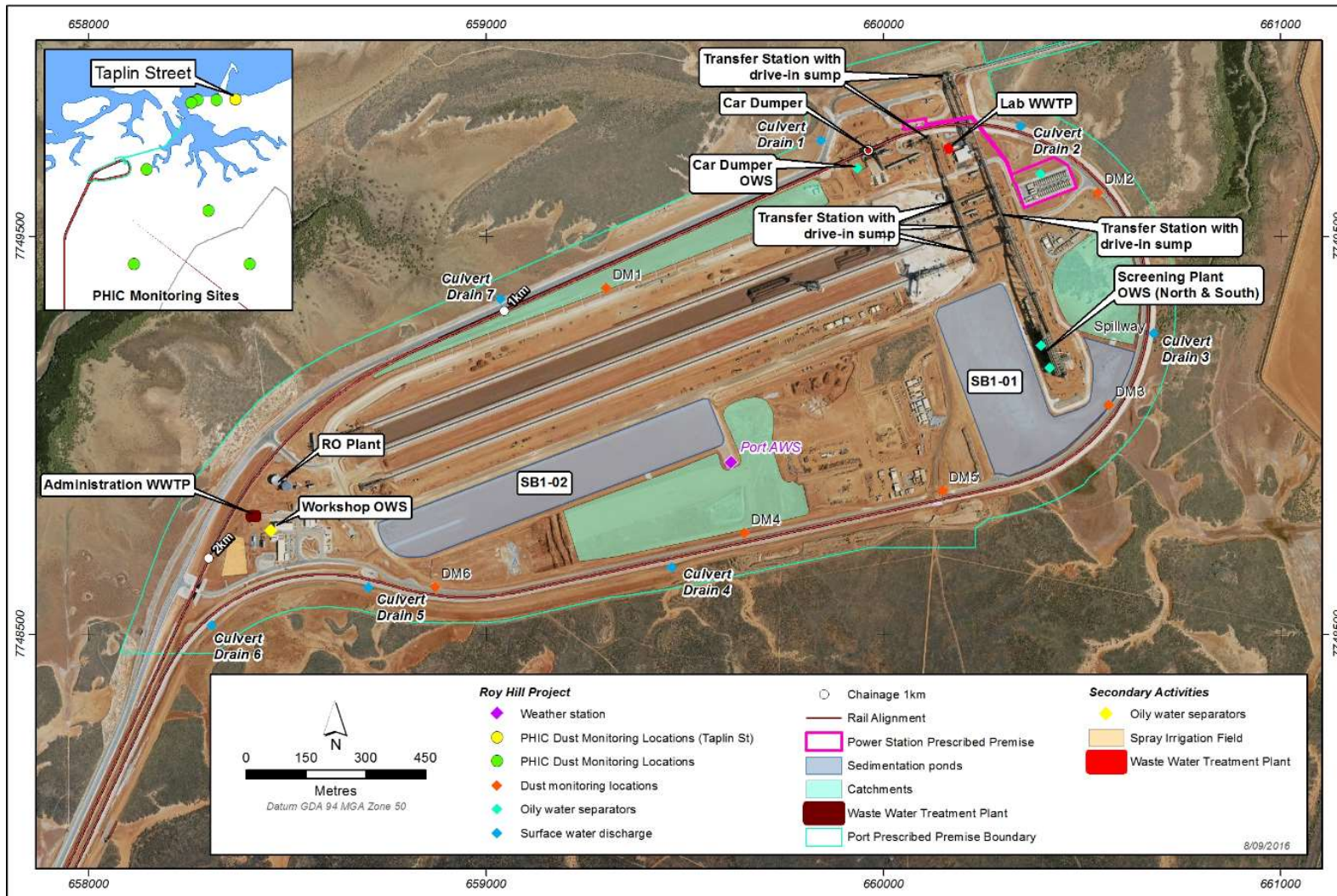


Figure 1: Stockyard area layout

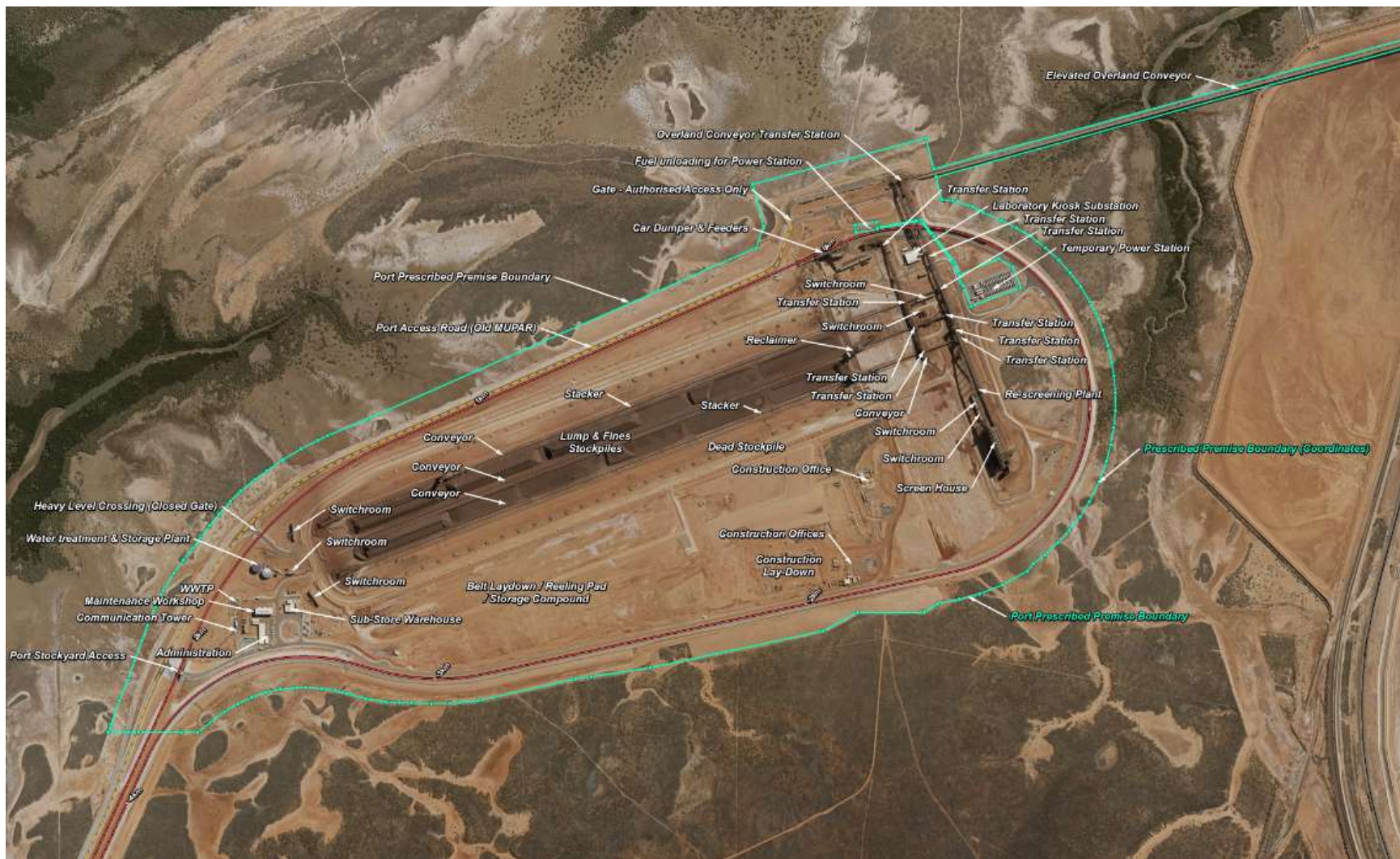


Figure 2: Stockyard area and overland conveyor layout



Figure 3: Overland conveyor and ship loading area layout

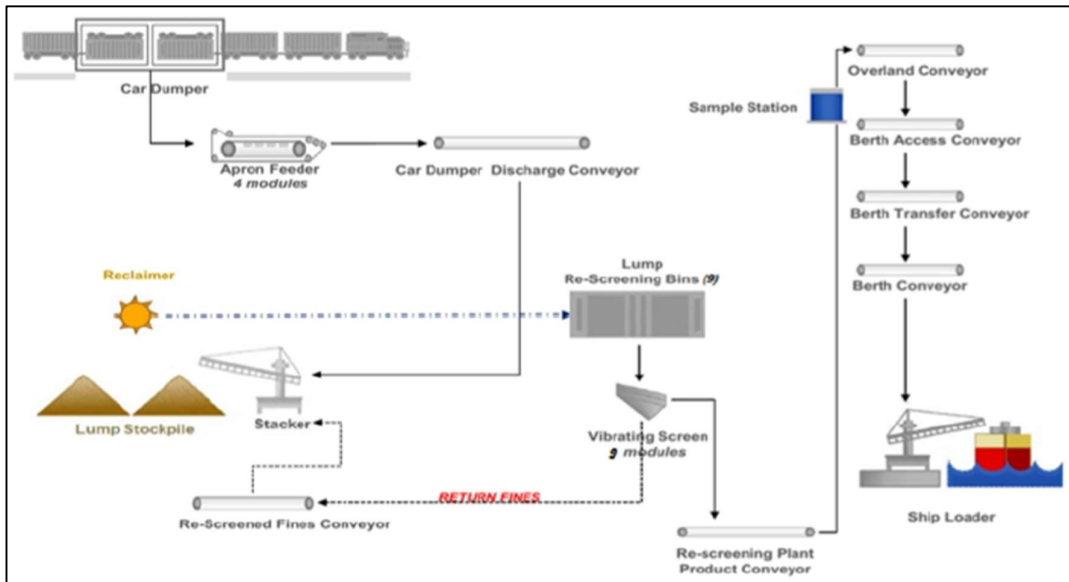


Figure 4: The Premises process and material movement

3.3 Exclusions to the Premises

The Premises includes the following infrastructure that is associated with secondary activities as defined within DWER’s Guidance Statement: *Licensing and works approval process* (September 2015);

- two waste water treatment plants with treatment capacities of 3.6kL /day and 19.3kL/day, which are below the Category Threshold for a category 85 sewage facility; and
- a reverse osmosis plant with a capacity to treat 0.12 gigalitres of water per year, which is below the category threshold for a category 54A water desalination plant.

As secondary activities, the operation of this infrastructure is not within the scope of this assessment.

4. Legislative context

Table 3 summarises approvals relevant to the assessment.

Table 3: Relevant approvals and tenure

Legislation	Number	Approval
Part IV of the EP Act (WA)	Statement Number 858	For the operation of the Roy Hill Port in Port Hedland.
	Statement Number 978	Conditions for the discharge of surplus dewater.
Part V of the EP Act (WA)	L8967/2016/1	Operation of the Premises.
	L8903/2015/1	Operation of the Temporary Power Station (refer to section 3.3).
<i>Rights in Water and Irrigation Act 1914</i>	GWL176004(1)	Licence to take groundwater
	GWL175984(2)	Port dewatering
	GWL178460(1)	Port dust suppression
<i>Port Authorities Act 1999</i>	Dangerous Goods Licence: DGS021947	3 x 110,000L diesel tanks for the operation of the Temporary Power Station (refer to section 3.3).
<i>Health Act 1911</i>	Approval numbers 22/14, 20/15, 35/15	Treatment of wastewater.

4.1 Part IV of the EP Act

4.1.1 Background

The operations of the Premises have been the subject of assessments under Part IV of the EP Act and are subject to Ministerial Conditions under Ministerial Statements 858 and 978.

4.1.2 Ministerial Statement 858

Cumulative impacts of the iron ore processing infrastructure and ship loaders was initially assessed under EPA Report Number 1377 by the Environmental Protection Authority (EPA) and managed under Part IV of the EP Act Ministerial Statement 858. In its assessment of the proposal, the EPA considered throughput rates of 55 Mtpa, project controls and cumulative dust modelling, noting the existing high background dust levels around Port Hedland and the potential for cumulative impacts.

The EPA concluded that the addition of the Premises to the existing operations in Port Hedland is likely to lead to minor increases only in the maximum 24 hour PM₁₀ ground level concentration within Port Hedland and Wedgefield, and that the impact on sensitive receptors is not expected to be significant. The EPA considered that maintenance of moisture levels of

ore at the proposal site above dust extinction moisture levels and dust covers on the conveyors are key dust controls.

Condition 6.1 of Ministerial Statement 858 requires the proponent (the Licence Holder) to manage its dust emissions in accordance with a *Port Dust Management Plan* (Roy Hill 2016c):

The proponent shall ensure that dust emissions from the proposal are managed in accordance with a Dust Management Plan to be prepared to the requirements of Chief Executive Officer of the Department of Environment and Conservation on advice of the CEO, and consistent with the Port Hedland Air Quality and Noise Management Plan (March, 2010) or its approved updates.

Commitments presented by the Licence Holder in the management plan include the:

- direct shipping of up to approximately 20% of ore;
- management of ore moisture content;
- operation of dust control infrastructure e.g. water sprays, sealed transfer points, dust collection equipment; and
- boundary air quality monitoring.

The EPA also considered noise emissions concluding that the proposal would comply with the assigned levels under the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations) and the State Planning Policy 5.4 *Road and Rail Transport Noise and Freight Considerations in Land Use Planning*, at all noise sensitive premises.

Key finding: Correspondence from the Licence Holder has identified that direct shipping (i.e. no stacking or reclaiming of ore) does not practically occur at site. Further, the Licence Holder has advised that current infrastructure results in slow throughput rates at the car dumper and difficulties in the coordination of in-loading the correct product, which requires blending at the Port.

As the action was not a mandatory requirement under the *Port Dust Management Plan* and had not been implemented to date, DWER accepted the view that direct shipping was not a relevant control for the purposes of this assessment.

DWER notes that the proposed dust management guidelines for bulk handling port premises licensed in Port Hedland will likely address the relevance of direct shipping as a control for the future management of dust in Port Hedland.

Amendments to Ministerial Statement 858

On 24 January 2018, the Minister for Environment requested the EPA to inquire into and report on the matter of changing the implementation conditions of Ministerial Statement 858 under section 46 of the EP Act. The inquiry scope was limited to the removal of Condition 6.

On 29 August 2018 the EPA released Report 1622 which outlined the considerations of the inquiry and a number of recommendations to the Minister for Environment. The inquiry primarily focused on the ability for DWER to regulate dust emissions from the Premises through Parts V and VI of the EP Act.

Concurrent to the section 46 inquiry, the EPA has also assessed an application submitted by the Licence Holder under section 45C of the EP Act to amend the Key Characteristics Table in Schedule 1 of Ministerial Statement 858. The application requests an increase to the annual iron ore throughput at the Port.

On 12 October 2018, the Minister for Environment published Ministerial Statement 1084 under Section 46 of the EP Act, changing the implementation conditions so that the condition relating to management of dust ceases to have effect once dust is licensed through Part V of the EP

Act. The Amended Licence gives effect to this change.

4.1.3 Ministerial Statement 978

At the request of the Minister for Environment, the EPA inquired into the matter of changing the implementation conditions relating to the proposal in order to include a dewatering discharge management condition for the discharge of dewatered groundwater to South West Creek. The EPA released Report No. 1515 in June 2014 assessing the impacts of discharging groundwater and Ministerial Statement No. 978 was issued 30 July 2014.

Key Findings:

- 1) The Minister's determination to amend the Ministerial Statement 858 has resulted in the Part V Licence (L8967/2016/1) being unconstrained by Part IV Ministerial Statement requirements.
- 2) Impacts associated with benthic primary producer habitat will continue to be managed under Part IV through Ministerial Statement 858.
- 3) Ministerial Statements 858 and 978 manage the impacts of discharging dewatered groundwater to the marine environment, which is not a prescribed activity under Part V of the EP Act. However, impacts to marine water quality from prescribed activities have not been conditioned under Part IV Ministerial Statements and therefore risks to the marine environment are considered through this Decision Report.
- 4) Noise emissions were not conditioned under Part IV of the EP Act.

4.2 Contaminated sites

The Premises is not classified as contaminated under the *Contaminated Sites Act 2003*.

4.3 Planning

The Premises is on land vested in the Pilbara Ports Authority (PPA) which operates under the *Port Authorities Act 1999*. The Premises is not subject to approvals from a local government authority. However, under provisions of the *Planning and Development Act 2005*, PPA is required to have regard for the purpose and intent of the local government planning schemes applicable to the site.

4.4 Port Hedland Dust Management Taskforce

The State Government established the Port Hedland Dust Management Taskforce (the Taskforce) in May 2009 to review existing reports and develop an integrated dust management plan for Port Hedland. The Taskforce is coordinated by the Department of Jobs, Tourism, Science and Innovation (DJTSI) and includes a range of industry and government members including DWER.

The Taskforce issued the *Port Hedland Air Quality and Noise Management Plan* (Management Plan) in 2010 to manage planning conflict between industrial growth and adjacent residential areas. The Management Plan was adopted by the Government and relevant to this report, recommended (DSD, 2010):

- adoption of interim air management criteria of $70\mu\text{g}/\text{m}^3$ (24-hour average) with allowance for 10 exceedances per calendar year at Taplin Street (residential street in Port Hedland); and
- the establishment of a State Environmental Policy for Port Hedland to monitor and manage noise using *Noise Regulation 17* exemptions where appropriate. This included

the development of a cumulative noise model, defining the noise sensitive zones, clarifying planning measures and clarifying building standards.

4.4.1 2016 Report to Government

On 9 August 2017, the DJTSI released the *Port Hedland Dust Management Taskforce Report to Government (August, 2016)* (the Taskforce Report) for public comment. Recommendations of the Taskforce Report applicable to DWER and the regulation of industry in Port Hedland include the:

- current interim guideline of 24-hour PM₁₀ of 70µg/m³ (+10 exceedances to accommodate natural events) continues to apply to residential areas of Port Hedland and that measures should be introduced to cap the number of permanent residents in dust affected areas of Port Hedland;
- implementation of a coordinated risk-based review and assessment for all port facilities in Port Hedland licensed under Part V of the EP Act;
- development and implementation of dust management guidelines for bulk handling port premises licensed under Part V of the EP Act;
- oversight of the ambient air quality monitoring network including data verification, storage and publication. The monitoring network will continue to be maintained and operated by the Port Hedland Industries Council (PHIC); and
- assessment of unacceptable noise levels and assess whether additional controls can be introduced as part of its coordinated risk-based review of all port facilities.

The Taskforce Report further considered changes to Town Planning Scheme No. 5 for Port Hedland's West End area. These changes include the creation of a Special Control Area to all areas west of McGregor and Lukis streets to rezone existing residential areas of the West End to mixed use and short stay accommodation areas (Figure 5). The objective of the Special Control Area is to prevent further permanent residential development west of Taplin Street and limit new sensitive land uses between Taplin and McGregor streets (Department of Planning, Lands and Heritage, 2017).

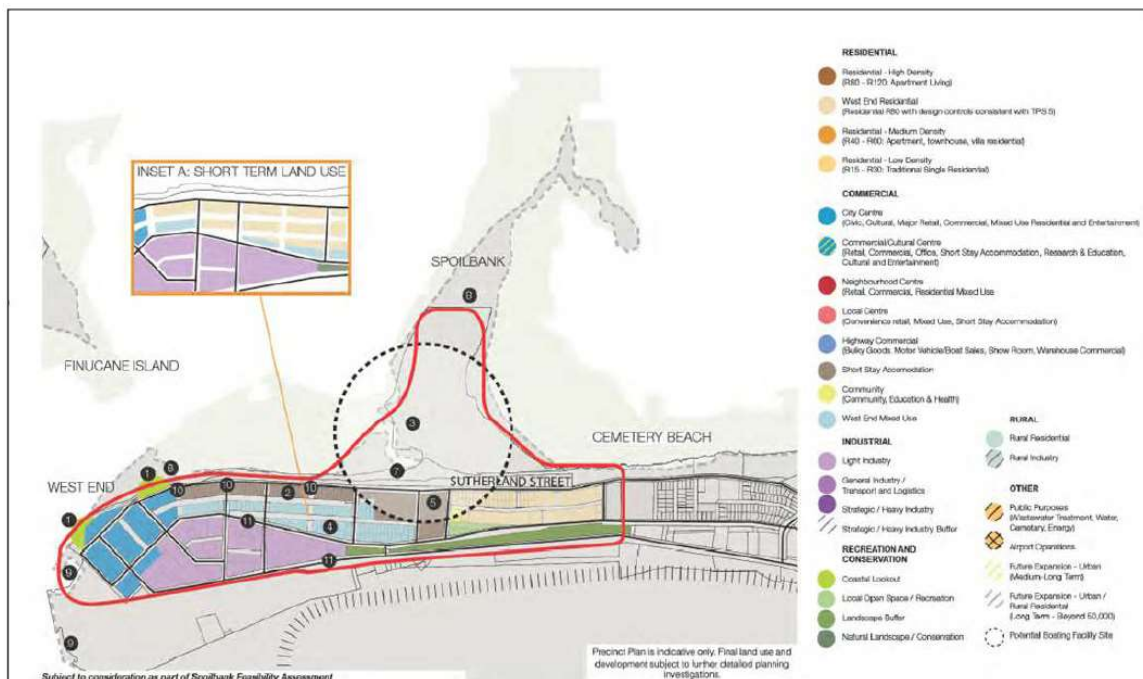


Figure 5: Proposed town planning scheme for Port Hedland’s West End (Source: Town of Port Hedland, 2012)

On 15 October 2018, the Government provided its response to the Taskforce Report, endorsing its recommendations. Representative agencies including DWER; DJTSl; DoH; the Department of Planning, Lands and Heritage; and the EPA will continue to have important roles in ensuring the Government’s response is enacted.

DWER has set the following nominal timeframe for action:

- 2018/19 – Develop best practice dust management guidelines for port operators. This will take an external consultant approximately one year, involving the benchmarking of current port practices and developing recommendations for significant improvements;
- 2018/19 and 2019/20 – Transfer the Port Hedland Industries Council air quality monitoring network to DWER. All costs for the refurbishment, operation and maintenance of the monitoring network will be absorbed by all port operators holding a licence granted for Category 58 under the *Environmental Protection Act 1986*, through an appropriate cost recovery arrangement. Once in control of the ambient monitoring network DWER will publish real time monitoring data on the Department’s website with trends and further analysis reported annually;
- 2019/20 – Develop industry-self-assessment criteria, to be implemented through licence conditions, that require port operators to determine performance gaps, and propose strategies for improving current handling practices to comply with the new standards proposed by the best practice guidelines;
- 2020/21 and 2021/22 – Industry to comply with new best practice standards for bulk handling, in conjunction with more robust regulatory instruments and controls and with ongoing monitoring; and
- 2022/23 – Undertake a review of the results to determine if improvement has occurred.

At the completion of the five years, the Department will report on the outcomes of the planned strategy to Government as a resolution to the issue first highlighted by the EPA in 2009. This report will describe the final outcomes, along with any recommendations for required future investigations or assessments (such as a new health risk assessment), and additional regulatory actions should the planned approach not fully meet its aims.

Key determination: DWER has an obligation as part of recommendations of the Port Hedland Dust Taskforce Report to improve regulatory controls for Prescribed Activities in and around Port Hedland. DWER will consider additional dust requirements following the finalisation of Dust Management Best Practice Guidelines and industry self-assessment outcomes.

DWER has proposed a five year plan for the proposed improvements to be finalised. Planning controls will also take a considerable period before changes begin to take effect. Further information is provided in *Industry Regulation fact sheet: Managing dust in Port Hedland*, which can be found on DWER’s website.

4.4.2 Health Risk Assessment (HRA)

The Department of Health released the *Port Hedland Air Quality Health Risk Assessment for Particulate Matter* (HRA) in January 2016. The report provides the final health risk assessment for Port Hedland. The Department of Health also published the *Port Hedland – Fact Sheet*, which provides the summary findings of the study as follows:

- The HRA identifies that PM₁₀ concentration in ambient air decreases with increasing distance from the Port.

- During the period of the assessment, areas of Port Hedland closer to the port experienced dust exceedances (dust levels greater than $70\mu\text{g}/\text{m}^3$) more frequently than areas further away. The greatest number of exceedances in Port Hedland was recorded in the West End.
- Patterns of dust exceedances (dust levels greater than $70\mu\text{g}/\text{m}^3$) dominate the West End of Port Hedland during the winter and spring. Dust sources during these periods are predominantly from the direction of the port and resources industry. However, bare earth such as the area known as the Spoilbank, regional dust storms and seasonal scrub fires also contribute to exceedances at particular times of the year and in response to certain meteorological conditions.
- The HRA confirms that there is sufficient evidence that increased levels of dust exposure can have an adverse impact on human health in Port Hedland over the long term. This is consistent with the broader scientific literature on the effects of dust on human health.
- The majority of the public health burden of dust in Port Hedland is associated with PM_{10} concentrations over $70\mu\text{g}/\text{m}^3$. These effects may be independent of any $\text{PM}_{2.5}$ effects although this is not clear, due to the small population.
- Nevertheless, there is no immediate or acute health risk to the Port Hedland community – however the focus must now be on minimising peoples' exposure to dust.
- The number of affected individuals is very low, but only because the Port Hedland population is small (~5000 people).
- The HRA considered a number of dust exposure scenarios. One scenario of importance explores the health impact of the highest dust levels on the population. It asks the question: what adverse health outcomes are forecast if the whole population (~5000 people) of Port Hedland were exposed to the levels of dust experienced in the West End? The important health outcomes were predicted to be as follows:
 - Increase in long term mortality (premature death),
 - **1 additional death per year** in areas that frequently exceed $70\mu\text{g}/\text{m}^3$
 - Cardiovascular disease
 - **1 additional death every 3 years** in areas that frequently exceed $70\mu\text{g}/\text{m}^3$
 - Increase in hospital admissions associated with:
 - Respiratory disease for people over 65 years of age
 - **2 additional admissions per year** in areas that frequently exceed $70\mu\text{g}/\text{m}^3$
 - Pneumonia and bronchitis.
 - **1 additional admission per year** in areas that frequently exceed $70\mu\text{g}/\text{m}^3$
 - Increase in emergency room attendance for pre-existing respiratory conditions i.e. asthma, between 15 - 65 years of age
 - **3 additional admissions per year** in areas that frequently exceed $70\mu\text{g}/\text{m}^3$
- Two other important exposure scenarios asked the questions what adverse health outcomes are forecast if the whole population (~5000 people) of Port Hedland were exposed to levels of dust :
 - not greater than $70\mu\text{g}/\text{m}^3$, and
 - not greater than $50\mu\text{g}/\text{m}^3$

The important health outcomes were predicted to be as follows:

- Increase in long term mortality (premature death),
 - **1 additional death every 3 years** for both scenarios.
- Cardiovascular disease
 - **1 additional death every 10 years** for both scenarios.
- Increase in hospital admissions associated with:
 - Respiratory disease for people over 65 years of age
 - **1 additional admission every 2 years** in areas not exceeding 70 µg/m³
 - **1 additional admission every 3 years** in areas not exceeding 50 µg/m³
 - Pneumonia and bronchitis
 - **1 additional admission every 4 years** in areas not exceeding 70 µg/m³
 - **1 additional admission every 5 years** in areas not exceeding 50 µg/m³
- Increase in emergency room attendance for pre-existing respiratory conditions i.e. asthma, between 15 - 65 years of age
 - **1 additional admission per year** for both scenarios.
- Based on the outcomes of these scenarios the HRA concluded that 70 µg/m³ for PM₁₀ provided a similar level of protection to the current population of Port Hedland as would the national standard for PM₁₀ of 50 µg/m³. This is because the population size and make-up influence the outcome; if the population were more than doubled and with more people that are more vulnerable, the health outcomes would be more prominent and demanding of more immediate regulatory control.
- The HRA recommended the dust levels (PM₁₀) should be managed so that 70 µg/m³ is not exceeded in Port Hedland (except under exceptional circumstances).

The HRA considered the cumulative impact of all dust sources on the population of Port Hedland and the findings and recommendations apply to all industry and other sources of dust in Port Hedland. The information in this section should be read in conjunction with the HRA and the Department of Health's *Port Hedland – Fact Sheet* and not taken to apply solely to Roy Hill's port operations.

Key Findings: While the HRA refers to the interim guideline lasting for five years from January 2016, this was based on predictions of a population increase which has not eventuated. As such, DoH and DWER support the ongoing application of the interim guideline, provided the composition of dust does not change and the population does not increase.

The Delegated Officer notes the findings of the HRA and the recommendation from the Taskforce Report, on advice from the Department of Health, that dust levels (PM₁₀) should be managed so that it does not exceed 70 µg/m³ (except under exceptional circumstances such as natural events).

4.5 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations.

The guidance statements which inform this assessment are:

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*

- *Guidance Statement: Land Use Planning (February 2017)*
- *Guidance Statement: Risk Assessments (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*

Other documents used in this assessment are documented in Appendix 1.

4.6 Part V of the EP Act

4.6.1 Works Approvals

Works Approval W5396/2013/1 was issued to the Applicant for the construction of the Premises on 19 September 2013.

The Works Approval was amended on 16 April 2014 following an amendment application by the Applicant to reflect a revised discharge program for excess groundwater abstracted from the car dumper dewatering activities, which were approved under Ministerial Statements 858 and 978.

The Works Approval was further amended on 30 July 2015 to extend the timeframe for the submission of a commissioning report from 1 month to 3 months after the completion of commissioning.

Commissioning was undertaken during the period of 6 October 2015 to 6 April 2016. The Commissioning Report (Roy Hill, March 2016) for the Premises was received by DWER on 14 April 2016. The information within the report indicates that the Premises was constructed and commissioned in accordance with the requirements of Works Approval W5396/2013/1, with the exception of a few minor variations.

4.6.2 Amendment Notice – 8 February 2017

An appeal was lodged by the Licence Holder in objection to a condition applied to the Original Licence.

The condition detailed in the Licence required the daily use of a street sweeper at the wharf to remove accumulated ore spillage and spilt material during ship loading. This requirement was informed by DWER's Regulatory Framework and a site visit conducted by DWER officers on 20 July 2016.

The Licence Holder lodged an appeal in objection to the above condition under section 102(1)(c) of the EP Act to remove the requirement for the daily operation of a street sweeper during ship loading. In its appeal the Licence Holder noted that sediment spills did not present a high risk to the marine environment and that the incident witnessed by DWER officers during a site visit occurred during a maintenance shutdown rather than during ship loading.

The Minister for Environment made a determination on the appeal following advice from the Appeals Convenor on the appeal under section 110 of the EP Act, and the licence was subsequently amended. Amendments related only to Schedule 3 requirements for the ongoing and regular operation of a street sweeper and following identification of a spill. Changes to operation requirements also included the requirement for a street sweeper be present during maintenance shutdown and wash down of ship loading equipment.

4.6.3 Compliance history check

There is no history of prosecution or formal statutory compliance/enforcement notices issued under the EP Act by DWER to the Applicant for the Premises.

The DWER's Incident and Complaints Management System (ICMS) has no record of a complaint from a member of the public or surrounding occupants relating to the Premises.

4.6.4 Site visit October 2018

On 31 October 2018, DWER officers visited the Premises as part of a program to identify key dust sources and controls at each Premises that has not had a full risk-based licence review conducted. During the site visit, DWER officers noted:

- very few vehicle movements due largely to the significant automation of operations out of the Licence Holder's Perth office, removing the need for a large number of onsite personnel movements;
- visible dust emissions being generated beneath the car dumper and at the rescreening plant where ore was moving through a transfer station;
- generally low levels of dust witnessed around other areas of the Premises; and
- that there were vast areas across the Premises that had been cleared and are no longer being used, presenting a potentially significant source of dust.

Key finding: Despite all ore products handled at the Premises having a moisture content above their respective DEM level, visible dust generation was witnessed underneath the car dumper and at the rescreening plant. Therefore, DWER notes that while maintaining moisture content above the DEM level is a key control for dust prevention, it cannot be used as a stand-alone control for the management of dust.

In addition, DWER notes that elevated levels of PM₁₀ may not appear as visible to the naked eye and that the lack of visible dust does not necessarily indicate low levels of dust emissions.

4.7 Noise modelling

Licence Holder provided noise modelling results within the works approval application for the Premises. Following commissioning in 2016, the modelling was updated and re-run, taking into account the final plant layout and additional noise sources. The results of the updated modelling were provided within the application to authorise ongoing operation and describe the potential impacts to noise sensitive receptors from the Premises in isolation of nearby industry.

The predicted noise levels at the noise sensitive receivers, from both the previous and updated model, are shown in Table 4. As a result of the updates to the original modelling conducted for the works approval, there has been an increase in predicted noise levels at all receptors identified within the updated modelling results. Adjustments for influencing factors and a 5 dB non-significant contributor reduction have been made to the assigned noise levels provided in the Noise Regulations to determine the applicable assigned noise levels used in the modelling. Noise levels at the hospital are predicted to exceed the applicable assigned noise levels by 5.7 dB at night time. The hospital within the town of Port Hedland has been closed but was retained in the model as it is representative of residential noise sensitive receptors at the corner of Howe Street and Kingsmill Street.

The original licence application submitted in 2016 identifies the ten pieces of infrastructure which contribute most significantly to the predicted noise level at the hospital. These are conveyors, conveyor transfer points, conveyor drives and ship loader drives.

Table 4: Predicted noise levels at noise sensitive receivers^{1,2}

Receiver	L _{A10} assigned noise levels for night time	Predicted L _{A10} Noise Levels		Exceedance	
		Previous Noise Model	Updated Noise Model	Previous Noise Model	Updated Noise Model

			(2016)		(2016)
Brearley St	32	26.0	30.7	-	-
Cooke Point	30	18.8	22.6	-	-
Green Acres	30	11.6	13.8	-	-
Hospital	32	32.1	37.7	0.1 dBA	5.7 dBA
Laurentis Point	47	37.8	43.6	-	-
Police Station	47	37.5	43.6	-	-
Pretty Pool	30	16.3	19.6	-	-
South Hedland	30	17.0	19.3	-	-
Wedgefield Camp	30	26.2	28.9	-	-

Note 1: Content sourced from *Port Hedland - Environmental Noise Model Updates*, SVT Engineering Consultants; provided within licence application.

Note 2: The previous noise model was submitted as part of the application for Works Approval (W5396/2013/1) in 2013 and was later updated in 2016 as part of the application for the original Licence (L8967/2016/1). Noise modelling was not updated for the application to amend the Licence in 2018.

Key Finding: DWER reviewed the environmental noise model submitted with the initial Licence application for the Premises in 2016 and found the estimated noise levels for night time (worst case) from the Premises are modelled to exceed the assigned noise levels by 5.7 dBA at a sensitive receptor.

The noise model submitted for the Reviewed Licence already assumed the continuous operation of port infrastructure. No additional infrastructure is proposed to allow for throughput increases and therefore there are no increases to worst case noise emissions. Rather the throughput increase will be achieved through longer operation of existing infrastructure – which the model has already taken into consideration.

Based on the above, there are no changes made to the risk assessment for noise in this Decision Report as a result of the application to increase throughputs to 60 Mtpa.

4.8 Dust modelling and monitoring

4.8.1 Air quality modelling

In support of the Amendment Application to increase throughputs to 60 Mtpa, the Licence Holder submitted an air quality dispersion model completed by Minera Mining Technologies (Minera, 2017) comparing the two throughput scenarios.

The Minera report was presented using the AERMOD dispersion model which included key dust emission sources and site representative meteorological data from 2013 used to predict the ground level concentrations of PM₁₀ at selected receptors. The model option and assumptions used were stated as being consistent with the Port Hedland Industries Council (PHIC) Cumulative Air model (CAM).

DWER reviewed the modelling report and noted that the only change between the 55 and 60 Mtpa scenarios, aside from the increase in tonnage, is a reduction in wind erosion emissions

in open areas in the yard due to the application of a surfactant dust suppressant chemicals. DWER notes that although surfactant has been applied to open areas at the Premises, it has not been considered within the assumptions of the 55 Mtpa scenario. Therefore the 55 Mtpa model is likely to overpredict dust emissions from the Premises relative to the 60 Mtpa model.

The model assumes that the maximum hourly tonnages at in-load and outload will remain the same with only the number of hours increasing where the maximum tonnages are achieved. No adjustment for ore type or wind speed has been presented in modelling data.

Figure 6 and Figure 7 show the predicted dust emissions under the 55 and 60 Mtpa scenarios, including background and cumulative (other industry) sources. DWER notes that the two images indicate a significantly greater dust emission footprint from FMG, PPA and Roy Hill category 58 operations when compared to BHP operations at Nelson Point and Finucane Island. This is likely due to the use of inconsistent emission estimation techniques used by each operator. The Licence Holder has assumed a grams per tonne emission estimation of 7.6 g/tonne compared to the 2.6 g/tonne assumed for BHP's operations.

The model statistics presented in **Error! Not a valid bookmark self-reference.**, and represented in Figures Figure 6 and Figure 7, show an insignificant difference at Taplin Street between the 55 and 60 Mtpa cumulative scenario and the same can be stated for the standalone scenario (Minera, 2017). At other, more impacted sites (e.g. Harbour) there is an increase of 1 µg/m³ for some statistics and an increase of 0.1 µg/m³ for annual averages.

Table 5: Predicted dust concentrations at PHIC monitoring sites for 55 Mtpa and 60 Mtpa cumulative modelled scenarios with background

24-hour concentrations of PM ₁₀	Richardson Street		Kingsmill Street		Taplin Street		Neptune Place	
	55 Mtpa	60 Mtpa	55 Mtpa	60 Mtpa	55 Mtpa	60 Mtpa	55 Mtpa	60 Mtpa
Maximum	225	225	222	222	202	202	196	196
99 th percentile	148	148	110	110	78	78	60	60
95 th percentile	105	105	92	92	65	65	46	47
90 th percentile	89	90	78	78	56	56	40	40
70 th percentile	70	70	61	61	45	45	33	33
Annual average	60.4	60.5	52.6	52.7	36.9	37.0	28.2	28.2
Exceedances (70µg/m ³)	NP	NP	NP	NP	7	7	1	1

NP: Not provided

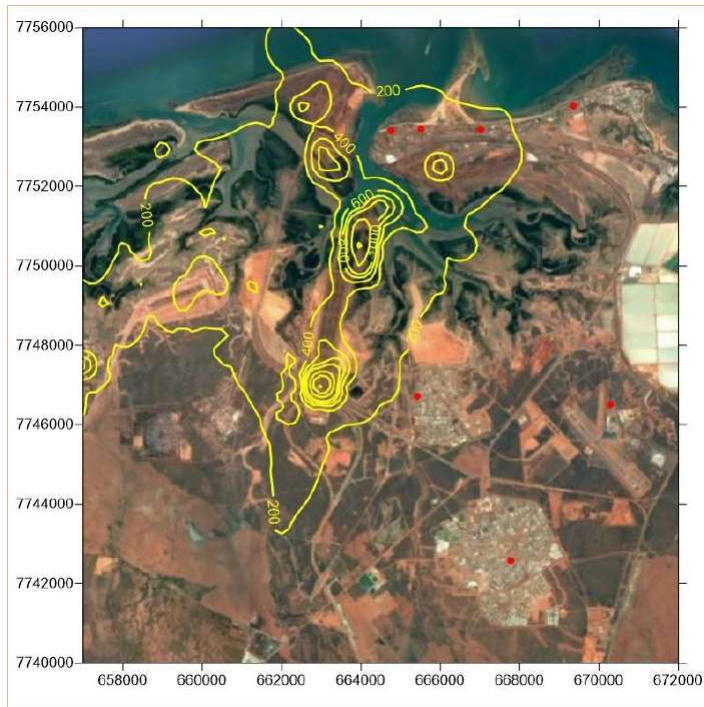


Figure 6: Maximum 24-hour predicted concentrations – 55 Mtpa cumulative scenario with background ($\mu\text{g}/\text{m}^3$)

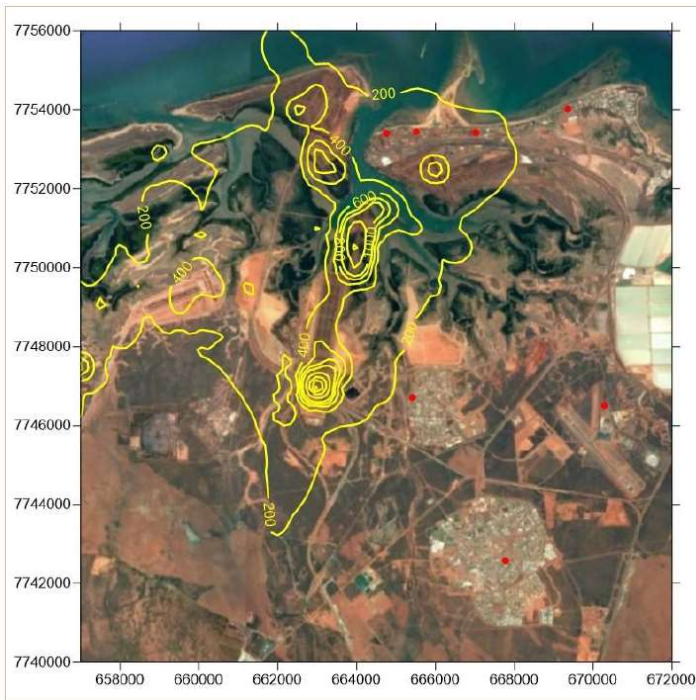


Figure 7: Maximum 24-hour predicted concentrations – 60 Mtpa cumulative scenario with background ($\mu\text{g}/\text{m}^3$)

Key dust sources

Key dust emission sources and site specific dust emission rates were used in the dispersion

model. The emission equations have been sourced from the National Pollutant Inventory (NPI) Emission Estimation Technique Manual for Mining. Therefore emissions estimates for material handling points are identical (0.002 kg/t) for all infrastructure and between the 55 and 60 Mtpa scenarios. Based on assumptions around dust control equipment availability and hourly tonnage rates, the following infrastructure has been identified in modelling as having an average emission rates greater than 1g/s and are therefore key sources of dust:

- Reclaimer 1 (3.53 g/s);
- Transfer station A (2.12 g/s);
- Transfer station at in-load (1.88 g/s);
- Outloading conveyors (1.41 g/s); and
- In-loading conveyors (1.25 g/s).

The box and whisker plot below (Figure 8) depicts all emission sources assumed in the modelling with the boxes representing the 25th to 75th percentile (interquartile) range for each emission. Where only a horizontal line is depicted, a single emission rate value has been assumed to represent the median. The whiskers (lines) indicate the maximum and minimum values that are not greater than 1.5 times the interquartile range. Extreme values are represented as dots. As can be seen in Figure 8 there are a large number of extreme values modelled for wind erosion at stockpiles and open areas indicating that these sources most probably have a windspeed dependency in their emissions factors, which increases uncertainty.

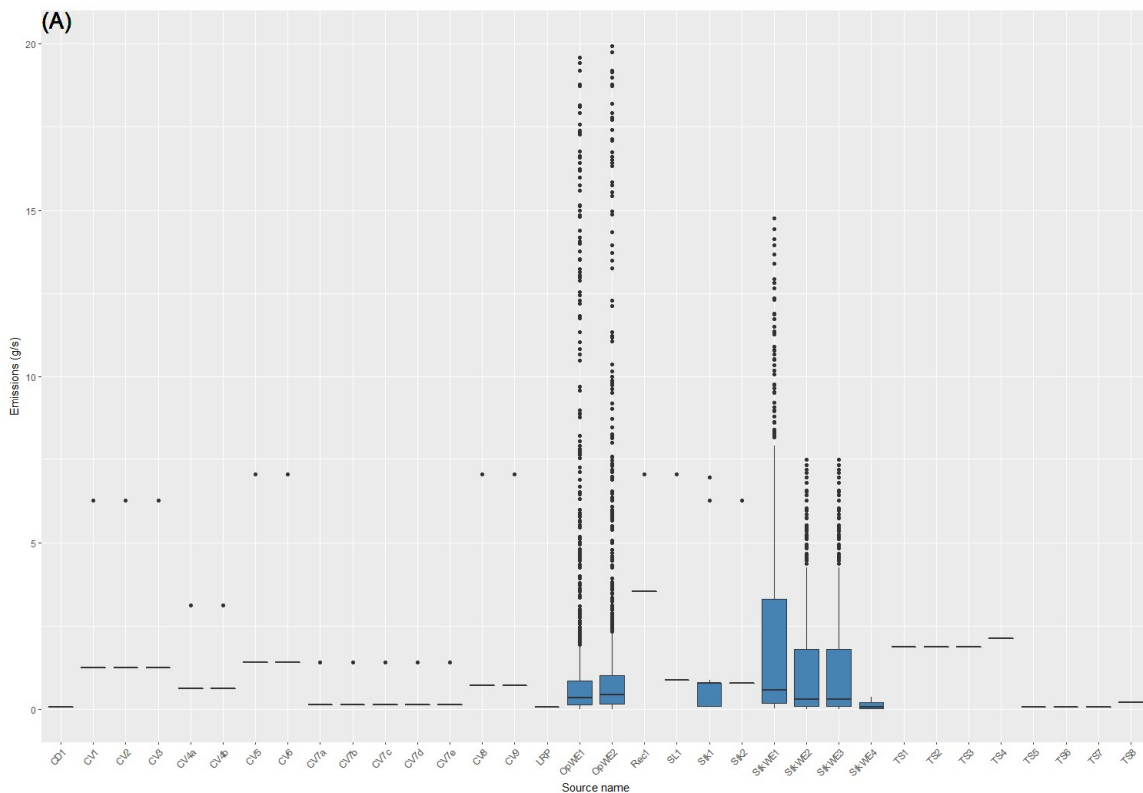


Figure 8: Box and whisker plot of Premises sources excluding vehicles

Vehicle emissions in both modelled scenarios were very low. Licence Holder vehicle emission rates represent around 2% of vehicle emissions estimations used in air quality modelling for other, larger category 58 premises in the same airshed. DWER notes that although there are very few vehicle movements at the Premises, this estimation may be the result of an error in

modelling assumptions. However, this is not expected to change the conclusions of modelling, which identifies only slight differences in ambient air quality at West End receptors between the two scenarios as proposed activities are not expected to increase the number of vehicle movements at the Premises.

Key Finding: DWER notes the following:

- In general, the modelling suggests there will be minor changes to maximum PM₁₀ concentrations resulting from the increase to throughput amounts.
- The dust emissions footprint is high at 7.6 g/tonne. Current benchmark levels in the region are approximately 2.6 g/tonne – this is likely due to the use of National Pollution Inventory data as opposed to ground level emissions testing data.
- There is no adjustment for ore type or wind speed. This is seen to be a limitation of the model as there is likely to be a correlation with the amount of dust generated and the type of material being transferred.
- Vehicle emissions appear to be underestimated, although this is unlikely to change the outcomes of the assessment as iron ore is in-loaded via trains and increase in vehicle movements are not anticipated. Therefore vehicle emissions estimates used in modelling are acceptable.
- Treatment of open areas to reduce dust emissions from wind erosion has already been completed and has not been considered a control for increased throughputs. Nothing within the Amended Licence restricts the Licence Holder from implementing dust controls not related to prescribed activities.

In addition, DWER notes that throughput increases at the Premises are, in part, the result of new mine site processes that involve the operation of a proposed WHIMS plant (refer to section 1.1). As discussed in section 7.4.5, there will be a greater proportion of ultra-fine particles added to the fines blend, which may increase the potential for dust lift-off from this product.

Therefore there exists significant uncertainties in the accuracy of modelling given that emission estimates remain the same for new products containing higher fines content, despite the potential for increased dust emissions.

Limitations of air quality modelling

It is important to note that air quality modelling represents a simplification of the actual physical conditions and modelling is inherently uncertain in its ability to accurately estimate ground level concentrations of particulate matter. Real world dust concentrations are also impacted by many other sources that are not included in the modelling and variations in emissions simply due to day to day variations in weather conditions can be much larger than incremental changes in the Licence Holder's emissions.

In addition, estimates of emissions used in modelling are themselves based on calculations rather than direct measurements of emissions. Modelling is useful however, for comparing scenarios and determining the relative change in emissions under those scenarios.

Finally, it is important to note that modelling conclusions are based on an analysis of concentrations at Taplin Street, which is a significant distance from the largest emission sources.

4.8.2 Ambient air quality monitoring

Ambient air quality monitoring is undertaken at Port Hedland through a number of monitoring stations within the Town of Port Hedland shown in Figure 9. Monitoring is coordinated through

the PHIC and real-time monitoring is reported on PHIC's website.

The HRA guideline value ($PM_{10} = 70 \mu\text{g}/\text{m}^3$ with a 24 hour averaging period, calculated from midnight to midnight) is used for Taplin Street, located on the eastern border of West End and approximately 3.8 km northeast of the ship loader. A summary of Taplin Street exceedances for annual periods are provided below.

- 2012-2013 period – 17 exceedances at Taplin Street monitoring station with two reported to be attributed to industry;
- 2013-2014 period – 6 exceedances at Taplin Street with three reported to be attributed to industry;
- 2014-2015 period – 10 exceedances at Taplin Street with seven reported to be attributed to industry;
- 2015-2016 period – 10 exceedances at Taplin Street with five reported to be attributed to industry;
- 2016-2017 period – 1 exceedance at Taplin Street reported to be attributed to natural events and/or third parties;
- 2017-2018 period – 9 exceedances at Taplin Street, with analysis of attribution not complete.

It is noted that the use of Taplin Street alone as a benchmark for air quality impacts from the Licence Holder's operations at the Premises is limited, as emissions may be masked by dust sources closer to Taplin Street. It is further noted that the HRA found that the number of exceedances of the interim guideline increased with proximity to the West End and that there are also seasonal influences on exceedances. The HRA noted that the analysis of monitoring data was consistent with preliminary modelling data from 2010 that indicated Nelson Point and Finucane Island operations dominate the background levels and exceedances of PM in the West End.



Figure 9: PHIC monitoring locations in Port Hedland (PHIC, 2016)

A detailed review of ambient air quality monitoring conducted at the PHIC monitoring locations from 2013 to 2017 is presented in Table 6.

Table 6: Number of exceedances of NEPM and interim guideline value for PM_{10} recorded

by PHIC ambient monitoring network – 2013 - 2017

Monitoring Station	24hr criteria ($\mu\text{g}/\text{m}^3$)	Days above criteria				
		FY 2012/13	FY 2013/14	FY2014/15	FY2015/16	FY2016/17
Richardson St	50	74	50	79	39	90
	70	23	9	11	Unknown	Unknown
Kingsmill St	50	89	98	156	112	83
	70	29	19	50	Unknown	Unknown
Taplin St	50	48	48	55	48	27
	70	17	6	10	10	1
Neptune PI	50	25	25	67	43	29
	70	11	8	14	Unknown	Unknown
Wedgefield	50	157	148	169	150	99
	70	92	84	59	Unknown	Unknown
South Hedland	50	23	13	19	12	8
	70	8	3	6	Unknown	Unknown

Based on the monitoring data provided in Table 66, it is evident that PM_{10} concentrations in Port Hedland area (inclusive of South Hedland and Wedgefield) are greatest at Wedgefield and the West End. In addition, PM_{10} concentrations in Port Hedland appear to increase with increasing proximity to category 58 activities (refer to section 6.1). The other Category 58 operators within the Port Hedland Inner Harbour are also likely to contribute to ambient dust at sensitive receptors. There are significantly fewer exceedances of NEPM ambient air quality criteria ($50\mu\text{g}/\text{m}^3$ averaged over a 24-hour period) in South Hedland compared to the West End and Wedgefield.

A site visit conducted by DWER officers in July 2016 identified a number of dust generating sources in the Wedgefield industrial area. Although roads in the Wedgefield Industrial Estate are sealed, the large number of truck movements result in substantial volumes of dust being mobilised from the road's soft shoulders. Potentially significant contributors to fugitive dust within Wedgefield include the scrap metal yard, two asphalt plants, sand blasting operators and a number of operators that move equipment on bare earth hardstands. Most of these sites are not prescribed premises and are not regulated by DWER under Part V of the EP Act.

A proportion of exceedances of 24 hour criteria at Wedgefield may be attributed to the siting of the monitor. A review of monitoring data collected during the LiDAR campaign (refer to section 4.8.3) identified that dust from Wedgefield did not appear to move across to the West End in significant concentrations when compared to Category 58 operations in Port Hedland. However, Wedgefield may impact on ambient air quality on South Hedland just 1.5km to the south.

4.8.3 Light Detection and Ranging (LiDAR) monitoring

The Department carried out a five-month dust monitoring campaign in Port Hedland from February 2017 to June 2017. The campaign was undertaken using conventional monitoring

methods for particles with an equivalent aerodynamic diameter smaller than 10 micrometres (μg) (PM_{10}) as well as a Light Detection and Ranging (LiDAR) instrument, which works by emitting a light beam and measuring the backscatter from particles or dust in the air.

The objective of the campaign was to determine the origins and movement of dust contributing to impacts experienced in and around Port Hedland and to assess the suitability of applying LiDAR technology.

The LiDAR was positioned atop the Town Centre Viewing Tower to allow for a largely unimpeded view of the surrounding landscape with some hard targets such as buildings within the landscape obscuring some of the LiDAR beam.

A review of LiDAR images suggest that most of Roy Hill operations are not visible to the LiDAR as either the dust sources are too far away or are blocked by hard targets such as buildings. However, ship loading activities at the Premises were within the range of the LiDAR and could be detected as a source of dust. In addition, the LiDAR campaign identified that some dust plumes can travel large distances.

Other port operators that were nearer to the LiDAR equipment during the monitoring period, and that use similar ore handling methods, were identified as being significant contributors to dust. Dust emissions were most concentrated at ore handling points where ore is dropped from height, for example, transfer stations, reclaimers and stackers.

Key finding: Given the type of handling methods used at the Premises is similar to that used at other Port operators in Port Hedland, it is reasonable to assume that the Premises will have a similar dust profile. However, DWER notes that the moisture of ore handled at the Premises is greater than that handled at other premises, which are closer to sensitive receptors.

DWER is currently conducting a review of boundary monitoring data from all Category 58 operators in Port Hedland and exceedance events recorded since 2016 to better understand sources of dust and plume dispersion over this period.

4.8.4 Dust levels and throughput increases

The data in Table 6 and Figure 10 does not clearly demonstrate a direct correlation between iron ore throughputs at Port Hedland increasing over the years, and more dust in the Port Hedland airshed. However there has been incremental improvements to site dust management and tightening of regulatory controls introduced over this time intended to mitigate impacts to the air shed. Despite these improvements, dust levels in Port Hedland's ambient air shed, in particular that of the West End, remains of concern from a public health, environmental and amenity perspective – as highlighted by the Dust Taskforce's Report described in section 4.4.1.

It is also important to note that the siting of some PHIC air monitoring equipment does not satisfy Australian/New Zealand Standard 3580.1.1: *Guide to siting air monitoring equipment*. For example, the ambient air monitor at Neptune Street is located within a few metres of two dwellings and a 1.8 m tall fence, which may restrict airflows in the vicinity of the monitor inlet or absorb some particulate matter affecting results. Other monitors are also located in residential areas with obstructions within close proximity to the monitor potentially limiting the reliability of data. However, it is understood that there are often significant constraints with regard to availability of land or other tenure issues when selecting suitable monitoring locations. It is considered the monitoring network, while not ideal, is generally satisfactory with regard to both the methods and equipment used as long as data is interpreted properly.

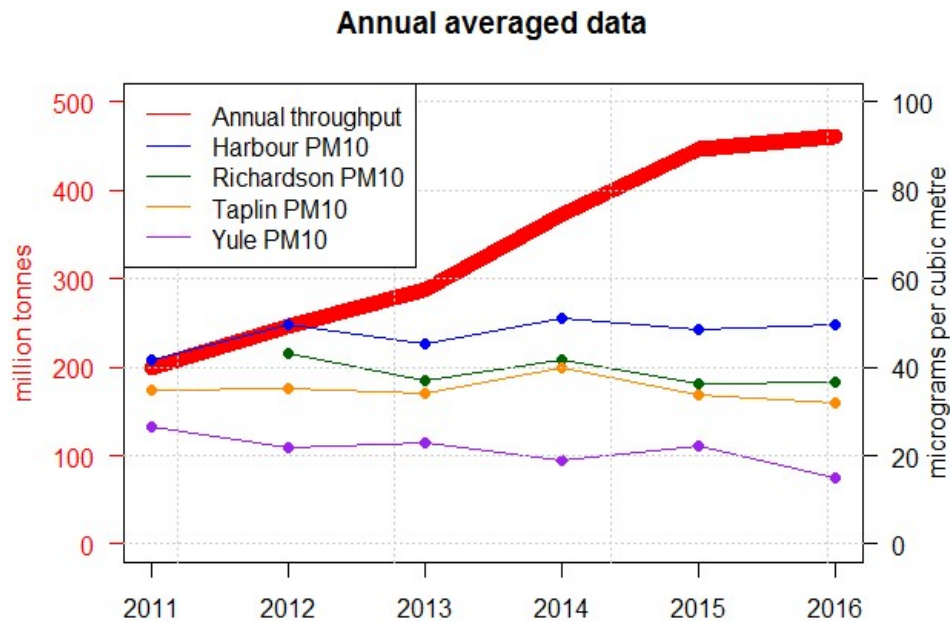


Figure 10: Total annual throughput at Port Hedland (all ports) versus ambient air quality (PM₁₀)

Key findings: Improvements to dust management practices are likely to have helped offset some of the expected increases in dust from increasing throughput at Port Hedland. However, further improvements are required amongst Port Hedland port operators generally as per the recommendations of the Taskforce Report, which was endorsed by Government on 15 October 2018 (refer to section 4.4). A determination of additional controls required for the management of dust at the Premises will be made following the outcomes of the self-assessment against the Dust Management Best Practice Guidelines.

4.9 Air quality and amenity

The Australian Concise Oxford Dictionary defines amenity to be the pleasant or useful features or overall pleasantness of a place. As such, the assessment of amenity is intrinsically subjective and it is best assessed against community expectations, reasonably held for that community and at that point in time.

In the context of air quality, amenity impacts are caused by elevated levels of particulate matter or other air pollutants. Katestone (2011) reports that commonly noted amenity impacts include:

- short-term reduction in visibility. For example a visible plume may adversely affect the aesthetics of the environment such as scenic view;
- build-up of particulate matter on surface within buildings resulting in increased cleaning;
- soiling of laundry being dried in the open air; and
- build-up of particulate matter on roofs which can flush into rainwater tanks potentially affecting quality (taste) of drinking water or tank capacity.

The most commonly used parameters to measure amenity impacts are total suspended particulates (TSP) and dust deposition. TSP refers to all dust particulates that are suspended in the air, including coarser fractions, while dust deposition refers to the amount of dust deposited over a set period and area.

There are no site specific criteria for TSP or dust deposition criteria that have been established or adopted for the Port Hedland area and no monitoring of these parameters for amenity currently conducted by PHIC or existing Part V licence holders in Port Hedland.

When viewing the amenity criteria of other environmental regulators around the world (Table 7) it is evident that there is significant variability in criteria. This is due to a number of factors including the baseline, or background dust levels in each regional area varying greatly as well as the sensitivities and expectations of local receptors in relation to dust.

Table 7: Dust deposition criteria used in other jurisdictions

Jurisdiction	Standard/objective	Comment
Quebec, Canada	7.5 tonnes/km ² /month (7.5 g/m ² /month)	None
Alberta, Canada	53 mg/100cm ² /month (5.3 g/m ² /month)	In residential and recreation areas
	158 mg/100 cm ² /month (15.8 g/m ² /month)	In commercial and industrial areas
New South Wales, Australia	2 g/m ² month	Incremental. 2 g/m ² /month corresponds to 67 mg/m ² /day
	4 g/m ² /month	Total. 4 g/m ² /month corresponds to 133 mg/m ² day
Germany	0.35 g/m ² /day (10.5 g/m ² /month)	Emission value of PM ₁₀ for the protection against nuisance or significant disadvantage due to dust fall (non-dangerous dust)

Source: (pg. 150, Katestone, 2011)

To measure the baseline dust deposition level, it is necessary to measure dust levels without all industry operating in the area. For this to be possible, it is likely that dust deposition monitoring of background sites would be required. With regard to TSP, a general correlative ratio with PM₁₀ can be determined although an appropriate trigger value for TSP (and dust deposition) that identifies the point at which amenity is likely to be impacted is unknown for Port Hedland.

Other measures commonly used to understand amenity impacts include community surveys and complaint information.

Key finding: In considering amenity and criteria used in other jurisdictions:

- 1) amenity is intrinsically subjective and linked to a particular community's expectations at a particular point in time;
- 2) there is significant variation between criteria used across other jurisdictions;
- 3) there is no site specific amenity criteria for Port Hedland or for the coastal Pilbara region of Western Australia; and
- 4) the community expectations in Port Hedland, the Pilbara region and the north west of Australia may be different to other parts of the world.

Based on the receipt of several stakeholder complaints and concerns relating to amenity impacts from dust, parts of the Port Hedland community is sensitive to existing ambient dust levels affecting amenity.

5. Consultation

5.1 Reviewed Licence – September 2016

The application for a new licence was advertised in the West Australian on Monday 30 May

2016.

Letters were sent to the following interested parties inviting submissions regarding the licence application for the Premises:

- Care for Hedland Environmental Association
- Department of Health (DOH)
- Pilbara Development Commission
- Pilbara Ports Authority
- Port Hedland Community Progress Association
- Port Hedland Industrial Council
- Town of Port Hedland

Responses were received from the DOH and the Pilbara Development Commission.

5.1.1 Department of Health

DWER referred the Premises licence application to the DOH for comment on 31 May 2016. The following comment was received from DoH on 30 June 2016.

“When considering the cumulative impacts on air quality, the current monitoring plan only selects Taplin Street as the “key sensitive receptor”. The DOH notes that there are five other community monitors, located at the Harbour, Kingsmill Street, Richardson Street, the BMX site, and the Hospital site, that should also be included in the review of PM₁₀ and concentrations of NO_x and SO_x, remaining below 60% of the National Environmental Protection Measure.”

At the time of reviewing the licence, comments received from DoH considered the entire residential area of Port Hedland to be a sensitive receptor for air quality impacts. However as dust impacts were managed through Part IV of the EP Act, the assessment did not include a risk assessment for dust. DWER did provide its assessment of dust impacts to the OEPA for consideration.

Emissions of NO_x and SO_x were not considered as significant emissions related to the Premises (specifically Category 5: Processing or beneficiation metallic and Category 58: Bulk materials loading or unloading). Subsequently they were not assessed as part of that process. NO_x and SO_x emissions were considered key emissions related to the power station which was not assessed under the Licence Review as it had previously been assessed by DWER and conditioned under Part V of the EP Act through a separate licence (L8903/2015/1). The power station has since been decommissioned with the Premises operating off mains power.

5.1.2 Pilbara Development Commission

DWER referred the Premises licence application to the Pilbara Development Commission for comment on 31 May 2016. The Pilbara Development Commission responded on 14 June 2016 with no objection to the proposal.

5.2 Amendment application – throughput increased to 60 Mtpa

On 15 January 2018, DWER referred the Amendment Application to a number of community stakeholders and government agencies including those consulted during the assessment of the Reviewed Licence. The Application was also publicly advertised in *The West Australian* on 15 January 2018 and in *The Northwest Telegraph* newspaper on 17 January 2018. The Application was made available for review at the Department’s website through the *Community Updates* page for Port Hedland.

At the request of the Town of Port Hedland and DJTSA, DWER extended the comment period

to 28 February 2018. The following public authorities and interested parties provided responses to the notification of Amendment Application:

- PHIC;
- Department of Health
- Town of Port Hedland;
- Department of Planning, Lands and Heritage; and
- Port Hedland Community Progress Association.

Submissions and DWER responses are provided below and summarised in Appendix 2.

5.2.1 Department of Health

On 30 January 2018, DoH provided comment on the Amendment Application generally opposing any increase in throughput until a Dust Taskforce Report has been finalised and the recommendations implemented through the Part V licence. However, the DoH acknowledged the time constraints associated with these commitments opting to not object to the proposal on the provision that:

- dust management controls satisfy industry best practice; and
- increased capacity through the port is unlikely to increase the number of exceedances of the interim dust guideline in Port Hedland.

In consideration of DoH comments DWER notes that 'industry best practice' is poorly defined and that the Taskforce Report's recommended Dust Management Best Practice Guidelines for Port Hedland are yet to be finalised (refer to section 4.4). In the absence of these guidelines proposals generally include the implementation of the following key management measures for minimising dust emissions from open materials handling:

- ore moisture content to remain above the DEM level;
- infrastructure controls including specifications on minimum operating requirements; and
- the rehabilitation of cleared areas previously utilised for equipment laydown ahead of mine closure.

DWER's internal experts in air quality conducted a review of dust modelling for both 55 and 60 Mtpa scenarios.

Key findings of the review of air quality modelling for 55 and 60 Mtpa scenarios:

- 1) The air quality model cannot differentiate between the concentration statistics for the 55 and 60 mtpa scenarios and there is no discernible differences in the numbers of exceedances of the 70 $\mu\text{g}/\text{m}^3$ 24-hour criterion for cumulative PM_{10} at Taplin Street. At other sites in the West End that are closer to Premises operations (e.g. Harbour monitor) there is an increase of 1 $\mu\text{g}/\text{m}^3$ for some statistics.
- 2) Generally, dust modelling for small increases in throughputs are limited in their ability to identify small changes at the Taplin Street monitor. It is possible that the combined effect of increased utilisation of infrastructure as a result of small increases in throughputs will be detectable eventually, unless the increases in throughput are offset by concurrent improvements in dust management.
- 3) The modelling undertaken did not take into account the approximate 4 Mtpa of ultra-fine product being added to the overall fines product. This amounts to an increase in fines smaller than 150 microns as proportion of all ore product, from 7% to up to 23% as a result of the WHIMS plant.

As a result of the significant uncertainties identified in the air quality modelling and the finer

particle size of the product (refer to section 4.8.1), DWER has applied a precautionary approach to the assessment of dust risks and has incorporated more stringent controls on the management of dust accordingly. Licence controls for the management and monitoring of dust are further discussed in section 8 of this Decision Report.

5.2.2 Town of Port Hedland

The Town of Port Hedland noted that after reviewing the Application the Council had determined that the Town of Port Hedland could not support an increase in throughputs at Roy Hill until the State Government reviews all public submissions on the Taskforce Report and finalises its commitments. Objection to the proposal was based on the assumption that the proposal will likely add to the cumulative dust problem experienced by the community of Port Hedland.

Comments were received from the Town of Port Hedland regarding the recommendations of the Taskforce Report relating to the management of ongoing dust issues in Port Hedland. DWER has an obligation as part of recommendations of the Port Hedland Dust Taskforce Report to improve regulatory controls for Prescribed Activities in and around Port Hedland.

DWER has proposed a five year plan for the proposed recommendations to be rolled out (refer to section 4.4).

In the interim DWER has applied a series of regulatory controls in accordance with its Regulatory Framework. These include the implementation of air quality monitoring requirements, outcome-based controls and product specifications to maintain risk of dust at an acceptable level and to ensure regulatory oversight.

6. Location and siting

6.1 Meteorology

Port Hedland is located in a semi-arid environment. The Port Hedland region has a dominant north-westerly wind direction during the summer months and south-easterly during the winter months. Spring also shows high north-westerly dominance.

The Bureau of Meteorology provides the mean rainfall and maximum temperature for Port Hedland (data from 1942 to 2016 and 1948 to 2016 respectively). The Port Hedland region is hot to warm all year round with rainfall predominantly over December to July (Figure 11).

The following wind rose (Figure 12) provides the annual wind direction and strength averaged over the past five years. Wind vectors in the north-northwest to west-northwest place residential South Hedland downwind of Premises bulk handling activities at approximately 20% of the time. Five year averaged wind directions place the West End downwind of Premises activities approximately 12% although these activities are in closer proximity to receptors. Prevailing westerly winds and those between the north, east and south vectors are expected to remove the pathway for noise and dust emissions to receptors the majority of the time.

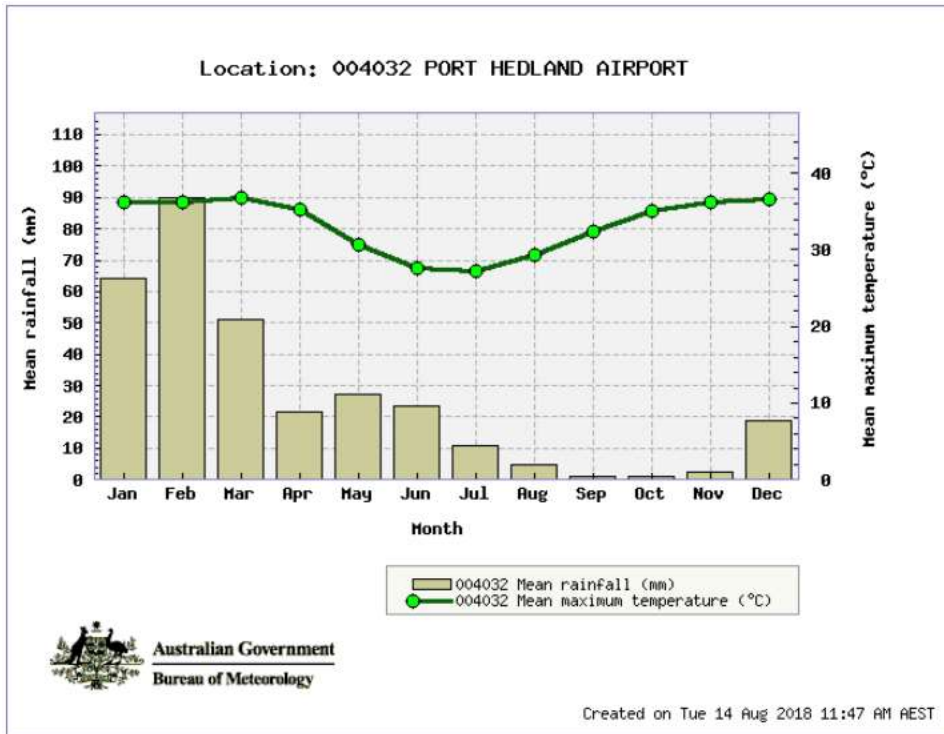


Figure 11: Mean temperature and rainfall Port Hedland (Bureau of Meteorology, 2018)

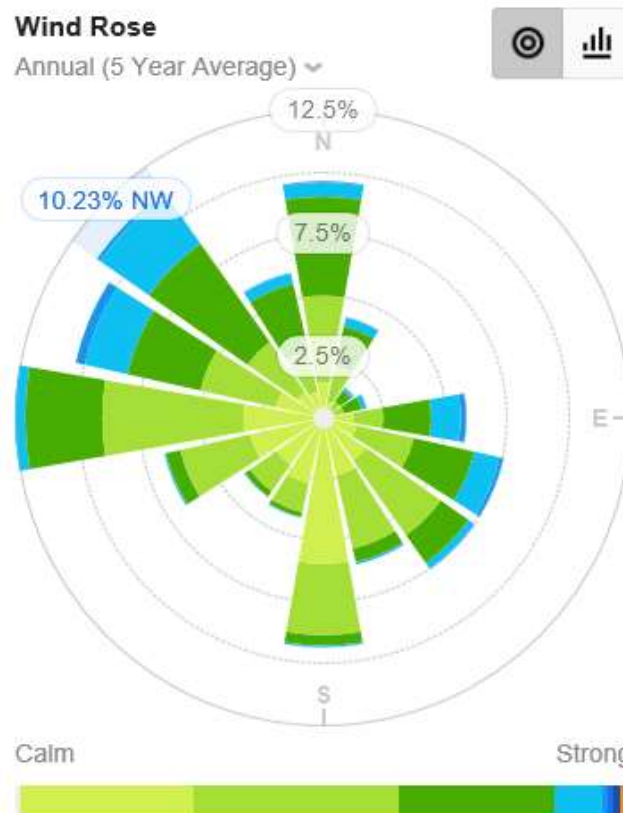


Figure 12: Wind Rose for Taplin Street, Port Hedland (WillyWeather, 2018)

6.2 Siting context

The stockyard area associated with the Premises is located approximately 5km south-west of Port Hedland. The berth and ship loading infrastructure of the Premises is located in South West Creek, within the Port of Port Hedland. The Port of Port Hedland is the world's largest volume port for bulk materials export.

The existing port operations in Port Hedland are listed in Table 8.

In addition to port operations, a number of other industrial activities are undertaken in Port Hedland including a variety of light and service industries at Wedgefield Industrial Estate. Wedgefield Industrial Estate is located approximately 5km south south-east of the Premises ship loading area and approximately 5km south east of the Premises stockyard area.

Table 8: Port of Port Hedland operators (category 58 and 58A premises)

Operator	Bulk Granular Material	Scale of operation
BHP Billiton Iron Ore	Iron ore	Allocated capacity 290 Mtpa Four berths at Nelson Point Four berths at Finucane Island
Fortescue Metals Group	Iron ore	Allocated capacity 175 Mtpa Five berths at Anderson Point
Port Hedland Port Authority – Utah Point	Iron ore, Manganese ore, Chromite ore	Allocated capacity 21.35 Mtpa Single berth at Finucane Island
Dampier Salt	Salt	Allocated capacity 75,000 tonnes per day Single berth leased from PPA at Nelson Point
Port Hedland Port Authority – Eastern Operations	Copper concentrate	Throughput approximately 1,170,000 tonnes per annum Two berths at Nelson Point
Roy Hill Infrastructure Pty Ltd (the Premises)	Iron ore	Allocated capacity under the Amended Licence – 60 Mtpa Two berths at South West Creek

6.3 Residential and sensitive receptors

The distances to residential and sensitive receptors are detailed in Table 9.

The closest residential area to the Premises is the West End. The location of the receptors are shown in Figure 13.

The Town Council of Port Hedland reported a permanent population of 4,590 people in 2012/13 and has a larger population of fly-in-fly-out workforce (DoH 2016).

Table 9: Receptors and distance from prescribed activity

Residential and sensitive premises	Distance from Prescribed activity
Esplanade and Pier Hotels (zoned Town Centre – retail/commercial in Town of Port Hedland Planning Scheme No.5)	Approximately 1,400m north-east of the ship loading area and 5,200m north-east of the nearest boundary of the stockyard area.

<p>Closest residential zoned premises – Port Hedland (zoned Residential in Town of Port Hedland Planning Scheme No. 5)</p>	<p>Approximately 2,000m north-east of the ship loading area and 5,800m north-east of the nearest boundary of the stockyard area</p>
<p>Closest residential zoned premises – South Hedland (zoned Residential in Town of Port Hedland Planning Scheme No. 5)</p>	<p>Approximately 8,400m south-east of the ship loading area and 8,000m south-east of the nearest boundary of the stockyard area.</p>

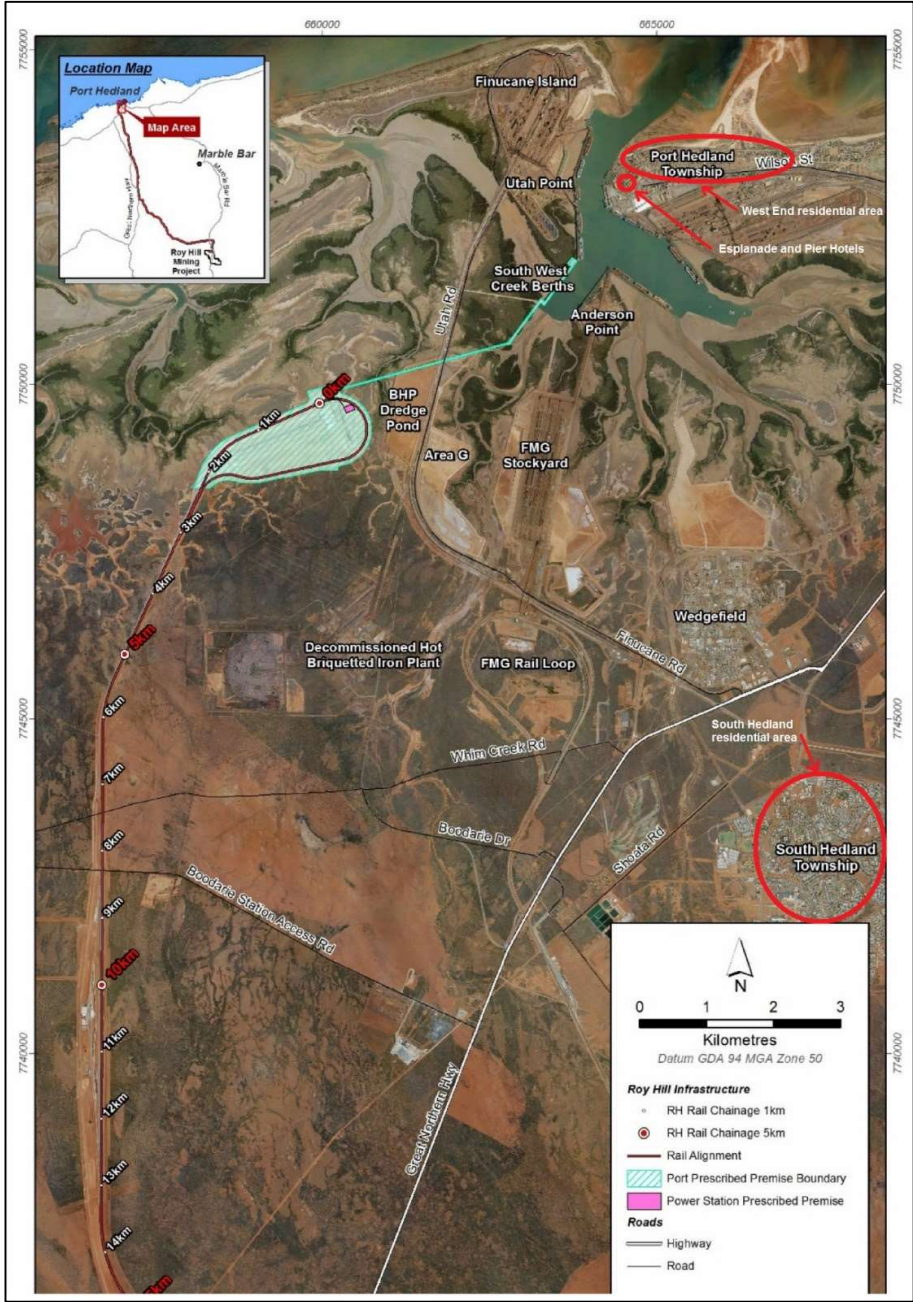


Figure 13: Location of receptors

Key determination: Table 6 indicates that over time, South Hedland has also experienced high dust levels albeit with fewer exceedances of 24 hour averaged NEPM ($50 \mu\text{g}/\text{m}^3$) and interim guideline levels ($70 \mu\text{g}/\text{m}^3$) than the West End. Based on average wind directions (refer to section 6.1.3) there exists a potential pathway for dust from the Premises adding to the cumulative dust levels in South Hedland.

The risk assessment of dust must also take into consideration the potential for impacts to South Hedland residents.

6.4 Specified ecosystems

The distances to specified ecosystems are shown in Table 10.

Table 10: Specified ecosystems

Specified ecosystems	Distance from Prescribed Premises
Port Hedland harbour – marine ecosystem (Moderate level of ecosystem protection*)	Within and directly adjacent to the Premises boundary.

* Department of Environment, 2006, Pilbara Coastal Water Quality Consultation Outcomes: Environmental Values and Environmental Quality Objectives (DoE 2006).

6.5 Groundwater and water sources

The distances to groundwater and water sources are shown in Table 11.

Table 11: Groundwater and water sources

Groundwater and water sources	Distance from Prescribed Premises	Environmental value
Water source – Ground water abstraction from off-site bore field. The aquifer is known as the Lower Turner Alluvial Aquifer. Licence to Take Water No. GWL176004(1)	Water for operational purposes is from the Roy Hill Rail Terminal Yard borefield located approximately 10 km south of the premises.	Groundwater suitable for industrial use.
Groundwater underlying the premises is the Pilbara Saline Groundwater Aquifer	Depth to groundwater is less than 3 m below ground level. There is some variation caused by tidal fluctuation.	The groundwater within the area is widely categorised as 1000-3000 mg/L TDS which is considered brackish. Results of groundwater monitoring undertaken during dewatering for construction indicated salinity in excess of 40,000 mg/L TDS which is considered brine. Water is not suitable for potable or operational purposes. Groundwater system linked to marine ecosystem with mangrove community located on the boundary of the Premises.

6.6 Soil type

Soil classifications at the Premises are 10 to 30 cm topsoil of clayey sand to sandy loam over a 30 to 60 cm subsoil of sandy clay loam or clay loam. Soils deeper than 1 metre are red to brown sandy or silty clay loams which are strongly alkaline and highly saline. Rich mineral content is reflected in the red soil and dust (DoH 2016).

6.7 Other site characteristics

The location of other receptors are detailed in Table 12.

Table 12: Other landscape features, relevant factors or receptors

Other receptors or areas of concern	Location
Benthic Primary Producer Habitat (BPPH) including mangroves, salt marshes and cyanobacterial mats (High value ecosystem) Identified and assessed by the Environmental Protection Authority*	Located on the northern and eastern boundaries of the stockyard and below the overland conveyor.
Oyster Passage Barrier – area of mangroves considered to be regionally significant and of high conservation value Identified and assessed by the Environmental Protection Authority*	Located approximately 1.5km west of the most western boundary of the Premises.
Turtle nesting grounds (listed under the EPBC Act)	Nesting grounds are located at Cemetery Beach and Pretty Pool, approximately 5.5km and 7.8km from shiploaders.
Migratory birds (listed under the EPBC Act)	Migratory birds have been sited near to the Premises boundary.

***Environmental Protection Authority, 2010, Report 1377 (EPA 2010).*

7. Risk assessment

7.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 13.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Table 133 below.

Table 13: Identification of key emissions

Risk Events						Continued to detailed risk assessment?	Reasoning if not progressed
Source/Activities	Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts			
Category 5 Processing or beneficiation of metallic or non-metallic ore	Lump ore rescreening at the screening plant.	Point source dust from the rescreening plant baghouse stack;	Esplanade and Pier Hotels in Port Hedland town centre	Air/wind dispersion	Impact on health – potentially includes respiratory problems Impact on amenity – visible dust leaving the Premises and dust fallout onto cars, homes, businesses and recreational areas.	Yes	Refer to section 7.4
		Fugitive dust from the rescreening plant.	Residents in Port Hedland and South Hedland			No	Protection of employees involves different exposure risks and management strategies that are regulated under other State legislation.
			Nearby industry (Wedgefield and FMG)				
	Noise from the operation and vibration of the screening plant.	Esplanade and Pier Hotels in Port Hedland town centre Residents in Port Hedland and South Hedland	Air	Impact on amenity	Yes	Refer to section 7.5	
Category 5B Bulk material loading or unloading	Ore is stockpiled, handled and moved at multiple times in the process at the car dumper, stackers, reclaimers, surge bins, conveyors, transfer points and the shiploaders. The Licence Holder operates at the premises 24 hours a day.	Point source dust from the baghouse collector stacks;	Esplanade and Pier Hotels in Port Hedland town centre	Air/wind dispersion	Impact on health – potentially includes respiratory problems Impact on amenity – visible dust leaving the Premises and dust fallout onto cars, homes, businesses and recreational areas.	Yes	Refer to section 7.4
		Fugitive dust from: • ore train unloading from car dumper; • ore stockpiling by stackers; • ore transport and transfer via conveyors and transfer stations within stockyard area and overland to ship loading area; and • conveyor booms and the updraft created within the ship's hold as ore displaces air.	Residents in Port Hedland and South Hedland			No	Protection of employees involves different exposure risks and management strategies that are regulated under other State legislation.
			Nearby industry (Wedgefield and FMG)				
	Noise from the operation of the car dumper, stackers, reclaimers, surge bins, conveyors, transfer stations and shiploaders.	Esplanade and Pier Hotels in Port Hedland town centre Residents in Port Hedland and South Hedland	Air	Impact on amenity and comfort	Yes	Refer to section 7.5	

Risk Events						Continued to detailed risk assessment?	Reasoning if not progressed
Source/Activities	Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts			
		Discharges of wastewater to land and seepage to groundwater and the marine environment. Spills of ore or hydrocarbons. Discharge of wash down water or contaminated stormwater.	Benthic Primary Producer Habitat Marine ecosystem Habitat	Spills and discharges directly to land Infiltration through soils to groundwater (less than 3 metres below ground level)	Land and groundwater contamination Reduction in ecosystem health and water quality	Yes	Refer to section 7.6
		Expression of wastewater-contaminated groundwater to creek lines or the marine environment Spills of ore or hydrocarbons Discharge of wash down water or contaminated stormwater	Marine ecosystem	Spills directly to marine waters Runoff directly to marine waters Overland or subsurface flow towards creek lines or marine waters.	Reduction in ecosystem health and water quality	Yes	Refer to section 7.6
		Light emissions from the premises – berth and ship loader	Flat back turtles (<i>Natator depressus</i>) nest at Cemetery Beach and Pretty Pool. In addition three other turtles visit Port Hedland waters.	Cemetery Beach is located approximately 5.5km from the shiploader.	Hatchlings have the potential to be impacted by artificial light as it can cause them to become disorientated and change natural behaviours (guided by light).	No	Berth is located approximately 5.5km from receptor and is not expected to significantly impact the behaviours of hatchlings.
Other activities associated with Prescribed Activities	Workshop and maintenance area	Seepage of wastes or wastewater to groundwater and the marine environment as a result of spills or discharges of wash down water or contaminated stormwater.	Benthic Primary Producer Habitat Marine ecosystem Habitat	Spills directly to land Discharge directly to land (via one way culverts) Infiltration through soils to groundwater Overland or subsurface flow towards creek lines or marine waters Groundwater is <3m below ground level (with variation due to tidal influence)	Land and groundwater contamination Reduction in ecosystem health and water quality	Yes	Refer to section 7.6
	Unsealed areas	Fugitive dust emissions from unsealed open areas including trafficable areas, dry sedimentation ponds and disused cleared areas.	Esplanade and Pier Hotels in Port Hedland town centre Residents in Port Hedland	Air/wind dispersion	Impact on health – potentially includes respiratory problems Impact on amenity – visible dust leaving the Premises and dust fallout onto cars, homes, businesses and recreational areas.	Yes	Refer to section 7.4

7.2 Risk Criteria

During the assessment, the risk criteria in Table 14 below will be applied to determine a risk rating set out in section 8.7.

Table 14: Risk Criteria

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 15 below.

Table 15: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
		Environment	Public health* and amenity (such as air and water quality, noise, and odour)	
Almost Certain	The risk event is expected to occur in most circumstances	Severe	<ul style="list-style-type: none"> onsite impacts: catastrophic offsite impacts local scale: high level or above offsite impacts wider scale: mid-level or above Mid to long-term or permanent impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are significantly exceeded 	<ul style="list-style-type: none"> Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	<ul style="list-style-type: none"> onsite impacts: high level offsite impacts local scale: mid-level offsite impacts wider scale: low level Short-term impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are exceeded 	<ul style="list-style-type: none"> Adverse health effects: mid-level or frequent medical treatment Specific Consequence Criteria (for public health) are exceeded Local scale impacts: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	<ul style="list-style-type: none"> onsite impacts: mid-level offsite impacts local scale: low level offsite impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> Adverse health effects: low level or occasional medical treatment Specific Consequence Criteria (for public health) are at risk of not being met Local scale impacts: mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> onsite impacts: low level offsite impacts local scale: minimal offsite impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	<ul style="list-style-type: none"> onsite impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal to amenity Specific Consequence Criteria (for public health) met

[^] Refer to the *Guidance Statement: Environmental Siting*.

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines*.

"onsite" means within the Prescribed Premises boundary.

7.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 16 below:

Table 16: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

7.4 Risk assessment – dust

7.4.1 Description of Risk Event

Fugitive dust generated from cleared areas, vehicle movements on gravel roads, ore re-screening, stockpiling and handling of ore at the Premises which is dispersed to Port Hedland residences, South Hedland residences and other sensitive land users at sufficient concentrations to cause health and amenity impacts.

7.4.2 Identification and general characterisation of emission

The DoH HRA identified iron oxide as the major component of dust arising from port and commercial operations in Port Hedland. However, as measured levels of iron-oxide were found to be below the health based guideline values the HRA focused on the contribution of iron oxide to total particulate matter levels (as PM₁₀). As the HRA’s indicative health guideline value for exposure to iron oxide is 120 µg/m³ over a 24-hour averaging period, and greater than the guideline value for PM₁₀ (70 µg/m³, refer to section 7.4.4), the HRA focused on health impacts from total particulate matter (as PM₁₀).

Fugitive dust emissions from handling and movement of iron ore include points where ore is dropped from height such as at transfer points, car dumpers and where stackers deposit ore onto stockpiles, or where stockpiled ore is reclaimed. Dust is also emitted at point sources where baghouses are used to filter the air within enclosed spaces and the exhaust is vented to the atmosphere.

The amount of dust generated at the Premises is a factor of the ore throughputs, the way that ore is handled at the premises, the moisture content of the ore and the physical nature (particle size) of the ore. The Licence Holder is proposing to increase exports from 55 Mtpa to 60 Mtpa, representing an increase in throughput of 9.1% which could therefore result in a potential increase in dust emissions. With the application to increase authorised iron ore throughputs at the Premises, the tonnages of bulk material authorised for handling at all Port Hedland ports (refer to section 6.1) equates to 541,925,000 tonnes per year. Therefore the proposed throughput increase of 5 Mtpa at the Premises represents approximately 0.9% of bulk tonnages through Port Hedland with total proposed tonnages representing approximately 11%.

7.4.3 Description of potential adverse impact from the emission

Iron oxide is not considered toxic or carcinogenic. The HRA found that there is no clear evidence of a causal link between iron-oxides and diseases. However, ambient dust particles 10 microns or smaller (PM₁₀) have the ability to be drawn deep within the lungs and is associated with both respiratory and cardiovascular health impacts following both long and short term exposures. Long term repeated exposure is much more detrimental than short term sporadic exposure. The most severe effects are reduced life expectancy due to long-term exposures.

Page 30 of the HRA summarised the findings of a comprehensive and detailed hazard assessment by Toxikos of PM₁₀ health effects in Port Hedland resulting in increases in:

- daily mortality;
- hospital admissions associated with respiratory disease, cardiovascular disease and pneumonia and bronchitis; and
- emergency room attendance for pre-existing respiratory conditions.

For Port Hedland, the HRA found that the level of impact as determined through modelling scenarios between PM₁₀ concentrations of up to 50 µg/m³ (NEPM standard) and PM₁₀ concentrations up to the interim guideline of 70 µg/m³ was not discernible for the current population levels in Port Hedland, in part due to the town's small population. The HRA concluded that the interim guideline of 70 µg/m³ should provide adequate protection of health and wellbeing (see section 4.4.2).

7.4.4 Criteria for assessment

In considering the HRA recommendations, the interim guidance of 24-hour average PM₁₀ of 70 µg/m³ will be continued to be applied for all areas in Port Hedland and South Hedland in the assessment of risk and controls for the Premises.

There are no current specific amenity criteria relevant to the Port Hedland community to quantify the point at which amenity impacts may be perceived.

7.4.5 Licence Holder controls

This assessment has reviewed the controls set out in Table 17 below.

Table 17: Licence Holder controls for dust emissions

Site infrastructure	Description	Operation details	Reference to issued licence plan (Attachment 1)
Controls for dust			
Stockyard	Two stackers One reclaimer	Water sprays fitted to the conveyor boom of the stackers and on the reclaimer wheel bucket. Drop height from the stacker to the stockpile is minimised.	Figure 3: Stacker; Reclaimer
	Stockpiles	Water cannons activated by wind anemometer and manual override only.	Not specified
Car dumper	In-loading of iron ore	Partially enclosed within a	Figure 2:

Site infrastructure	Description	Operation details	Reference to issued licence plan (Attachment 1)
	material	negative pressure shed. Baghouse collector operated to remove dust.	Car dumper
Rescreening Plant	Removal of fines from lump ore using vibrating feeders and screens	Dust laden air is extracted to a baghouse. Fitted with dust covers.	Figure 3: Re-screening Plant Screen House
Conveyors	Transport of ore from the car dumper to the stockyard and then to the ship loading facility	Elevated overland conveyors (approximately 8.5 m) are covered to reduce exposure to winds. Fitted with belt scrapers on return belts at transfer stations and at the head end of the stackers and shiploading boom conveyor. Belt wash stations on overland conveyors.	Figure 3 and Figure 4: Conveyor
Transfer stations	Transport of ore from one conveyor to another	Fully enclosed with seals on chutes and inspection doors. Misting sprays fitted to the transfer chute exit.	Figure 3: Transfer Station
Ship loader	Transfer of ore from stockpiles to the vessel via surge bins	Ore is transported to the ship via surge bins to reduce inconsistencies in flow at the ship loader. Head chute deflector plate in place during loading.	Figure 4: Ship Loader
Internal roads	Vehicle movements over unsealed roads or sealed roads where dust/spills are deposited	Vehicle speed restrictions on unsealed roadways. Use of a water cart as required to minimise dust lift off from minor roads and access tracks. Heavily trafficked roads are bitumen sealed.	Not specified
Cleared areas (unsealed)	Wind erosion from untrafficked areas	Hydromulch or chemical surfactants applied to prevent dust and reduce water usage	Not specified
Mobile equipment	Collection of spilt material and deposited dust	Accumulated dust and ore spillage removed using a road sweeper, front end loader and/or other mobile equipment.	N/A – mobile

Site infrastructure	Description	Operation details	Reference to issued licence plan (Attachment 1)														
Monitoring																	
Moisture content and particle size distribution of material	<p>The moisture content of ore is measured at the mine train load-out and at the Ship-Loading Sample Station located at the Overland Conveyor Transfer Station (Figure 3 of the Licence).</p> <p>Ore is washed at the mine to remove excess non-iron ore material finer than 38 µm, both reducing the percentage of fines and increasing the moisture content to approximately 5% w/w and 8.5% w/w for lump and fines respectively. However, up to approximately 4 Mtpa of ultra-fines ore produced from the WHIMS plant at the mine site will be added to the fines product. Fines ore moisture is expected to be similar prior to, and following the introduction of WHIMS concentrates to the fines product.</p>																
Dust monitors	<p>Continuous real time monitoring conducted at the Premises boundary using Beta Attenuation Monitors (BAMs). BAMs used at the Premises have the ability to monitor PM₁₀ over 10-minute intervals.</p> <p>Meteorological forecasting used to instigate dust mitigation measures, for example the activation of stockyard water sprays prior to windy events.</p> <p>The Licence Holder applies short-term and medium-term trigger levels at boundary monitors to instigate further investigation and management actions for the following criteria¹:</p> <table border="1"> <thead> <tr> <th>Monitor</th> <th>Nearest receptor (approximate distance)</th> <th>Wind arc</th> <th>Dust trigger level</th> </tr> </thead> <tbody> <tr> <td>DM2</td> <td>Short-stay accommodation in the West End (5,400 m)</td> <td>230° - 245°</td> <td rowspan="3"> PM₁₀ exceeds: <ul style="list-style-type: none"> • 300 µg/m³ over a 1 hour averaging period; • 150 µg/m³ over an 8 hour averaging period; or • 120 µg/m³ over a 24 hour averaging period. </td> </tr> <tr> <td>DM3 or DM6</td> <td>FMG operations (2,400 m) Wedgefield Industrial Area (5,400 m)</td> <td>280° - 305°</td> </tr> <tr> <td>DM4, DM5 or DM6</td> <td>FMG operations (3,300 m) Short-stay accommodation in South Hedland (8,400 m)</td> <td>295° - 315°</td> </tr> </tbody> </table>			Monitor	Nearest receptor (approximate distance)	Wind arc	Dust trigger level	DM2	Short-stay accommodation in the West End (5,400 m)	230° - 245°	PM ₁₀ exceeds: <ul style="list-style-type: none"> • 300 µg/m³ over a 1 hour averaging period; • 150 µg/m³ over an 8 hour averaging period; or • 120 µg/m³ over a 24 hour averaging period. 	DM3 or DM6	FMG operations (2,400 m) Wedgefield Industrial Area (5,400 m)	280° - 305°	DM4, DM5 or DM6	FMG operations (3,300 m) Short-stay accommodation in South Hedland (8,400 m)	295° - 315°
Monitor	Nearest receptor (approximate distance)	Wind arc	Dust trigger level														
DM2	Short-stay accommodation in the West End (5,400 m)	230° - 245°	PM ₁₀ exceeds: <ul style="list-style-type: none"> • 300 µg/m³ over a 1 hour averaging period; • 150 µg/m³ over an 8 hour averaging period; or • 120 µg/m³ over a 24 hour averaging period. 														
DM3 or DM6	FMG operations (2,400 m) Wedgefield Industrial Area (5,400 m)	280° - 305°															
DM4, DM5 or DM6	FMG operations (3,300 m) Short-stay accommodation in South Hedland (8,400 m)	295° - 315°															

Note 1: Taken from the Roy Hill Port Dust Management Plan (Environment). DWER has not considered dust risks to workers at FMG or Wedgefield Industrial Area (see Table 13).

Further controls specified by the Licence Holder in the *Port Dust Management Plan* as a control to reduce material handling, and consequent dust generation, includes directly shipping up to 20% of all throughputs from the car dumper to the ship loader, avoiding the need for stockpiling and reclaiming. However, discussions with the Licence Holder have revealed that no ore is direct shipped during operations unless during emergency shut down of key infrastructure such as reclaimers.

Each iron ore product requires different concentrations of moisture to reduce the potential for dust generation and these moisture concentrations are termed dust extinction moisture (DEM). It is noted that the application for Works Approval W5396/2013/1 included the proposal that the ore received at the Premises would be maintained at or exceed the DEM levels of 5.1% w/w (lump) and 6.0% w/w (fines) (Roy Hill, 2012) (refer to section 4.6.1). Data obtained from sample testing conducted in October 2016 measured the DEM levels for the

two lump products to be 2.3% w/w and 3.0% w/w respectively; and 3.8% w/w for fines (Tunra, 2016).

Following the installation of the WHIMS at the mine site, the particle size distribution and DEM level for the fines product is expected to change. To measure the potential changes the Licence Holder presented three samples to the laboratory to measure these potential changes: Base, Blend 1 and Blend 2 samples as shown in Table 18.

Table 18: Projected composition of fines product based on WHIMS output

Sample	Proportion of WHIMS concentrate (%)	Proportion of particles 150 µm and finer (%)	DEM level (%)
Base (fines)	0	6.94	4.97
Blend 1 (fines)	13	21.40	5.51
Blend 2 (fines)	17	22.78	5.30

Particle size distribution data provided above shows only those particles that have passed a 150 µm diameter screen. Data about particles sized 150 microns and smaller are limited in their value for determining the potential for health impacts, which are commonly associated with PM₁₀ (airborne particles sized 10 microns and smaller in diameter). Further to the addition of fines material from the WHIMS, and given the grinding effect on the ore from railcar vibrations over the 277 km journey from mine to port, more fines are expected to be generated.

Should product moisture exceed the transportable moisture limit (TML) for a particular type of ore, the ore can liquefy in the ship's hold presenting safety concerns and issues at the point of unloading. At the premises, high moisture contents may also prevent flow on conveyor belts onsite.

7.4.6 Key findings

Regarding fugitive dust emissions and Licence Holder controls:

1. a number of factors or variables influence the amount of dust generated at the Premises including throughput, the method of ore handling, moisture content and the physical properties (particle size) of the ore, and the meteorological conditions;
2. the Licence Holder has a limited ability to increase the moisture content of the ore at the Premise. However, the moisture content for both lump and fines products received at the Premises have consistently remained above DEM levels as the majority of product is mined below groundwater level and/or treated via a wet process (including WHIMS);
3. the screening process at the Premises is likely to result in a reduction in the moisture level of lump, while the washing process at the Premises is likely to result in an increase in the moisture content of fines;
4. the DEM levels for both lump and fines are likely to change over time with changes to the ore body being mined and the WHIMS recovery rate, which will change the proportion of finer particles added to the fines product;
5. there has been a number of complaints from Port Hedland residents received by DWER relating to ambient dust levels with the majority being

received within the last year;

6. there are a number of other dust generating activities that are likely to significantly contribute to PM₁₀ concentrations at the nearest receptors in the West End and South Hedland;
7. dust monitors positioned around the Premises boundary are located at considerable distance to sensitive receptors and are not an accurate indicator of ambient concentrations at the nearest receptors;
8. there are no ambient dust monitors at or near to the shiploader, which is the nearest dust source to sensitive receptors at approximately 1,500 m to the south west of short-stay accommodation in the West End; and
9. estimated dust emissions provided in modelling are not likely to accurately reflect the potential increased dust risk as a result of changes in product composition (refer to section 4.8.1);

The determination of health impacts is measured against PM₁₀, as this is the fraction of dust that is considered respirable. Therefore the assessment of the Risk Event must conservatively assume that all particles measured as passing screen diameters of 150 µm have the potential to become respirable.

The likelihood of the Risk Event will be assessed against dust controls listed in the *Port Dust Management Plan*, with the exception of direct shipping as the Licence Holder advises that this does not currently occur.

7.4.7 Consequence

Dust emissions from the handling of iron ore at the Premises (including through the increase to 60 Mtpa) contributes to ground level dust concentrations of PM₁₀ in Port Hedland and South Hedland.

It is evident from historical monitoring data that sensitive receptors in Port Hedland are currently exposed to high dust concentrations and the PM₁₀ consequence criterion (70µg/m³ at Taplin Street over a 24-hour period) has the potential to be exceeded. Residents in the West End have reported high level impacts to amenity and may endure health effects requiring medical treatment should the consequence criterion be exceeded.

Dispersion modelling results indicate that the Premises currently contributes to ground level concentrations of PM₁₀ at the West End and to a lesser extent Taplin Street. Analysis of cumulative levels of PM₁₀ between 55 Mtpa and 60 Mtpa scenarios indicates that concentrations will be similar following throughput increases.

Therefore, the consequence of dust emissions is **major**.

7.4.8 Likelihood of Risk Event

Taking into consideration the existing and proposed tonnages of bulk material handled, typical ore moisture content, methods of handling, infrastructure controls and distance to nearest receptors, dust emissions stemming from the Premises may contribute to the ambient air quality exceeding the relevant criterion at some time.

Based on dust modelling provided with the Amendment Application and the small increase to the cumulative bulk handling throughputs in Port Hedland, the Risk Event is not expected to occur in most circumstances. All ore undergoes wet processing and is expected to have a moisture content above the DEM level, which is an indicator of reduced dust potential.

However, throughput increases are the likely result of the Licence Holder's separate proposal to reprocess waste fines at the mine site through a WHIMS. As dust emission estimates

provided within modelling do not change from 55 and 60 Mtpa scenarios, modelling is unlikely to accurately reflect the impact of the proposed expansion on ambient air quality (refer to section 4.8).

It is likely that there will be an increase in PM₁₀ emissions as a result of the addition of further fines material, all other factors being equal. Limited information has been provided on the particle size distribution or any potential improvements to Premises handling methods off/for fines mixed with WHIMS concentrates.

Therefore the Risk Event likelihood is conservatively assessed as **likely** for Port Hedland.

Due to its proximity to significant local sources of dust, the HRA notes that the risk in Port Hedland may be up to twice as high than for those living in South Hedland (DoH, 2016). However, there remains a pathway for dust emitted from the Premises to South Hedland as the Premises is located only 1km further from South Hedland than it is from Port Hedland receptors. Cumulative emissions from the Premises and other sources including cleared areas, natural sources and other industrial activities may contribute to high ambient dust in South Hedland above criteria at some time. Therefore the Risk Event likelihood is **possible** for South Hedland.

7.4.9 Overall rating of dust impacts

The consequence and likelihood ratings described above using the risk rating matrix (Table 14) determined that the overall rating for the risk of dust emissions from the Premises impacting the health and amenity of sensitive receptors in both Port Hedland and South Hedland is **High**.

7.5 Risk assessment – noise

7.5.1 Description of Risk Event

Noise emissions from the Premises significantly contributing to exceedances of assigned levels at nearby sensitive receptors.

7.5.2 Identification and general characterisation of emission

Noise is generated from normal operations onsite including operation of the car dumper, conveyors and conveyor drives, stackers, the reclaimer and ship loaders.

7.5.3 Description of potential adverse impact from the emission

Noise has the potential to impact upon amenity and comfort. Where assigned noise levels are exceeded regularly, health impacts may arise from stress and/or lost sleep.

7.5.4 Criteria for assessment

The criteria for noise is detailed in the Noise Regulations.

The most recent noise modelling undertaken indicates that noise from the Premises (worst case scenario) would breach the Noise Regulations assigned noise levels at night time (see Key Findings and section 4.7 of this Decision Report).

A cumulative noise study of Port Hedland undertaken in 2014 by the PHIC and DWER indicates that the cumulative noise levels in Port Hedland currently exceed the Noise Regulations assigned noise levels.

7.5.5 Licence Holder controls

Licence Holder has proposed the noise controls within Table 19. In addition, the Applicant has proposed to confirm the noise emissions from sources on-site through measurement and

updating of the noise model, which will inform any additional proposed noise controls.

Table 19: Proponent controls for noise

Control	Description
Engineering	Screening plant is fitted with isolation frames to prevent excessive vibration. Low noise idlers installed on conveyors and tripper.

7.5.6 Key findings

Cumulative noise emissions from all industries in the area do not currently comply with the noise regulations levels at Port Hedland.

1. Estimated noise levels for night time (worst case) from the Premises are modelled to exceed the assigned noise levels by 5.7 dBA at a sensitive receptor. Therefore the Premises is likely to be a significant contributor to Assigned levels under the Noise Regulations during worst case meteorological conditions.
2. Noise emissions from trains underway, vessels within the Port Hedland port and equipment start-up alarms are exempt from the *Environmental Protection (Noise) Regulations 1997*. Noise emissions from trains during ore unloading are not exempt.
3. The greatest impacts from Premises activities are likely to be experienced by residents in the West End or South Hedland, depending on meteorological conditions and other noise sources.
4. A long term strategy for managing noise impacts has been identified as required to be developed in the Taskforce Report.

7.5.7 Consequence

Based upon the relevant factors discussed in this report, particularly the results of noise modelling which assumes all equipment operating at the same time, the contribution of noise emissions may result in an impact to amenity for residents in Port Hedland as criteria is at risk of not being met. Therefore, the consequence is **moderate**.

7.5.8 Likelihood of Risk Event

Based upon the relevant factors discussed in this report, mainly in regard to the noise modelling undertaken which assumes 24/7 operations, noise from the premises could impact amenity at some time. Therefore, the consequence is **possible**.

7.5.9 Overall rating of noise emissions

The consequence and likelihood ratings described above through the Risk Matrix (Table 14) determined that the overall rating for the risk of noise emissions impacting sensitive receptors during operation is **Medium**.

7.6 Risk assessment - discharge to land, groundwater and marine waters

7.6.1 Description of Risk Event

Contaminants may enter the marine environment or impact the benthic primary producer habitat through contaminated stormwater and wash down water discharges and spills directly to land and water, or by infiltration of soluble contaminants to groundwater.

7.6.2 Identification and general characterisation of emission

The contaminants may be from iron ore or hydrocarbons from infrastructure, machinery and transport activities on site. Iron ore is not soluble so will be present as suspended solids only.

It is noted that the wastewater discharges to land via the one way culverts around the rail loop will include reject water from the reverse osmosis plant (secondary activity) which has been discharged into the sedimentation ponds. A maximum of 32 000 kL per year of reject water may be discharged, with an estimated TDS concentration of 5,455 mg/L. The TDS concentration of the reject water is below that of seawater and the local groundwater (indicated TDS >40,000 mg/L). This water would also be diluted further with collected stormwater runoff prior to discharge to land. Therefore the TDS component of the discharges from the one way culverts is not expected to have an impact on the surrounding environment.

7.6.3 Description of potential adverse impact from the emission

Discharges containing high sediments loads and hydrocarbons can impact receiving water quality and disrupt the ecology of marine waters and creeks within Benthic Primary Producer Habitat. Discharges can also cause sedimentation; impacting the surrounding mangrove community. Hydrocarbon discharges may also result in the contamination of land and impacts upon aquatic ecosystems.

7.6.4 Criteria for assessment

The ship loading facility is located in the Port Hedland harbour which has been characterised as requiring moderate ecological protection (DoE 2006).

7.6.5 Licence Holder controls

The stormwater and wash down water controls proposed by the Applicant are identified in Table 20.

Table 20: Proponent controls for stormwater and wash down water management

Infrastructure		Description	Reference to site plan
Stockyard area	Rail loop	The raised rail loop which surrounds the stockyard area prevents the inflow of surface runoff from outside the premises area into the stockyard area.	Figure 1: Stockyard area layout
	Sedimentation ponds 1 and 2 (SB1—1 and SB1-02)	Stormwater within the stockyard is directed to two sedimentation ponds which are designed to remove 80% of sediment in a 10 year Average Recurrence Interval (ARI) rain event, and lined with low permeable fill. Overflow from the pond spillways discharges to land immediately outside the rail loop embankment via seven one way culverts.	
	Small catchments	Stormwater collected within smaller catchments will discharge through the one way culverts.	
	Car dumper sump and oily water separator	Area of car dumper facility graded to drain into a containment bund, which is designed to minimise flood water entry. Waste water within the containment bund will be fed directly to a concrete sump and oily water separator	Figure 1: Stockyard area layout Figure 2: Stockyard area

		for treatment. Wastewater will be treated to contain less than 15 mg/L of Total Recoverable Hydrocarbons (TRH) prior to discharge to the drainage network and subsequent discharge to land immediately outside the rail loop embankment via seven one way culverts.	and overland conveyor
	Screening plant sump and oily water separators	Area of screening plant graded to drain into containment bunds, which are designed to minimise flood water entry. Waste water within containment bunds will be pumped directly to lined sumps and two oily water separators for treatment. Wastewater will be treated to contain less than 15mg/L of TRH prior to discharge to the drainage network and subsequent discharge to land immediately outside the rail loop embankment via seven one way culverts.	Figure 1: Stockyard area layout Figure 2: Stockyard area and overland conveyor
	Workshop and maintenance area oily water separator	Wastewater will be treated via an oily water separator to contain less than 15 mg/L of TRH prior to discharge to the drainage network and subsequent discharge to land immediately outside the rail loop embankment via seven one way culverts.	Figure 1: Stockyard area layout Figure 2: Stockyard area and overland conveyor
Transfer station drive in sumps		Water is collected within drive in sumps. Potentially contaminated water can be removed from the sumps and treated via the oily water separators within the Premises.	Figure 1: Stockyard area layout Figure 2: Stockyard area and overland conveyor
Covered overland conveyors		The elevated overland conveyors are covered. Belt wash station slurry is returned to the ore stream.	Figure 2: Stockyard area and overland conveyor Figure 3: Overland conveyor and ship loading area layout
Wharf flooring		Concrete flooring on the berth side of the wharf (where ships are loaded).	Figure 3: Overland conveyor and ship loading area layout

The ore and hydrocarbon spill controls proposed by the Applicant are identified in Table 21.

Table 21: Proponent controls for ore and hydrocarbon spills

Control	Description	Reference to site plan
Spill prevention	<p>A stockpile management system is programmed to prevent overflowing of conveyor belts.</p> <p>Ore is transferred from the stockpile out-loading conveyor to the berth conveyor via surge bins (removes surges in ore feed from the reclaimer).</p> <p>Conveyor belts have 15% surge capacity and adequate distance between the product and the belt edge to minimize spillage.</p> <p>The elevated overland conveyor is provided with belt wash stations.</p>	<p>Figure 2: Stockyard area and overland conveyor</p> <p>Figure 3: Overland conveyor and ship loading area layout</p>
Spill cleanup	<p>Concrete floors for all transfer stations on the elevated overland conveyors, berth conveyors and berth side of the wharf.</p> <p>Accumulated ore spillage will be regularly removed using a road sweeper, bobcat/front end loader and other mobile equipment.</p> <p>Spill kits will be available.</p>	<p>Figure 2: Stockyard area and overland conveyor</p> <p>Figure 3: Overland conveyor and ship loading area layout</p>

The wastewater monitoring controls proposed by the Applicant are identified in Table 22.

Table 22: Proponent monitoring of wastewater discharges

Monitoring	Description	Reference to site plan
Oily water separator discharges	<p>Quarterly (when flowing) monitoring of TRH (mg/L). Treated water will be tested by a NATA accredited laboratory.</p>	Figure 1: Stockyard area layout
One way culvert discharges		Figure 1: Stockyard area layout

7.6.6 Key findings

Regarding discharges to the marine environment:

1. The Port Hedland Inner Harbour is highly modified and zoned for heavy industrial use.
2. The marine environment has already been exposed to extensive maintenance dredging and shipping movements. Remaining existing benthic communities that live in the shallows of the Port Hedland Harbour are likely to be resilient to minor increases in turbidity at localised locations.

7.6.7 Consequence

Based upon the relevant factors discussed in this report, mainly in regard to the environmental

value of the potential receptors, discharges of contaminated stormwater, wash down water or direct spills to land or marine waters may have minor or short term impacts to sensitive ecosystems. Therefore, the consequence is **moderate**.

7.6.8 Likelihood of Risk Event

Based upon the relevant factors discussed within this report, it is unlikely that the discharge of contaminated stormwater, wash down water or direct spills will cause an impact to sensitive ecosystems. Therefore, the consequence is **unlikely**.

7.6.9 Overall rating washdown water discharges and spills

The consequence and likelihood ratings described above through the Risk Matrix (Table 14) determined that the overall rating for the risk of discharges of contaminated stormwater, wash down water or spills causing an impact to sensitive receptors during operation is **Medium**.

DWER's assessment of risk has not changed following the Minister's determination on the appeal lodged by the Licence Holder under s.102(1)(c) of the EP Act for the removal of daily street sweeper requirements during shiploading.

7.7 Summary of risk assessment and acceptability

The risk items identified in section 8.1 including the application of risk criteria and the acceptability with treatment are summarised in Table 23 below.

Table 23: Risk rating of emissions

	Emission		Pathway and Receptor	Proponent controls	Impact	Risk Rating	Acceptability with treatment (conditions on instrument)
	Type	Source					
1.	Dust	Open areas, infrastructure and handling processes	Air, moving with direction of wind	Ore moisture content Infrastructure and management controls	Amenity and public health	Major consequence Likely High risk	Acceptable subject to Licence Holder controls conditioned and additional regulatory control under Part V of the EP Act.
2.	Noise	Unloading, handling, screening, transport and ship loading infrastructure	Through the air levels depending on atmospheric conditions.	Infrastructure	Amenity	Moderate Consequence Possible likelihood Moderate risk	Subject to application of alternative regulatory strategy which is being considered in addition to the requirements of the licence.
3.	Waste and wastewater to land, groundwater and marine waters	Spills of ore or hydrocarbons and discharges of wash down water or contaminated stormwater from infrastructure and runoff within the Premises.	Direct spills and discharge points to land. Infiltration through soils to groundwater. Overland or subsurface flow towards creek lines or marine	Infrastructure, specified actions and monitoring	Land and groundwater contamination Reduction in ecosystem health and water quality	Moderate consequence Possible likelihood Moderate risk	Acceptable subject to Licence Holder controls conditioned.

	Emission		Pathway and Receptor	Proponent controls	Impact	Risk Rating	Acceptability with treatment (conditions on instrument)
	Type	Source					
			waters. Receptors – Benthic Primary Producer Habitat Marine Waters				

8. Determined regulatory controls

8.1 Summary of controls

The regulatory controls within Table 24 will be applied through Licence conditions.

Table 24: Summary of determined regulatory controls

		Controls			
		8.3 Specified infrastructure requirements	8.4 Limits	8.5 Monitoring	8.6 Specified Actions
Risk Items (see section 7)	1. Dust emissions (refer to sections 8.6 and 8.7)	•	•	•	•
	2. Noise from infrastructure and operations	Medium risk. Acceptable subject to application of alternative regulatory strategy outside of the licence.			
	3. Discharge of waste and wastewater to land and groundwater (stormwater/wash down water and spills)	•	•	•	• (spills only)
	4. Discharge of waste and wastewater to marine waters (stormwater/wash down water and spills)	•			• (spills only)

8.2 Alternative regulatory strategy for noise

Noise impacts on sensitive receptors in Port Hedland are the result of cumulative emissions from a range of sources.

In order to adequately address the issue of noise impacts within Port Hedland, a broader regulatory strategy is being considered.

8.3 Infrastructure and equipment controls

8.3.1 Dust management

The following environmental controls, infrastructure and equipment are existing and must be maintained and operated onsite for dust management:

- water sprays operated at stackers and reclaimers when operating;
- baghouse dust collectors operated at the car dumper and rescreening house to extract dust-laden air;
- coverings on elevated conveyors to minimise the product's exposure to wind;
- conveyors are fitted with belt scrapers at transfer stations to reduce carry-back with belt wash stations on overland conveyors operated as required; and
- the operation of a surge bin to control the flow of iron ore into the vessel.

The dust control equipment is operational at greater than 90% of the time with some downtime occurring for malfunction, servicing and repairs. The operation of dust control equipment reduces the number and significance of dust emitting sources and will continue to be required when transporting all material and at an availability rate of 90%.

In its application to increase throughputs to 60 Mtpa, the Licence Holder proposed the use of chemical surfactants to unsealed areas as a control for the management of dust. DWER has considered this control and has determined that the maintenance of open areas with dust suppressants should continue regardless of throughput increases. Therefore the Licence contains requirements for the management of all unsealed roads and open areas with chemical surfactants and/or water carts.

The existing and proposed Licence Holder controls listed above act to contain dust at the source and have been determined to be necessary based on the high level of risk associated with dust emissions from Primary Activities. Placing these controls on the Licence requires the continued use of dust abatement infrastructure and equipment and ensures regulatory oversight, by requiring records to be kept to demonstrate the availability of dust control infrastructure.

8.3.2 Stormwater and wash down water control infrastructure

The following environmental controls, infrastructure and equipment should be maintained and operated onsite for stormwater and wash water management:

- stormwater runoff within the stockyard is directed to sedimentation ponds SB1-01 and SB1-02;
- overflow from sedimentation ponds SB1-01 and SB1-02 may be discharged to land via one way culvert discharge points (Culvert Drain 1 – Culvert Drain 7);
- water captured within the car dumper facility containment bund, the screening facility containment bund and the workshop and maintenance area;
 - is treated via an oily water separator; and
 - may be discharged to land via one way culvert discharge points (Culvert Drain 1 – Culvert Drain 7) subject to water quality limit (see below);
- Wash down water or runoff from the transfer stations;
 - is contained within sumps; and
 - potentially contaminated water is removed from sumps for treatment via an oily water separator; and

- may be discharged to land via one way culvert discharge points (Culvert Drain 1 – Culvert Drain 7) subject to water quality limit meet at oily water separator (see below);
- the cover of the elevated overland conveyor must prevent stormwater access to the ore stream.
- concrete flooring on the berth side of the wharf.

Specified infrastructure requirements are derived from the proponent controls.

8.3.3 Spill control infrastructure

The following environmental controls, infrastructure and equipment should be maintained and operated onsite for spill management:

- surge bins used to control surges to the conveyors from the reclaiming process;
- conveyor skirts have 15% surge capacity and sufficient distance from the product to belt edge to minimize spillage;
- spill kits available.

8.4 Limits

8.4.1 Discharge to land

Wastewater discharges from oily water separators shall not contain a greater than 15 mg/L TRH. Post treatment wastewater is directed to drainage network and then to the environment through Culvert Drains 1 – 7.

There are no sources of potentially contaminated waters directed into the drainage network without treatment through an oily water separator. Subsequently the limit is set at the discharge point from the oily water separator and is derived from the proponent controls.

The *Environmental Protection (Unauthorised Discharge) Regulations 2004* (UDR) outlines a number of materials including petrol, diesel or other hydrocarbons that if discharged into the environment causes an offence. Should hydrocarbons be released into the environment (through the culvert) it may be considered an offence. Should the hydrocarbons be considered to be from the treated wastewater (post oily water separator treatment) and requirements of the licence are met, a defence to the offence provision in the UDR is available.

8.5 Monitoring requirements

8.5.1 Dust monitoring

The Licence Holder will be required to conduct real time monitoring of PM₁₀ concentrations at the Premises boundary.

Reporting of high level dust events will be required on a quarterly basis to notify DWER of PM₁₀ trigger criteria being exceeded at dust boundary monitors (refer to section 8.8.2).

The provision of boundary monitoring data will be required annually.

Grounds: The Licence Holder has the current ability to monitor PM₁₀ at its boundary in 10 minute real time averaging periods. Data received by DWER will be used to identify the possible source, or sources of dust, which will assist in future risk-based decision making.

8.5.2 Discharges to land monitoring

The treated wastewater discharged from the oily water separators shall be monitored for TRH

in mg/L.

Samples shall be analysed by a NATA accredited laboratory.

The monitoring is derived from the proponent controls.

8.6 Specified actions

8.6.1 Dust monitoring and trigger actions

The Licence Holder will be required to monitor PM₁₀ at a number of boundary monitors to investigate the source/s of dust and if found to be the result of Premises activities, to take management action to remove the source of dust in near-real time.

Stockpile water cannons and misting sprays at conveyors and transfer stations must be operated as required upon identification of visible dust from stockpiles and transfer stations. The operation of stockpile water cannons will also be triggered by elevated PM₁₀ concentrations at boundary monitors when wind directions place sensitive receptors downwind from Premises activities.

Trigger levels applied to boundary monitors align with short term (1 hour) and 24-hour average indicators currently applied by the Licence Holder through its *Port Dust Management Plan* as alert and alarm levels requiring further investigation into the cause of elevated PM₁₀ concentrations. Short term trigger levels also require immediate management action to be undertaken to ensure that the Premises does not contribute to high dust levels where sensitive receptors may be impacted.

Grounds: Licence controls for dust management actions have been developed to apply to all Premises boundary monitors that are located downwind of prescribed activities. Trigger criteria are based on high risk events where Premises activities are generating dust and are located upwind of sensitive receptors in the West End and South Hedland. Wind directions often swing, which may result in dust generated from the Premises also swinging to impact sensitive receptors even during conditions that do not place these receptors downwind for the a significant portion of time. Therefore the wind arcs designated in the Licence provide a buffer around residents in the event that winds spread a dust plume or swing it toward receptors.

BAMs typically measure PM₁₀ on an hourly averaging period, presenting data for the previous hour meaning that data received may not accurately represent the ambient air quality in real time. The BAMs located at the Premises boundary are capable of measuring PM₁₀ over 10 minute intervals. Therefore the Licence Holder is capable of reacting to high ambient dust levels at the Premises boundary in near-real time.

Although South Hedland is located further from the Premises compared to the West End, prevailing wind directions are more likely to place South Hedland residents downwind of prescribed activities. As existing dust levels in South Hedland are also elevated (refer to Table 7), residents in this area are sensitive receptors.

Where high dust levels are permitted to continue, the risks of both amenity impacts to sensitive receptors and interim health criteria being exceeded increase.

The risk of impacts from dust has been assessed as 'High' to sensitive land users in the West End and South Hedland. In accordance with DWER's *Guidance Statement: Setting Conditions*, DWER has determined it necessary to apply these management conditions to reduce the risk from dust.

Similar conditions have been applied to other Category 58 licences in Port Hedland. Due to the distance of the Premises to sensitive receptors, narrower wind arcs have been applied to management trigger criteria when compared to these other licensed premises. The likelihood of criteria being exceeded is commensurate to the likelihood of Premises activities impacting

sensitive residential receptors.

8.6.2 Spill control actions

The following actions should be undertaken for spill management;

- During ship loading an inspection for spills takes place (twice daily);
- spilled ore is regularly removed from the berth;
- During ship loading, maintenance shutdown and washdown a street sweeper is present at all times and operated to remove spills.

8.7 Amendments to Licence – December 2018

8.7.1 Bulk granular material specifications

Based on the Licence Holder's bulk material handling methods and the current high levels of dust within the airshed, the risk from fugitive dust has been demonstrated to be high. Limits have been placed on the Licence to restrict the cumulative wet tonnes of iron ore handled at the Premises over an annual period. The throughput limits are applied following the licence amendment application submitted to increase throughput at the Premises. Gross throughput may not always directly correlate to ambient dust concentrations at receptors as dust controls at the Premises may compensate for a potential rise in dust generation as a result of increased ore handling. Therefore dust controls referenced in the *Port Dust Management Plan* have been transitioned to the Amended Licence as enforceable conditions, and additional improvements to existing handling methods are also required, as discussed in section 8.7.2.

Grounds: It is possible that the combined effect of small increases in throughputs will gradually contribute to the existing high levels of dust in Port Hedland unless the increases in throughput are offset by concurrent improvements in dust management. Therefore specifying a cap on throughput amounts where dust risks are high, is valid, risk-based and outcome based in accordance with DWER's *Guidance Statement: Setting Conditions*.

As discussed in section 4.8, DWER does not have confidence in the results of modelled emissions and impacts on ambient air quality in the West End following advice from the Licence Holder that increased throughputs are partly the result of increasing fines product throughputs. The operation of the WHIMS at the mine site is expected to change the composition of the fines product by increasing the proportion of smaller particles that have a greater potential to become airborne.

8.7.2 Improvement requirements

Vast amounts of clearing was undertaken during the construction of the Premises for the purpose of equipment laydown, which has left a significant area of disused land that has the potential to emit dust in dry, windy conditions. As part of the Licence Holder's closure plan, these areas are earmarked for revegetation.

Note: The Licence Holder has identified the areas provided in Schedule 1 of the Amended Licence as areas where revegetation could commence ahead of closure as they are projected to remain as disused.

Further conditions have been applied to require the Licence Holder to avoid ground disturbance activities and topsoil application relating to the revegetation program where winds may carry high dust concentrations to receptors in the West End or South Hedland.

Grounds: To ensure that the Premises has a net negative contribution to the cumulative airshed following the increase in throughput and fines content, the Licence Holder is required to revegetate the disused cleared area to the south of the stockyard prior to closure.

DWER understands that although the level of emissions reductions from the revegetation of cleared areas is difficult to quantify, revegetation is expected to significantly reduce emissions stemming from the Premises. Revegetation will be carried out in two stages over two years with a smaller area planned for seeding (Stage 1) in the first year. This allows for the Licence Holder to obtain sufficient seed quantities and trial the revegetation process to ensure the correct soil amelioration and seed mix is applied prior to the larger area seeded through Stage 2.

8.7.3 Moisture Content

Moisture content of the iron ore product was determined through the risk assessment to be a key management measure within the application to minimise dust.

Moisture content monitoring requirements have been applied to the Licence for all iron ore in-loaded and out-loaded at the shiploaders as measured from the sampling station located at the Overland Conveyor Transfer Station depicted in Figure 3 of the Licence. The moisture content of iron ore product at the time of out-loading is currently monitored as a requirement of sale to the customer, and to ensure that the moisture content falls below the TML to meet international maritime safety standards. All ore handled at the Premises must have a moisture content above the DEM level, averaged over each shipload. As the Licence Holder is also the occupier of the mine sites from which ore is received at the Premises, the Licence Holder has the ability to control the level of moisture of the ore.

The amended Licence requires the DEM level to be known for all in-loaded and out-loaded iron ores to accurately compare with moisture contents. The Licence Holder is required to obtain the specific DEM level numbers for each iron ore product, including blended products, on an annual basis.

Based on the knowledge that there will be no increase to the maximum existing Category 58 throughput amounts at the Premises on any given day, proposed annual throughput increase is not expected to result in a significant increase to exceedances of criterion in the West End following the implementation of product specification and handling controls.

8.7.4 Stockpile restrictions

Stockpile restrictions have been placed on the Licence to limit the time that iron ore is held at the Premises without the Licence Holder being required to apply additional measures to suppress dust. A restriction of 6-week maximum hold time per static stockpile has been applied to the Licence. A static stockpile refers to any Iron Ore stockpile that has been stacked and not reclaimed for a period of six weeks or more. Following this 6-week hold time either a physical barrier or stabilising chemical must be applied to the outer layer of the stockpile or the Licence Holder must be able to demonstrate that the stockpile has a moisture content above the DEM level. An additional condition has been applied to prevent the movement of stockpiles for the purpose of avoiding the time-based restriction.

The stockpile restrictions have been applied following the licence amendment application submitted to increase throughput at the Premises. The application of physical barriers or chemical stabilising material is in replacement of the standard operating procedure to apply water to stockpiles via water cannons. Further, the condition does not apply where the Licence Holder can demonstrate that the moisture content of stockpiled material is at or above the specified DEM level therefore reducing the risk of dust emissions.

Based on the licence amendment application and air quality dispersion model, emissions from stockpiles and wind erosion were identified as a key emission source representing the majority of sources with an upper quartile emission rate of above 1 g/s at the Premises. Without additional and sufficient control the longer the period that material is stockpiled at the Premises the greater the likelihood of increased emissions, particularly during periods of high wind speed or when the ore is reclaimed. The operation of water cannons on stockpiles may

not always be sufficient to increase the moisture content of the stockpile outer layer.

Due to the high risk of dust from the Premises it has been determined that restricted holding times on stockpiles should be applied to the Licence unless further management actions are employed to prevent fugitive emissions.

8.7.5 Removal of Material Change conditions

Further to the addition of conditions relating to the monitoring and management of dust emissions from the Premises, the Amended Licence also sees the removal of conditions that allow Material Changes.

Material Changes have been defined as changes to the type and amounts of ore handled, changes to site layout and control of ownership. Since the issue of the Reviewed Licence the Licence Holder has not submitted any notifications of Material Change.

Material Change conditions have been progressively removed from all port licences. Most determinations in response to Material Change notifications received from all ports in Western Australia have been to amend each respective port Licence. Due to the high dust risks associated with bulk ore handling in Port Hedland DWER has determined that Material Change conditions should be removed from all Category 58 Licences in the airshed.

In addition, former environmental compliance condition, Condition 1, has been removed from the Amended Licence due to unnecessary duplication with general provisions of the EP Act. The Licence Holder will continue to be required to comply with the EP Act and all regulations prescribed under the EP Act.

8.7.6 Quarterly event reporting

The Licence Holder will be required to notify DWER of the following events on a quarterly basis:

- Where the Taplin Street community air quality monitor identifies that PM₁₀ exceeds 70 µg/m³ over a 24-hour period;
- Throughputs of iron ore out-loaded at the Premises being greater than 240,000 tonnes in any 24 hour period (12am to 12pm); and
- Reportable Events as a result of trigger criteria dust boundary monitors.

As a minimum the Licence Holder will need to provide on a quarterly basis the following information for the period where Reportable Events occurred:

- meteorological data throughout the day;
- graphical representation of PM₁₀ concentrations at boundary monitors throughout the day;
- air quality data from other community monitors and the Yule and BoM (background) monitors;
- the moisture content of ore handled at each shiploader in comparison to the DEM level for each product; and
- a summary of operations, including total amount of ore handled, relative volumes of ore blends and products, activities being undertaken and the age of stockpiles.

Given the absence of a clear correlation between air quality at boundary monitors and those air quality monitors at the location of sensitive land users (based on existing information and prior to DWER's investigation of boundary air quality data), DWER has determined that interim boundary targets should be used as triggers for further reporting only. These triggers align with the Licence Holder's *Port Dust Management Plan – Environment* alarm levels requiring further investigation.

Similarly the limited understanding of the correlation between daily throughputs and dust

levels at nearby receptors has instigated the requirement for further investigation. It is understood that a 24 hour averaged throughput of 240,000 tonnes is expected to occur approximately 5-10 times a year.

Information provided for each event will assist DWER to identify the possible source, or sources of dust, which will assist in future risk-based decision making.

9. Setting conditions

The conditions in the Issued Licence have been determined in accordance with DWER's *Guidance Statement on Setting Conditions*. DWER's *Guidance Statement on Licence Duration* has been applied and the Issued Licence expires in 20 years from date of issue.

Table 25: Grounds for conditions applied to the Amended Licence

Condition Ref	Grounds
Emissions 1	This condition is valid, risk-based and consistent with the EP Act.
Bulk Granular Material Specifications 2 and 3	These conditions are valid, risk-based and contain appropriate controls (see sections 7 and 8 of this Decision Report).
Moisture Content Monitoring and Management 4, 5, 6 and 7	As above.
Infrastructure and Equipment 8, 9, 10 and 11	As above.
Dust Monitoring and Management 12, 13, 14, 15, 16, 17, 18, 19, 20 and 21	As above.
Wash water and Stormwater Monitoring and Reporting 22	As above.
Record-keeping 23, 24, 25 and 26	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.

10. Applicant's comments on Risk Assessment

The applicant was provided with the draft Amended Licence and associated this Decision Report on 19 October 2018. Comments were submitted by the applicant on 7 November 2018. The Delegated Officer's consideration of these comments are shown through Appendix 3. On the basis that significant changes were made following Licence Holder comment, the Department offered the Licence Holder a second opportunity to provide comment on draft Licence conditions on 26 November 2018. The Licence Holder responded to DWER on 3 December 2018, waiving the 21 day comment period and requesting that the licence be issued with no changes.

The applicant was provided with the draft Reviewed Licence and associated decision report on 29 August 2016. Comments were submitted by the applicant on 13 September 2016. The Delegated Officer's consideration of these comments are shown through Appendix 4.

11. Conclusion

This assessment of the risks of activities on the Premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this Decision Report (summarised in Appendix 1). This assessment was also informed by a site

inspection by DWER officers on 20 July 2016.

Based on this assessment, it has been determined that the Amended Licence will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Ed Schuller

A/Director, Regulatory Services (Environment)

delegated Officer under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

	Document Title	Availability
1.	DWER <i>Guidance Statement: Licensing and works approvals process</i> (September 2015)	Accessed at: https://www.der.wa.gov.au/our-work/regulatory-framework
2.	DWER <i>Guidance Statement: Regulatory principles</i> (July 2015)	
3.	DWER <i>Guidance Statement: Setting conditions</i> (October 2015)	
4.	DWER <i>Guidance Statement: Licence duration</i> (November 2014)	
5.	DWER <i>Guidance Statement: Land Use Planning</i> (October 2015)	
6.	DWER <i>Guidance Statement on Licensing and works approvals processes</i> (September 2015)	
7.	Bureau of Meteorology (2018) Port Hedland Airport – weather observations 1948 - 2018.	Accessed at: http://www.bom.gov.au
8.	DoE (2006) <i>Pilbara Coastal Water Quality Consultation Outcomes: Environmental Values and Environmental Quality Objectives</i> , Department of Environment, March 2006	Accessed at: http://www.wamsi.org.au/sites/wamsi.org.au/files/pilbaracoastalwaterquality_Marine%20Report%201.pdf
9.	DoH (2016) <i>Port Hedland Air Quality Health Risk Assessment for Particulate Matter</i> , Department of Health, January 2016	Accessed at: http://ww2.health.wa.gov.au/Reports-and-publications/Port-Hedland-Health-Risk-Assessment
10.	Department of Jobs, Tourism, Science and Innovation (2017) Port Hedland Dust Management Taskforce – 2016 Report to Government – released for public comment August 2017.	Accessed at: http://www.jtsi.wa.gov.au/economic-development/economy/port-hedland-dust
11.	Department of State Development (2010) <i>Port Hedland Air Quality and Noise Management Plan</i> .	www.jtsi.wa.gov.au
12.	EPA (2010) <i>Roy Hill 1 Iron Ore Project Port Infrastructure, Report and recommendations of the Environmental Protection Authority, Report 1377</i> , Environmental Protection Authority, December 2010	Accessed at: http://www.epa.wa.gov.au/EIA/EPAREPORTS/Pages/1377.aspx
13.	Minera Mining Technologies (2017) <i>Air Quality Assessment: Proposed Expansion at</i>	DWER records (A1548099)

	<i>Roy Hill Port Facility.</i>	
14.	PHIC (2016) Annual Report – 20152016: Port Hedland Ambient Air Quality Monitoring Program	Accessed at: http://www.phichedland.com.au
15.	PHIC (2015) Annual Report: Ambient Air Quality Monitoring Report to the Port Hedland Dust Management Taskforce (20142015)	Accessed at: http://www.phichedland.com.au
16.	Roy Hill (2012) <i>Roy Hill Port Infrastructure Project – Port Hedland, Bulk Ore Handling Facility and Screening Plant Application for Works Approval 100RH-4000-EN-REP-2001</i> , Roy Hill Holdings Pty Ltd, 19 December 2012	DWER internal
17.	Roy Hill (2016a) Licence application form, Roy Hill Infrastructure Pty Ltd, 5 April 2016	DWER internal
18.	Roy Hill (2016b) <i>Roy Hill Infrastructure Port Bulk Handling Facility and Screening Plant Licence Application Supporting Documentation OP-APP-00019</i> , Roy Hill Infrastructure Pty Ltd, 5 April 2016	DWER internal
19.	Roy Hill (2016c) <i>Port Dust Management Plan OP-PLN-00204</i> , Roy Hill Infrastructure Pty Ltd, 2 July 2016	DWER internal
20.	Roy Hill (2016d) <i>Commissioning Report – Roy Hill Port Bulk Handling Facility and Screening Plant (W5396/2013/1) OP-REP-00319</i> , Roy Hill Infrastructure Pty Ltd, 31 March 2016	DWER internal
21.	Roy Hill (2017) Roy Hill Infrastructure – Port Operating Licence Amendment Application – Increased Iron Ore Export	DWER records (A1548099)
22.	Toxikos (2015) Report – Health Risk Assessment Port Hedland, commissioned by the Department of Health.	Accessed at: http://ww2.health.wa.gov.au/~media/Files/Corporate/general%20documents/Environmental%20health/Port%20Hedland%20Health%20Assessment.pdf
23.	Tunra Bulk solids Handling Research Associates (2016) Iron Ore Lump and Fines Test Work, Report No. 8868, October 2016.	DWER records (A1326122)
24.	WillyWeather (2018) Port Hedland Wind Forecast.	Accessed at: https://wind.willyweather.com.au/wa/pilbara/port-hedland.html

Appendix 2: Summary of submissions on the proposal for increased throughputs to 60 Mtpa

Stakeholder	Comments	DWER Response
Department of Health	<p>Does not object to the application.</p> <p>However, the following comments were also provided:</p> <p><i>“In principle, the DOH opposes any increase in throughputs until the whole-of-government dust management report has been finalised and the government has adopted its policy in relation air quality in the Port Hedland. However, in view of the delay in government endorsing the recommendations in the report, DOH will not object to the requested increase on the condition that the Department of Water and Environmental Regulation (DWER) is satisfied that</i></p> <ul style="list-style-type: none"> <i>• The dust management controls at the facility are industry best practice, and</i> <i>• In the opinion of the DWER’s air-quality branch the increased capacity through the port is unlikely to increase the number of exceedances of the interim dust guideline for Port Hedland.”</i> 	<p>Noted.</p> <p>The Department has considered the management strategies set out in the <i>Pilbara Ports Authority, Dust Management Leading Practice Guidelines</i> in establishing regulatory controls in the licence.</p> <p>The licence amendment authorising the increase has resulted in numerous additional site-specific regulatory controls being applied to address uncertainty in emissions modelling.</p> <p>As a result of these additional regulatory controls, the residual risk to public health, the environment and amenity is acceptable. Determination of what is ‘industry best practice’ will be made through the development of Dust Management Best Practice Guidelines for Port Hedland (refer to section 4.4).</p>
Port Hedland Industries Council (PHIC)	<p>Supports the application</p> <p>PHIC also contend that for the last financial year 2016/17 there was the lowest number of exceedances at Taplin Street (3 exceedances for PM₁₀, 24-hour average), while export volumes have been at there highest supporting the fact that industry has continued to reduce their dust emissions.</p>	<p>Noted. DWER notes that data does not indicate zero correlation between throughput amounts and ambient dust in the West End or South Hedland. Although it is acknowledged that there is a no notable or clear correlation between the amount of materials exported and ambient PM₁₀ concentrations based on available data including over an annualised period.</p> <p>This is due in part to the limited level of detail in the data previously available to DWER, which is raises uncertainty in the assumption of a definitive “zero correlation”.</p>
Port Hedland Community Progress	<p>Supports application</p> <p>While the Port Hedland Community Progress Association supports the</p>	<p>Noted.</p> <p>Boundary monitoring requirements have been applied to</p>

Stakeholder	Comments	DWER Response
Association	<p>application they raises a number of questions, as follows:</p> <ul style="list-style-type: none"> • <i>“The DER (DWER) has recommended boundary monitoring to ensure Roy Hill’s low emission rate due to modern practices and industrial location away from town is commended, and held as an acceptable standard for old operators on old licences abutting the town centre and polluting the town?”</i> • <i>How can DER ensure other polluting operators are not negatively impeding on Roy Hill’s operations. How can this be considered to ensure Roy Hill’s operating high technical standards and industrial location are not incorrectly blamed or included in pollution over the town of Port Hedland?”</i> 	<p>the Licence. Reporting of boundary monitoring data is required annually and at the time of interim criteria exceedances at Taplin Street. Reporting requirements during exceedance events are designed to assist DWER in determining the potential source of dust.</p>
Department of Planning, Lands and Heritage	<p>No objections to application</p> <p>The Department of Planning, Lands and Heritage also advise that there are 11 Aboriginal Heritage Sites identified at the Premises and that the proponent is advised to comply with requirements of the <i>Aboriginal Heritage Act 1972</i>.</p>	<p>Noted.</p>
Town of Port Hedland	<p>Does not support application</p> <p>The Town of Port Hedland does not support the application until such time as the State Government provides a formal position on the state of Port Hedland air quality, the Port Hedland Dust Taskforce Report and all received public submissions through the public consultation.</p>	<p>Note.</p> <p>The Taskforce Report provided several recommendations to the Government in relation to dealing with ongoing dust and noise issues in Port Hedland.</p> <p>Should the recommendations in the Taskforce be endorsed by Government, the Department will implement the required actions and works.</p> <p>In the interim DWER has applied a series of regulatory controls in accordance with its Regulatory Framework. These include the implementation of air quality monitoring requirements, outcome-based controls and product specifications to maintain risk of dust at an acceptable level and to ensure regulatory oversight.</p> <p>Refer to section 8.</p>

Appendix 3: Summary of Applicant’s Comments on Amended Licence and Decision Report

Draft Condition/ Decision Report section	Comments (verbatim)	DWER Response
<i>Licence Holder comments on draft Licence conditions</i>		
16 – Requiring 30% Direct Ship Loading	<p>For the below reasons, the Licence Holder submits that the improvement condition requiring the Licence Holder to direct load a percentage of its volume is neither feasible nor appropriate and should be deleted.</p> <p>Requiring a minimum percentage of direct loading is not feasible to apply to the Licence Holder given the way that the Licence Holder is set up for its operations.</p> <p>For consistency in product quality for the Licence Holder's customers, the Licence Holder blends (i.e. mixes) its fines product at both mine and port; and does the same with its lump product.</p> <p>Direct shipping removes the ability for the Licence Holder to blend products at the Premises, which can negatively impact on the pricing of ores.</p> <p>Due to the constraints on ship loading speeds (which are beyond the control of the Licence Holder), the Licence Holder would need to make considerable further investment in its in load and outload systems at the Premises to optimise ore handling speeds. Any such changes would need to be carefully managed to avoid unintended consequences in terms of dust emissions from the Premises.</p>	<p>Noted. While DWER has not based its decision making on financial constraints, it is noted that existing infrastructure at the mine and port limits the ability for the Licence Holder to directly ship blended ore products.</p> <p>To achieve the recommendations of the Taskforce Report, DWER has proposed a five year plan for best practice dust management guidelines and proposed improvements to port operations to be finalised. In the interim period, conditions relating to improving infrastructure to directly ship ore have been removed from the draft Licence.</p> <p>Alternative Premises improvement conditions proposed by the Licence Holder, relating to the revegetation of disused cleared areas, have been applied to the Licence to mitigate the potential dust risks associated with increasing throughputs and the proportion of fines material handled at the Premises.</p>
	The ore stockpiles maintained by the Licence Holder are situated at considerable distance from sensitive receptors at the West End of Port Hedland.	Noted. The Licence Holder’s distance to receptors and existing controls were considered through the risk assessment for dust. Also considered was the existing high dust levels in Port Hedland and the ability for dust plumes to travel large distances as identified by the LiDAR monitoring campaign.
	The Licence Holder also already has in place modern, industry leading	As above.

	<p>infrastructure for the effective control and management of dust emissions at the Premises, including dust collectors on dumper and screen house, sprays on transfer points, water cannons on stockpiles, covered conveyors, belt scrapers and belt washing on wharf conveyors.</p>	
	<p>All of the products which the Licence Holder throughputs at the Premises are relatively "wet" and above the Dust Extinction Moisture (DEM) level. This means the products are less dusty and less prone to dust than the products shipped through the port by at least one other Category 58 licence holder.</p>	<p>Noted. As discussed in section 4.6.4, dust emissions can still arise where the ore handled has a moisture content above the measured DEM level. Therefore additional controls have been placed on the Licence to ensure that risks associated with dust are appropriately managed.</p>
	<p>The Licence Holder has proposed an alternative improvement condition to align with its continuous improvement initiatives, in particular a revegetation plan, including details of the areas to be revegetated, vegetation methodology and timelines for implementation.</p>	<p>Noted. DWER agrees that the Licence Holder's proposal to revegetate disused cleared land will reduce the risk of dust from the Premises to acceptable levels.</p>
<p>Condition 13 (Monitoring and management response)</p>	<p>The Licence Holder seeks clarification of the management trigger criteria set out in Column 2 of Table 4 of the draft Licence. As currently drafted, the management trigger criteria are based on:</p> <ul style="list-style-type: none"> • threshold dust levels at each Monitoring Station; and • wind directions at the Licence Holder's automatic weather station, unless benchmark monitoring stations have also recorded $\geq 100 \mu\text{g}/\text{m}^3$ PM_{10} within three hours of the trigger event (emphasis added). <p>The Licence Holder seeks confirmation that the three hour period described in each of the management trigger criteria is a reference to the preceding three hours before the trigger event occurs.</p>	<p>Noted. The condition has been revised to note that management criteria is not triggered where regional background monitors (Yule and BoM) have also recorded $\geq 100 \mu\text{g}/\text{m}^3$ PM_{10} within three hours prior to the trigger event.</p>
	<p>The Licence Holder requires that management actions only be undertaken in circumstances where the Premises is the source of the management trigger criteria exceedance.</p>	<p>Noted. Determination of attribution is difficult in an airshed with existing high dust levels and a variety of contributors, such as that experienced in Port Hedland. Contribution of external sources to trigger events is not considered at DM2 to DM5 (inclusive), unless where regional background monitoring stations have recorded $\geq 100 \mu\text{g}/\text{m}^3$ PM_{10} within three hours prior to the trigger event.</p> <p>Port Hedland already experiences a high levels of dust. Further contribution to high dust events (with the exception of some</p>

		natural events eg. bush fire) without the application of additional dust controls specified in licence conditions is not acceptable.
	The Licence Holder also requests that air quality boundary monitoring stations DM1 and DM6 are removed from Column 1 of Table 3 of the draft amended Licence, as these receptors are up wind of the Premises when the wind arc is between 215° and 250°. These monitoring stations could be affected by dust that occurs outside of the Premises by other industry.	Noted. Boundary monitors DM1 and DM6 have been removed from the management trigger criteria table as they are beyond the nominated wind arc that places receptors downwind of Premises activities (Table 4).
Schedule 3 (Infrastructure controls table)	Row 6 - it should be noted that: <ul style="list-style-type: none"> elevated overland conveyors 161 and 162 are covered to reduce exposure to winds; and belt wash stations on overland conveyors 161,162 and 164 are operated as required to reduce carry-back of iron. 	Amended.
	Row 7 - the reference to "Misting Sprays" in Column 3 should be corrected to read "Water Sprays"	Amended.
	The Licence Holder also notes an apparent duplication between the requirements of Row 6 and Row 16 of Table 10. These requirements should be consolidated into a single row.	Agreed. Row 16, requiring the covering "of the elevated overland conveyor must minimise rainfall onto the ore stream" has been removed as this is the same control referred to in Row 6 for the reduction in exposure to wind to manage dust emissions.
<i>Licence Holder comments on draft Decision Report</i>		
Direct Shipping Section 4.12	<p>In addition to the comments on direct shipping requirements outlined in response to draft condition 16 above, the Licence Holder makes the below representations to Decision Report section 4.12.</p> <p>The blending that occurs at the Premises is a second stage blending undertaken to further reduce stockpile variation and minimise ship-to-ship variability of product.</p> <p>A direct shipping requirement necessarily affects the Licence Holder's one ship loader coupled with its one car dumper at the Premises. Due to capacity constraints on ship loading (namely, the ability of third party vessels to de-ballast), the car dumper at the Premises will be required to</p>	<p>Noted. The process of directly shipping ore from the car dumper removes double handling of ore and known dust sources identified through the LiDAR campaign including ore stacking, reclaiming and additional movements through transfer stations. The double handling of ore can reduce moisture content and increase potential dust source locations, presenting a potentially significant contribution to dust generation at the Premises.</p> <p>However, proposed Licence Holder commitments to bring forward the revegetation of disused cleared areas ahead of closure present an acceptable alternative to direct shipping. DWER has determined that the revegetation of disused cleared</p>

<p>dump ore at a slower rate.</p> <p>Given these capacity constraints, and due to the integration of the Licence Holder's infrastructure, the Licence Holder would need considerable investment to optimise other aspects of its existing infrastructure, including:</p> <ul style="list-style-type: none"> • in load systems (for example, train load out at the Licence Holder's mine site, additional rolling stock on the Licence Holder's railway, and speeds at the Licence Holder's car dumper and apron feeder at the Premises); and • outload systems at the Premises (for example, belt speed, belt width, structures, and ship loader capacity). <p>It is important to note that:</p> <ul style="list-style-type: none"> • any of the above initiatives, if implemented, still would not satisfy product consistency expectations associated with direct shipping, and the Licence Holder would seek to undertake a second stage of blending at the Premises (where possible) to meet product specification and ensure continued operational viability; • any changes to the speed or capacity of any ore handling infrastructure operating from the Premises would need to be carefully managed to minimise unintended consequences in terms of dust emissions; and • the same volume of iron ore will still be loaded through the shiploader at the wharf under a direct shipping requirement. <p>The additional costs of implementing these infrastructure changes may also require the Licence Holder to reconsider its proposed investment in its wet high intensity magnetic separator (WHIMS) in light of competing capital expenditure requirements.</p> <p>The Licence Holder regards direct shipping as an operational practice, not a dust control practice.</p> <p>The Licence Holder is only aware of one other Category 58 operator in Port Hedland (BHP Billiton Iron Ore) using direct shipping (predominantly for operational reasons), and understands that the remainder of Port Hedland Category 58 operators do not use direct shipping except in case of</p>	<p>areas reduces the risk of dust from the Premises to acceptable levels.</p> <p>DWER will consider additional dust requirements following the finalisation of Dust Management Best Practice Guidelines and industry self-assessment outcomes (refer to section 4.4).</p> <p>For all future licence amendment or works approval applications the Licence Holder will be encouraged to demonstrate no net increase to dust emissions in Port Hedland from port related activities. Where this is not demonstrated, DWER will consider further controls that may in part reduce dust emissions that serve to offset any increase in dust emissions.</p>
--	---

	<p>emergencies (e.g. during periods of equipment failure or maintenance).</p> <p>Although the Port Hedland Dust Taskforce Report notes BHP Billiton's direct shipping practice, the government response to the Port Hedland Dust Taskforce Report and the Pilbara Port Authority's Dust Management Leading Practice Guidelines make no reference to direct shipping as a control for the management of dust.</p> <p>A direct shipping requirement is not expected to lead to a reduction in stockpile sizes at the Premises, and may instead lead to an increase in the time that ore spends on stockpiles before it can be shipped (as stockpiles at the Premises can only be cleared at a reduced rate).</p> <p>The Licence Holder reiterates that a risk-based approach should be applied to the risk of the Licence Holder generating dust from its operations at the Premises, at an increased throughput of 60 million tonnes per annum. On a risk based approach, it should be noted that:</p> <ul style="list-style-type: none"> • the Licence Holder is already required to ensure that all iron ore in-loaded to the Premises and out-loaded from the Premises has a moisture content at or above required DEM levels, pursuant to Condition 6 of the draft amended Licence; and • the Licence Holder's stockpiles at the Premises are located at considerable distance from sensitive receptors in the West End of Port Hedland. <p>The Licence Holder considers that a condition requiring direct shipping is not consistent with a risk based approach, as it imposes an operational and commercial burden that is disproportionate to the risk that it seeks to mitigate.</p>	
<p>Air quality modelling Section 4.8</p>	<p>In the absence of actual emissions figures from the Premises, the Licence Holder's dust emissions modelling adopts the emissions factor (7.6 g/tonne) set out in the National Pollutant Inventory (NPI) Emission Estimation Technique Manual for Mining. The default NPI emission factors conservative when compared with other facilities in the vicinity of the Premises.</p> <p>Factors such as ore type and wind speed cannot be accounted for using the default NPI emission factor, which is applicable to all emissions. The ore</p>	<p>Noted. Discussion in section 4.8 merely identifies discrepancies between emission estimates used by the various operators in Port Hedland. DWER understands that Roy Hill has adopted NPI emission estimate rates. These are default emission rates for coal operations although it is acceptable to apply them to iron ore where no other means of estimation is available.</p> <p>A site visit conducted by DWER officers in October 2018, noted the small number of vehicles present at the Premises. Further</p>

<p>exported by the Licence Holder undergoes beneficiation at the mine, and is well above required DEM levels. Accordingly, wind speed is considered to play a minor, if any, role in dust emissions from the Premises.</p> <p>Given the smaller scale and modern nature of the Licence Holder's operations relative to other port users, it is reasonable to expect vehicle emissions at the Premises to be lower than that of other port users. In particular, vehicle emissions are low due to:</p> <ul style="list-style-type: none"> • the location of the Licence Holder's administration buildings outside of the Premises, limiting vehicle movements within the Premises to personnel required to be in that area; • CD-location of transfer stations within the facility, further reducing the distance that vehicles are required to travel within the Premises; • the sealed ring road around the Premises used by the majority of vehicular traffic within the Premises, with strict speed limits applied; and • modern and automated nature of the Licence Holder's facilities at the Premises (requiring fewer vehicle movements by operators and maintenance personnel) <p>The Licence Holder has incorporated dust suppression technologies into construction and operation of the facility, including dust collectors on dumper and screen house, sprays on transfer points, water cannons on stockpiles, covered conveyors, belt scrapers and belt washing on wharf conveyors.</p> <p>It is not reasonable for DWER to assume a similar dust profile across port operators at Port Hedland, as each port operator is exporting different ore products with different moisture content and dust emission profiles, using different infrastructure, situated in different locations relative to sensitive receptors at the West End of Port Hedland.</p> <p>WHIMS plant</p> <p>The Licence Holder notes that DWER has sought to conflate this current application for licence amendment at the Premises, and the amendment application made by Roy Hill Iron Ore Pty Ltd in respect of a WHIMS plant at the Roy Hill mine.</p>	<p>discussion has been added to section 4.8 to note that vehicle emission estimates may be reasonable.</p> <p>DWER acknowledges that all ore handled at the Premises has a moisture content above the measured DEM level. However, and as discussed in section 4.6.4, moisture content cannot be used as a stand-alone control for dust management.</p> <p>Ore handling emission rates estimated in modelling were the same for both throughput scenarios. DWER notes that total dust emission from all sources, as presented in modelling, is greater for the 60 Mtpa scenario because the number of operating hours is increased.</p> <p>However, increases in the proportion of ultra-fines by up to 4 Mtpa was not considered through the application, increasing the level of uncertainty in emissions estimates. Therefore DWER has applied the precautionary principle when assessing the risk of dust emission from the Premises.</p>
---	---

	<p>The Licence Holder's modelling did not specifically take into account the introduction of the WHIMS product, because in the absence of actual emissions factors for the Premises, the default NPI emissions factors were adopted and are appropriate for all ore types.</p> <p>Given that WHIMS is a wet process, it is considered that any product from the WHIMS plant has limited potential for increased dust emissions, particularly when:</p> <ul style="list-style-type: none"> • the product moisture content remains above DEM levels; • the product from the WHIMS plant is blended with the Licence Holder's fines product which also has a moisture content exceeding DEM levels); and • WHIMS product is only expected to deliver approximately 4 MTPA of a total 60 MTPA throughput. <p>The Licence Holder has separately provided DWER with a report showing the particle size distribution and DEM levels of the Licence Holder's fines product blended with various concentrations of WHIMS product. These results indicate moisture levels remaining above DEM levels.</p>	
<p>Air quality and amenity Section 4.9</p>	<p>The Licence Holder notes the finding in section 4.6.3 of the draft Decision Report that there have been no complaints received in respect of dust emissions from the Premises.</p> <p>This is likely due to the Premises distance from sensitive receptors at the West End of Port Hedland, and the Licence Holder's smaller size of operations (including stockpile sizes) relative to other Category 58 operators in Port Hedland.</p> <p>The draft Decision Report confirms that even with an increased throughput of 60 Mtpa, the Licence Holder's tonnages will represent only 1.1% of bulk tonnages through Port Hedland.</p> <p>In addition, it is noted that the Port Hedland Community Progress Association has supported the Licence Holder's application.</p>	<p>Noted.</p>
<p>Improvement requirements</p>	<p>Despite having an already favourable product composition (with high moisture content), the Licence Holder is demonstrating leading industry practice in dust management and is focused on identifying and</p>	<p>Noted. As discussed above.</p>

Section 8.7	<p>implementing opportunities for continuous improvement.</p> <p>The Licence Holder notes that it will be subject to Condition 6 of the draft Licence Amendment, which requires the Licence Holder to ensure that all iron ore in-loaded to the Premises and out-loaded from the Premises has a moisture content at or above required DEM levels.</p> <p>As explained above, the Licence Holder considers that direct loading of iron ore is not an appropriate risk based condition for the management of dust emissions from the Premises.</p> <p>Nevertheless, the Licence Holder is committed to continuous improvement of dust management at the Premises, and has proposed an amended improvement condition for Condition 16, including:</p> <ul style="list-style-type: none">• a requirement for the Licence Holder to submit to DWER details of revegetation initiatives within the Premises, and details of improvements which can be made in unsealed roads around the Premises; and• a requirement for the Licence Holder to undertake two Dust Emission Source Characterisation Studies to understand the location and volume of emissions emanating from the Premises (one before the commissioning of the WHIMS plant, and one after commissioning).	
-------------	--	--

Appendix 4: Summary of Applicant's Comments on Draft Reviewed Licence and Decision Report from September 2016

Comments received	Environmental risk/condition	Delegated Officer's consideration:
<p>Applicant – Comment Decision Report</p> <p>Risk Assessment – Discharge to land, groundwater and marine waters</p>	<p>Applicant comment on one way culvert discharges – the culverts are excluding from the licence (monitoring). Are these required to be sampled?</p>	<p>It is noted that the applicant has proposed to undertake monitoring of TRH through the culverts and from the oily water separators on a quarterly frequency (when flowing)</p> <p>Based on the risk assessment and taking into account potential sources (hydrocarbon) that licence conditions for the monitoring from the oily water with limits are appropriate.</p> <p>There are offences detailed in the <i>Environmental Protection (Unauthorised Discharge) Regulations 2004</i> for the discharge of certain materials into the environment. Section 8 has been updated to reflect these requirements and provide additional clarity.</p>
<p>Applicant – Comment on Licence Condition 7.</p>	<p>Suggested addition in italics to: Table 1: Wash water and Stormwater Monitoring Column 3 (Monitoring Period) <i>Quarterly unless there is no discharge from the OWS during the quarter</i></p>	<p>Noted and accepted.</p>
<p>Applicant - Comment on Licence</p> <p>Schedule 3: Infrastructure and Equipment</p> <p>Sedimentation ponds 1 and 2 (SB1-1 and SB1-02)</p>	<p>Suggested removing to: Table 6: Infrastructure Controls Table Row 1, Column 2 Sedimentation ponds lined with low permeable fill</p>	<p>Noted and accepted.</p>
<p>Applicant – Comment on Licence</p> <p>Schedule 3: Infrastructure and Equipment</p> <p>Car dumper sump and OWS</p>	<p>Suggested replacing word to: Table 6: Infrastructure Controls Table Row 2, Column 2 Lined to Concrete sump</p>	<p>Noted and accepted.</p>

Comments received	Environmental risk/condition	Delegated Officer's consideration:
<p>Applicant – Comment on Licence</p> <p>Schedule 3: Infrastructure and Equipment</p> <p>Screening plant sump and OWS</p>	<p>Suggested replacing Table 6: Infrastructure Controls Table Row 3, Column 3 Pumped to fed directly to sumps and OWS for treatment.</p>	<p>Noted and accepted</p>
<p>Applicant – Comment on Licence</p> <p>Schedule 3: Infrastructure and Equipment</p> <p>Transfer station drive in sump</p>	<p>Table 6: Infrastructure Controls Table Row 5, Column 3 Wash down water or <i>slurry</i> runoff from transfer stations is contained within sumps or <i>concrete kerbed areas</i>. <i>Hydrocarbon spills from transfer stations will be cleaned using spill kits and potentially contaminated water will be disposed through an OWS or removed from site by a licensed contractor. and removed from sumps for treatment via an oily water separator.</i></p>	<p>Noted and accepted.</p>
<p>Applicant – Comment on Licence</p> <p>Applicant Schedule 3: Infrastructure and Equipment</p> <p>Covered overland conveyor</p>	<p>Table 6: Infrastructure Controls Table Row 6, Column 3 The cover of the elevated overland conveyor must prevent stormwater access <i>minimise rainfall onto the ore stream.</i></p>	<p>Noted and accepted.</p>
<p>Applicant – Comment on Licence</p> <p>Schedule 3: Infrastructure and Equipment</p> <p>Wharf</p>	<p>Table 6: Infrastructure Controls Table Row 7, Column 3 Cleaned daily by operators and street sweepers. Excess and spill ore (under conveyors, transfer stations and shiploader) is stored in a contained area on the wharf and collected by a truck and transported back to stockyard. Inspections occur every shift (twice daily). Spills are cleaned up as required.</p>	<p>Noted and disagree.</p> <p>The proposed wording by the applicant does not provide for a valid and enforceable condition and does not clearly address the risk from spills entering the environment from the wharf.</p> <p>Alternative control detailed.</p>
<p>Applicant – Comment on Licence</p> <p>Schedule 3: Infrastructure and Equipment</p> <p>Conveyor skirts</p>	<p>Table 6: Infrastructure Controls Table Row 9, Column 1 & 2 Conveyor skirts <i>belts</i> have 15% surge capacity</p>	<p>Noted and accepted</p>

Appendix 5: Licence amendments from 15 September 2016 to present

Previous condition	Amendment condition/ section number	Changes made
<i>Amendment Notice 1 – 8 February 2017</i>		
Row 7 of Table 6, Schedule 3: Infrastructure controls table	Row 7 of Table 6, Schedule 3	Changes to operational requirements in the event of product spills on the wharf in accordance with section 110(1) of the EP Act following a determination from the Minister for Environment.
Information Condition 11	Condition 11	Sub conditions (c), (d) and (e) inserted to increase the level of record-keeping so as to improve the auditability of changes made to Schedule 3 (see above).
<i>Licence amendment 3 December 2018</i>		
Environmental Compliance Condition 1	N/A	Condition removed due to unnecessary duplication with requirements of the EP Act and its subsidiary regulations.
Notification of Material Change Condition 2 to 4 (inclusive)	N/A	Notification of Material Change conditions (including all references in Schedule 2 and Definitions section) have been removed. Refer to section 8.7.5.
Infrastructure and Equipment Conditions 5 and 6	Condition 8	Minor amendment to Condition 5 (now Condition 8) to remove repetition between conditions. Changes made to Schedule 3 to include additional infrastructure relating to dust management.
Wash water and Stormwater Monitoring Conditions 7 to 9	Conditions 22	No change to condition 7. Conditions 8 and 9 for record keeping have been incorporated into condition 23.
Emissions Condition 10	Condition 1	No change to condition other than to include reference to requirements pertaining to dust emissions.
Information	Record-keeping	Former Condition 11 (now 23) – Amended to remove reference to Material Change and include the requirement to maintain accurate and auditable records of all information

Previous condition	Amendment condition/ section number	Changes made
Conditions 11 to 15	Conditions 23 to 26	<p>collected in accordance with the Amended Licence.</p> <p>Former Condition 12 – Deleted as reporting requirements duplicate requirements of the EP Act.</p> <p>Former Condition 13 (now 24) – Amended to require the recording the number and details relating to emissions and discharges from the Premises only. Previously the condition required the submission of all complaints relating to the Premises</p> <p>Former Condition 14 (now 25) – Amended to require the annual provision of monitoring data required by the Amended Licence.</p> <p>Former Condition 15 (now 26) – No change to condition.</p>
Schedule 2 General Description	Schedule 2 General Description	<p>Former Table 5 (now Table 9): Bulk material amounts assessed (in wet tonnes) has been increased from up to 55 Mtpa to up to 60 Mtpa.</p> <p>Examples of Material Change and Non-Material Change have been removed from the Licence (refer to section 8.7.5).</p>
Table 6, Schedule 3: Infrastructure controls table N/A	Table 10, Schedule 3 Dust control infrastructure (Rows 1 to 10)	Minimum dust control infrastructure requirements applied to limit the number and volume of dust sources. Refer to section 8.3.
Stormwater and wash down water control infrastructure (Table 6, Schedule 3) Row 1 to 7	Row 11 to 16 of Table 10, Schedule 3	Table and row number change only with the exception of former Row 6, which has been removed due to duplication with dust control requirements specified in Row 6 of the Amended Licence.
Spill control infrastructure (Table 6, Schedule 3) Row 9 and 10	Row 17 and 18 of Table 10, Schedule 3	Table and row number change only.
N/A	Bulk Granular Material Specifications	Conditions added to manage the risk of dust (refer to section 8.7.1).

Previous condition	Amendment condition/ section number	Changes made
	Conditions 2 to 3	
N/A	Moisture Content Monitoring and Management Conditions 4 to 7	Conditions added to manage the risk of dust (refer to section 8.7.3)
N/A	Infrastructure and Equipment Conditions 9 to 11	Conditions added to manage the risk of dust (refer to section 8.3)
N/A	Dust Monitoring and Management Conditions 12 to 21	Conditions added to manage the risk of dust (refer to sections 8.7)
N/A	Quarterly Event Reporting Schedule 4	Schedule added to ensure the regulatory oversight of dust emitted from the Premises (refer to section 8.7.6)
N/A	Boundary Monitoring Data Format Schedule 5	Schedule added to ensure that boundary monitoring data is validated and provided in an editable format that enhances DWER's ability to analyse data.

Attachment 1: Issued Licence L8967/2016/1