



Ordinary Council Meeting Attachments

Tuesday, 26 May 2020 at 3.30pm

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Flammable Onsite Hazards Risk Management Plan

Hanwha Ammonium Nitrate Emulsion Plant

Mullewa-Wubin Road, Wubin

Shire of Dalwallinu

Job Ref. No: Associated Bushfire Management Plan (BMP)

180091

Date:

4 March 2020

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Limitations

The measures contained in this Bushfire Risk Management Plan are considered to be minimum standards and they do not guarantee that a building will not be damaged in a bushfire, persons injured, or fatalities occur either on the subject site or off the site while evacuating. This is substantially due to the unpredictable nature and behaviour of fire and extreme weather conditions. Additionally, the correct implementation of the required bushfire protection measures established by the associated Bushfire Management Plan (BMP) and the required preparation and response bushfire actions set out in this Bushfire Risk Management Plan, will depend upon, among other things, the ongoing actions of the landowners or occupiers over which Bushfire Prone Planning has no control.

All surveys, forecasts, projections and recommendations made in this report associated with the proposed development are made in good faith based on information available to Bushfire Prone Planning at the time. All maps included herein are indicative in nature and are not to be used for accurate calculations.

Notwithstanding anything contained therein, Bushfire Prone Planning will not, except as the law may require, be liable for any loss or other consequences whether or not due to the negligence of their consultants, their servants or agents - arising out of the services provided by their consultants.

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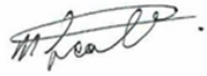

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1. Purpose of the Risk Management Plan

1.1 Aim and Objectives

The aim of the Risk Management Plan (For Onsite Flammable Hazards) (RM Plan) is to document a coordinated and efficient approach towards the identification, assessment and treatment of assets exposed to bushfire-related risk within the facility and the facility potentially igniting a bushfire, thus exposing firefighters, the community, environment and facility staff to dangerous uncontrolled substances.

The objective of the RM Plan is to effectively manage bushfire risk within the facility site in order to protect people, assets and environmental values.

The reasons to develop this RM Plan includes:

1. To develop and justify the site specific information that will be used to produce the required mitigation measures for the proposed Facility;
2. To assist those persons within the facility who have management and emergency management responsibilities by improving their understanding and therefore operation of the facility;
3. To reduce the level of risk from the threat of bushfire to the facility, and;
4. Assist planning decision makers and their advisors to assess the content of the RM Plan and Information for the specific site and its use.

Under State Planning Policy 3.7, the Ammonium Nitrate Emulsion Plant (the Facility) is considered a high-risk land use, and a development application is required to include a Risk Management Plan (For Onsite Flammable Hazards).

Under the *Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007 (the Regulations)*, the operator will also be required to complete a separate risk assessment that addresses risks other than bushfire for the proposed development.

1.2 DEVELOPING THE RISK MANAGEMENT PLAN (For Onsite Flammable Hazards)

Planning for a bushfire emergency must account for the complex and variable characteristics of bushfire threats. It requires a tailored approach that is specific to the location and operations of the subject development.

The RM Plan assesses the risks to staff, the wider community and hazardous materials from the threats of bushfire at the facility and determines how these will be managed to result in a residual level of risk that is tolerable and justifies the approach.

The site is not considered a Vulnerable Land Use. The site does not have short stay accommodation and staff are familiar with onsite emergency procedures and are familiar with their surroundings, transport operators regularly visit the site to transport goods and are familiar with their surroundings.

This plan has required the Hanwha AN Emulsion Emergency Plan to be updated to include relevant information relating to a bushfire event and responding bushfire brigades. Refer Risk Treatment Schedule, Section 6 of this Plan.

2. The High-Risk Land Use – Bushfire Risk Management

2.1 HIGH RISK LAND USE

The basis on which the Ammonium Nitrate Emulsion Plant is to be considered as a high-risk land use is:

- The existing development relates to the onsite storage and handling of Ammonium Nitrate, Calcium Nitrate, Diesel and Mineral Oil which is a class of dangerous goods and is therefore considered a high-risk land use.
- The proposed Stage 2 development relates to the onsite production and storage of detonators.

2.2 LEGISLATION AND GUIDELINES

- AS/NZS ISO 31000:2018 Risk management – Guidelines.
- State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7) and associated guidelines.
- Australian Disaster Resilience Handbook 10: National Emergency Risk Assessment Guidelines (NERAG) 2015.
- DFES Guidelines for Preparing Risk Management Plan
- AS 3745-2010 Planning for Emergencies in Facilities
- Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007 (the Regulations)
- Dangerous Goods Safety (Security Risk Substances) Regulations 2007
- Dangerous Goods Safety Act 2004
- Dangerous Goods Guidance Note: Licensing and exemptions for storage and handling 2015
- Australian Dangerous Goods Code (ADG Code) for transport by Road and Rail.
- AS 2187.1-1998 Explosives – Storage, transport and use Storage
- DIMRS licensing conditions
- Hanwha Safety Data Sheet
- Hanwha AN Emulsion Emergency plan
- AS 3000 electrical wiring rules & IP 65 lighting

2.3 CONTEXT – BUSHFIRE HAZARD IN RELATION TO HIGH -RISK LAND USE

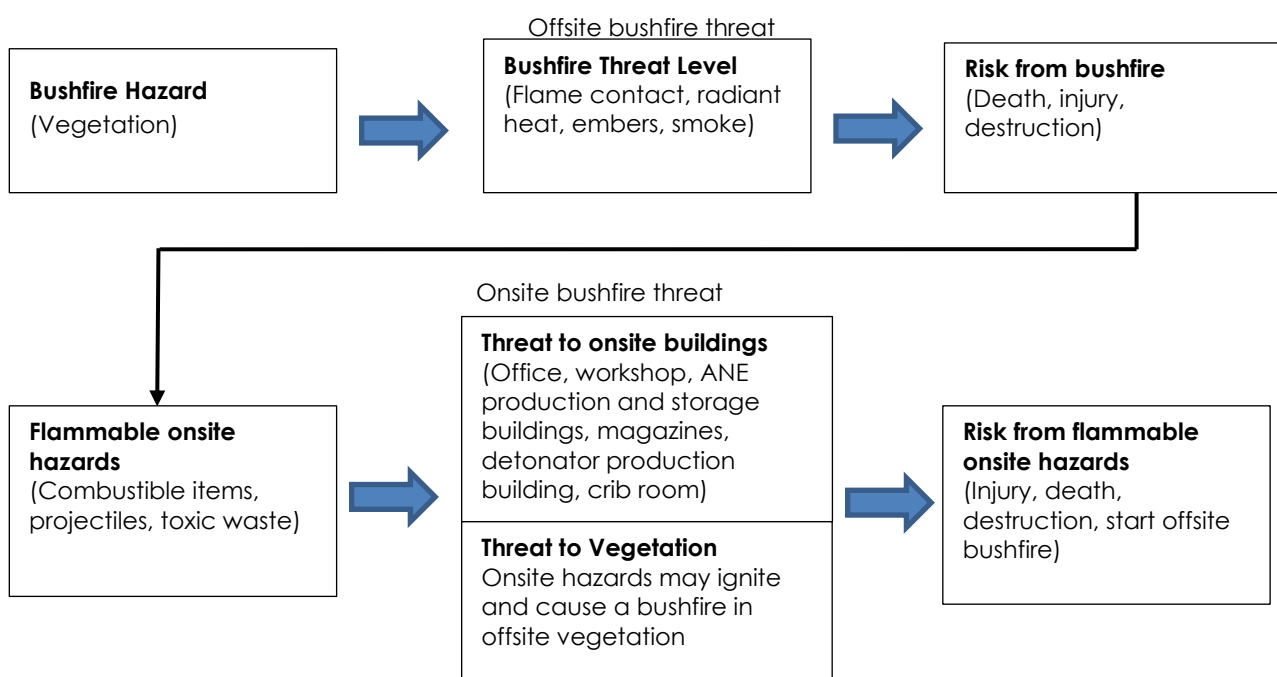


Figure 1: High-risk bushfire management process

2.4 THE BUSHFIRE RISK ASSESSMENT

This RM Plan conducts a bushfire risk assessment for the proposed development (the Facility) and subsequently provides further detail of the risk treatment measures and justification for their application.

The format and content of the risk assessment is an adaptation of the risk assessment framework established by the *Australian Disaster Resilience Handbook 10: National Emergency Risk Assessment Guidelines (NERAG), 2015* Australian Institute for Disaster Resilience CC BY-NC.

This handbook is consistent with AS/NZS ISO 31000:2009 Risk management – principles and guidelines). The diagrammatic representation of the NERAG structure is shown in Figure 1 (page 8) of the Handbook and is reproduced below.

NERAG is structured to align broadly with relevant sections of AS/NZS ISO 31000:2009, as illustrated in Figure 1.

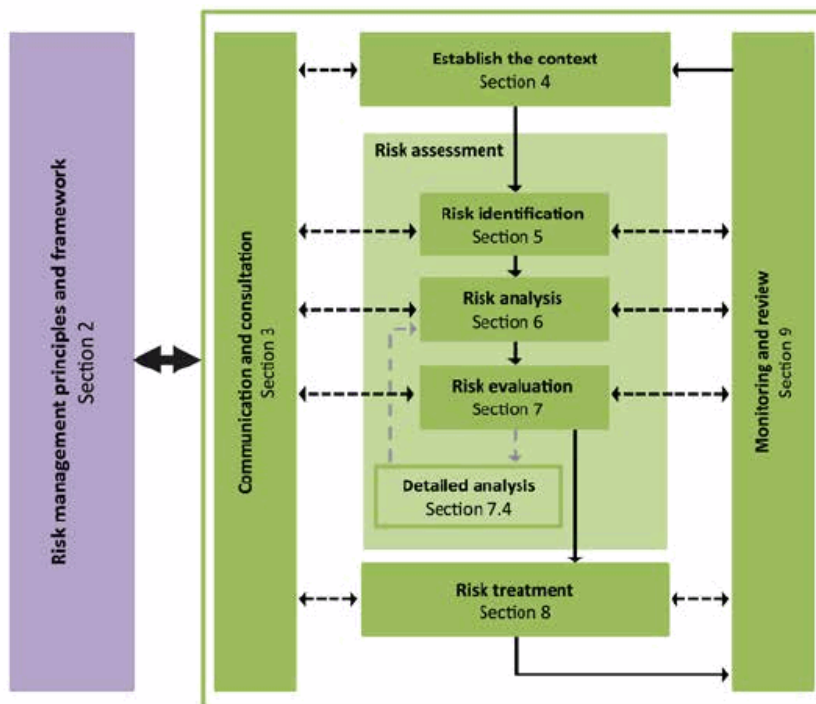


Figure 2: National Emergency Risk Assessment Guidelines structure (NERAG, 2015)

3. Risk Management Plan Context

The RM Plan is developed within the context of the protection of life being the primary focus of the bushfire planning framework in WA.

State Planning Policy 3.7 *Planning in Bushfire Prone Areas* (SPP 3.7) establishes:

- The Policy intent which includes the preservation of life by implementing effective, risk-based land use planning and development;
- The Policy objectives that include the provision that preservation of human life is paramount; and
- The Policy measures which establish the concept of a "high risk land use", define it as a land use which may lead to the potential ignition, prolonged duration and/or increased intensity of a bushfire. Such uses may also expose the community, site workers, roadway, firefighters and the surrounding environment to dangerous, uncontrolled substances during a bushfire event.

Consequently, the development of the RM Plan is focussed on:

- Reducing the risk of onsite ignition of flammable hazardous material from bushfire, thus reducing likely exposure of toxins to firefighters, site workers, surrounding community and environment.

The planning requirement is to identify the risks associated with both the use of a site and the existence of any bushfire threat due to the proximity of bushfire prone vegetation and the potential for consequential local fire.

These risks are to be assessed to determine their relative risk level, and the measures to be implemented that will manage and reduce these risks to a tolerable level are to be developed.

3.1 BUSHFIRE SEASON

The greatest fire risk for the Dalwallinu region is from November through to the end of February, when the moisture content in vegetation is low. This is exacerbated by high temperatures and low humidity. The BOM states that, in these conditions, when grasses are dead and fuels have dried, the mid-west becomes most susceptible to bushfires. Intense high-pressure systems over South Australia produce strong southeast to northeast winds which increase the risk of bushfires.

Dangerous fire weather conditions often follow a sequence of hot days and easterly winds that culminate when the trough deepens near the coast and moves inland. Winds can change from south easterly to south westerly during this sequence of climatic events. This wind shift is a pattern regularly experienced in summer, when westerly winds often arrive during the afternoon, when temperatures have peaked and bushfire fuels are at their driest. Fires burning under these conditions can intensify quickly as the fire changes direction and the long flank becomes the head fire.

3.2 BUSHFIRE FREQUENCY AND CAUSES OF IGNITION

Accurate Information is not available for causes and frequency of ignition that will potentially impact the facility. The offsite vegetation has been considered regarding how and where bushfires are likely to start, including;

- Possible ignition sources or activities, such as roads, power lines and industries including farming; and
- Potential fire paths.
- It has been assumed a fire event will threaten the facility once in every 5 years.

3.3 VALUES AND ASSETS

Any risk analysis assumes that there is a chance that an undesired outcome may occur. The undesired outcome will relate to Values or Assets that are considered important to maintain. Some of the Values and Assets considered in bushfire risk analysis include:

- Values such as human life
- Assets such as the onsite buildings, parked machinery and stored products
- Offsite critical infrastructure such as, electricity distribution and roads etc.

- Offsite environmental values
- Economic values such as business continuity, offices, plant, local community, employment, etc.
- Political values such as business reputation, public perception, government and local government policy support, etc.

A bushfire, or series of bushfires over a period of time can impact on all of the above Values and Assets. Being able to quantify the degree of potential impact, in terms of the magnitude, duration, extent or frequency, is needed if different bushfire management options are to be assessed.

3.4 VULNERABILITY

Each building and onsite hazard will have a particular vulnerability to bushfire exposure. The vulnerability will lead to possible loss of value in the Value or Asset if the exposure to a bushfire threat exceeds specific levels of magnitude, duration, extent or frequency. For example, an accommodation building exposed to more than 29kW/m² of radiation or intense ember attack, if not constructed to AS 3959 requirements will most likely catch alight and be destroyed.

Vulnerable onsite structures include;

- Office, lunch room and amenities
- CN processing and day storage shed
- Emulsifier tank
- Boiler
- Mineral oil tanks
- Diesel tank
- Ansol tanks
- Emulsion storage tanks
- A/N storage dome shelters
- HE magazines
- Assembly building
- Final product store
- Base cap store
- Detonator test building
- Detonator assembly building

Flammable on site hazards are particularly vulnerable to bushfire exposure. Onsite hazards include;

- Storage domes
- 30kl diesel storage tank
- 68kL and 75kL Mineral oil tank
- Wooden pallets.
- Open waste bin (large industrial)

3.5 BUSHFIRE THREATS

Bushfire threats are characteristics of bushfires that can result in the damage or loss to Values and Assets. Some typical bushfire threats include:

- Flame Contact (involves heat plus free radicals for piloted ignition)
- Heat (transmitted mainly via radiation and convection)
- Ember and debris (attack by smouldering or flaming windborne debris that is capable of entering or accumulating around a building, and may ignite the building or other combustible material).
- Smoke (airborne particles, many gases, respiratory irritants, vision blockers, heat)

3.6 EXPOSURE TO BUSHFIRE THREAT

Exposure is viewed from each asset and onsite flammable products and items perspective in terms of the magnitude, duration, extent or frequency that can be expected to be experienced by each asset and onsite flammable product and items being assessed, under the range of conditions being planned for. The assessment of

the exposure to the bushfire threat and the potential onsite ignition resulting in a bushfire event is determined whether or not the vulnerability level is exceeded, or not, in each instance.

4. Risk Assessment – Identification / Analysis

When planning for the management of a bushfire emergency, either impacting the site or emanating from the site, the fundamental risk being considered is that of injury or death to persons. The primary threats are flame contact, radiant heat and embers. The secondary threat is induced winds which can cause secondary local fire and consequently expose persons to the primary threats of fire along with physical impact risk such as, structure fires and exposures to high levels of toxic plumes.

Determining the potential exposure of the facility, visitors and staff to the risks from the threats of onsite hazards and bushfire, either impacting the site or emanating from the site and the required measures to manage this risk to a tolerable level (residual risk), requires the identification of all potential risks, an analysis of the scale of the consequences and their likelihood, and an evaluation of the relative importance of the risks to be treated.

Inherent and tolerable (residual) bushfire risk can be determined for individual bushfire events on the basis of the following risk criteria, which is used to inform the likelihood and consequence of such events:

- Likelihood of ignition of onsite hazards and bushfire occurrence takes into consideration the bushfire history of the area, risk of ignition, vegetation type, slope under vegetation and predominant fire weather conditions; and
- Consequence or impact from bushfire on life, property and the environment takes into consideration the degree and severity of potential bushfire scenarios, location of bushfire hazard areas, impact on people, assets present in the area and the level of management and suppression response available.

The likelihood and consequence process determines the inherent bushfire risk of the event and informs the level of mitigation or management response required to reduce the risk to an acceptable (tolerable) level. The risk assessment matrix used to determine inherent and residual bushfire risk is outlined below.

Likelihood ratings

Likelihood rating	Description
Almost certain	<ul style="list-style-type: none">• Is expected to occur in most circumstances;• High level of recorded incidents and/or strong anecdotal evidence; and/or• Strong likelihood the event will recur; and/or• Great opportunity, reason or means to occur;• Strong likelihood buildings will be ignited and destroyed;• Strong likelihood onsite hazards will be ignited;• May occur more than once in 5 years
Likely	<ul style="list-style-type: none">• Regular recorded incidents and strong anecdotal evidence; and /or• Considerable opportunity, reason or means to occur;• Likely buildings will be ignited and destroyed;• Likely onsite hazards will be ignited;• May occur at least once in 5 years.
Possible	<ul style="list-style-type: none">• Should occur at some stage; and/or• Few, infrequent, random recorded incidents or little anecdotal evidence; and/or• Some opportunity, reason or means to occur.
Unlikely	<ul style="list-style-type: none">• Would only occur under exceptional circumstances.

Consequence rating

Consequence rating	Description
Minor	<ul style="list-style-type: none"> No fatalities. Near misses or minor injuries with first aid treatment possibly required. No persons are displaced. Little or no personal support (physical, mental, emotional) required. Inconsequential or no damage to an asset, with little or no specific recovery efforts required beyond the immediate clean-up. Inconsequential or no disruption to community. Inconsequential short-term failure of infrastructure or service delivery. (Repairs occur within 1 week, service outages last less than 24 hours.) Inconsequential or no financial loss. Government sector losses managed within standard financial provisions. Inconsequential business disruptions.
Moderate	<ul style="list-style-type: none"> Isolated cases of serious injuries, but no fatalities. Some hospitalisation required, managed within normal operating capacity of health services. Isolated cases of displaced persons who return within 24 hours. Personal support satisfied through local arrangements. Localised damage to assets that is rectified by routine arrangements. Community functioning as normal with some inconvenience. Isolated cases of short to mid-term failure of infrastructure and disruption to service delivery. (Repairs occur within 1 week to 2 months, service outages last less than 1 week.) Local economy impacted with additional financial support required to recover. Government sector losses require activation of reserves to cover loss. Disruptions to businesses lead to isolated cases of loss of employment or business failure. Isolated cases of damage to environmental or cultural assets, one-off recovery efforts required, but with no long term effects to asset.
Major	<ul style="list-style-type: none"> Isolated cases of fatalities. Multiple cases of serious injuries. Significant hospitalisation required, leading to health services being overstretched. Large number of persons displaced (more than 24 hours duration). Significant resources required for personal support. Significant damage to assets, with ongoing recovery efforts and external resources required. Community only partially functioning. Widespread inconvenience, with some services unavailable. Mid to long-term failure of significant infrastructure and service delivery affecting large parts of the community. Initial external support required. (Repairs occur within 2 to 6 months, service outages last less than a month.) Local or regional economy impacted for a significant period of time with significant financial assistance required. Significant disruptions across industry sectors leading to multiple business failures or loss of employment. Significant damage to environmental or cultural assets that require major rehabilitation or recovery efforts. Localised extinction of native species. This may range from loss of a single population to loss of all of the species within the RM Plan area (for a species which occupies a greater range than just the RM Plan area).
Catastrophic	<ul style="list-style-type: none"> Multiple cases of fatalities. Extensive number of severe injuries. Extended and large number requiring hospitalisation, leading to health services being unable to cope. Extensive displacement of persons for extended duration. Extensive resources required for personal support. Extensive damage to assets that will require significant ongoing recovery efforts and extensive external resources. Community unable to function without significant support.

	<ul style="list-style-type: none"> • Long-term failure of significant infrastructure and service delivery affecting all parts of the community. Ongoing external support required. (Repairs will take longer than 6 months, service outages last more than 1 month.) • Regional or State economy impacted for an extended period of time with significant financial assistance required. Significant disruptions across industry sectors leading to widespread business failures or loss of employment. • Permanent damage to environmental or cultural assets. • Extinction of a native species in nature. This category is most relevant to species that are restricted to the RM Plan area, or also occur in adjoining areas and are likely to be impacted upon by the same fire event. 'In nature' means wild specimens and does not include flora or fauna bred or kept in captivity.
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5. Risk Evaluation

5.1 RISK ASSESSMENT MATRIX

The risk rating for each asset has been assessed against the Likelihood and Consequence descriptions to ensure:

- The rating for each asset reflects the relative seriousness of the bushfire risk to the asset;
- Likelihood and consequence ratings assigned to each asset are appropriate; and
- Local issues have been considered.

The following Table shows how likelihood and consequence combine to give the risk rating and subsequent treatment priority for an asset.

Risk assessment matrix

Consequence Likelihood	Minor	Moderate	Major	Catastrophic
Almost certain	3D (High)	2C (Very High)	1C (Extreme)	1A (Extreme)
Likely	4C (Medium)	3A (High)	2A (Very High)	1B (Extreme)
Possible	5A (Low)	4A (Medium)	3B (High)	2B (Very High)
Unlikely	5C (Low)	5B (Low)	4B (Medium)	3C (High)

5.2 RISK ACCEPTABILITY

Risks below a certain level were assessed as not requiring asset specific treatment within the life of this plan and will be managed through routine company controls. Proximity to vegetation is a significant factor in the overall risk assessment and risk rating for the site. The risk will be managed by routine company controls and monitored for any significant change in risk.

In most circumstances risk acceptability and treatment will be determined by the company, in collaboration with local government and or DFES and or a BPAD Level 3 Bushfire Practitioner. However, the following courses of action have been adopted for each risk rating.

Risk Rating	Criteria for Acceptance of Risk	Risk Response
Extreme (Priorities 1A, 1B, 1C)	Only acceptable with excellent controls. Urgent treatment action is required.	Routine controls are not enough to adequately manage the risk. Immediate attention required as a priority. Specific action is required in first year of Bushfire Risk Management Plan.
Very High (Priorities 2A, 2B, 2C)	Only acceptable with excellent controls. Treatment action is required.	Routine controls are not enough to adequately manage the risk. Specific action will be required during the period covered by the RM Plan.
High (Priorities 3A, 3B, 3C, 3D)	Only acceptable with adequate controls. Treatment action may be required.	Specific action may be required. Risk may be managed with routine controls and monitored annually.
Medium (Priorities 4A, 4B, 4C)	Acceptable with adequate controls. Treatment action is not required but risk must be monitored regularly.	Specific action may not be required. Risk may be managed with routine controls and monitored periodically throughout the life of the RM Plan.
Low (Priorities 5A, 5B, 5C)	Risk acceptable with adequate controls. Treatment action is not required but risk must be monitored.	The need for specific action is unlikely. Risk will be managed with routine controls and monitored as required.

5.3 RISK EVALUATION, ASSESSMENT AND TREATMENT

The risk evaluation process considers the level of risk determined during the identification and analysis against the pre-established criteria. Risk can be avoided, accepted or treated. Decisions are made about the priority of risks and the nature of treatment required and if current controls are in place and adequate.

Evaluating the risk will;

- Confirm that the risk ratings for each asset are appropriate
- Identify treatment options
- Identify which asset or item requires treatment

It is necessary to prioritise risk for treatment and consider areas of extreme risk for treatment first before addressing risk with a lower risk rating. The treatment priority may also be based on the company's own priorities, for example, available finance, future planning.

The risk assessment process used to determine a risk rating means that some existing treatments could be assessed at a lower risk and subsequently, have a lower risk treatment priority.

The purpose of risk treatment is to reduce the likelihood of a bushfire igniting onsite flammable hazards or onsite flammable hazards igniting and starting a bushfire. This is achieved by implementing onsite treatments that modify the characteristics of the risk (onsite environment).

5.4 BUSHFIRE RISK ASSESSMENT AND TREATMENT

Impact of bushfire fuels on the facility

- Vegetation threat description is relevant to all people and onsite buildings and hazards.
- The vegetation is predominately grassland and scrub with ribbon and stringy bark, Mallee tree (eucalyptus).
- The Mallee commonly sheds during the summer period and can cause spotting in excess of 500 metres.
- Ember attack will be medium to long distance and extreme within 50 metres to 100 metres
- Burnout duration time for scrub fuels will be short (10 minutes) and will have a low impact on the facility.
- Grassland / crop/stubble fire is fast moving and has no residual heat and ember attack forms part of the fire front
- Grassland / crop / stubble fire will have a low impact on the facility

Risk Analysis					Risk Treatment				
Bushfire threat	Comment	Likelihood	Consequence	Inherent risk	Controls in place (Y/N)	Mitigation	Likelihood	Consequence	Residual risk
<u>People</u> (Staff and visitors) The bushfire threat surrounds the development and the threat will be from radiant heat and ember attack.	A Bushfire Management Plan (BMP) for the ANE Plant Stage 1 has included conditions to ensure controlled development in respect to establishing Asset Protection Zones (APZ) around the existing site structures. Industry standard is to achieve <10kWm2 exposure as a minimum, if possible. Siting and design is compliant with SPP3.7 and associated Guidelines.	Possible	Catastrophic	Very High (2B)	Yes	The site is surrounded by pasture / crop / stubble. These vegetation types are classified as grassland. APZ distances will be increased from 22.5 metres to 50 metres to reduce the impact of ember attack. A 50 metre separation distance as a minimum to be maintained from for all structures including domes and magazines. Potential heat flux exposure to all onsite structures will be <4 kWm2. Conditions have been applied within this Plan and the BMP to ensure ongoing compliance.	Unlikely	Catastrophic	High (3C)

<p><u>CN processing and day storage building</u></p> <p>The bushfire threat surrounds the building and the threat will be from ember attack (grassland (crop/stubble) and ribbon bark (mallee))</p>	<p>The existing structure is surrounded by grassland / pasture and > 200 metres from bushland containing mallee trees (ribbon bark).</p> <p>The building is exposed to a low level of radiant heat flux of <10.0 kWm², and the threat to the site is from ember attack, specifically from ribbon bark.</p> <p>Calcium Nitrate (C/N) /Ammonium Nitrate (AN) Double Salt. C/N and A/N are non-flammable and non-combustible but are oxidising so may intensify a fire.</p> <p>Dangerous goods are managed according to DMIRS licensing requirements and relevant legislation, guidelines and safety data sheets. (Refer Section 2.2 of this Plan).</p>	Possible	Moderate	Medium (4A)	Yes	<p>The building is non-combustible and will be sited in an area with a heat flux exposure of <4 kWm².</p> <p>There will not be any storage of flammable materials in the C/N processing building.</p> <p>There will be onsite housekeeping requirements to ensure flammable items are stored in appropriate places and containers (excluding the CN processing building) and positioned to reduce the spread of fire if ignited (consequential fires).</p> <p>Onsite litter (fuels) will be managed to ensure any flammable material, such as leaves, bark and grass does not build up under or near any structures. Onsite litter is to be removed.</p> <p>All containers that may become projectiles during a fire event, for example aerosol cans and gas bottles, will be stored in a cage.</p>	Unlikely	Moderate	Low (5B)
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						All flammable items/materials to be located greater than 6 metres from building.			
<u>Onsite buildings</u> (Office, Crib and onsite dome storage shelters (main processing production site)). The bushfire threat surrounds the buildings and the threat will be from ember attack (grassland (crop/stubble) and ribbon bark (mallee))	The existing structures are surrounded by grassland / pasture / crop / stubble. The buildings are exposed to a low level of radiant heat flux of <10 kWm2. The threat to structures are from mallee bushland, and the risk is ember attack, specifically, ribbon bark. The office and crib are constructed with steel cladding and the two storage domes are covered with fire retardant membrane (Heavy-duty fire retardant Armouretex 400gsm fabric.	Possible	Moderate	Medium (4A)	Yes	The classifiable vegetation surrounding the main processing production site separation distance has been increased from 22.5 metres (10kWm2) to 50 metres (<4kWm2), therefore reducing radiant heat exposure and ember attack. All flammable items/materials to be located greater than 6 metres from the buildings. All containers that may become projectiles during a fire event, for example aerosol cans and gas bottles, will be stored in a cage.	Possible	Moderate	Low (5B)
<u>Magazines (Proposed)</u> The bushfire threat surrounds the building and the threat will be from ember attack (grassland / pasture /	Buildings will be constructed to AS 2187.1-1998 Explosives – Storage, transport and use Storage. Accordingly, section 2.3.3.3 of the Australian Standards requires screens for openings, ventilation and shall have 1.6 mm aperture stainless steel screens fitted internally	Possible	Catastrophic	Very High (2B)	Yes	The structure exceeds AS 3959: 2018 Construction of Buildings in Bushfire Prone Areas requirements. A minimum separation distance from classifiable grassland will be 50 metres to	Unlikely	Catastrophic	Low (5C)

crop/stubble) and ribbon bark (mallee))	to prevent insects and other foreign matter entering. The magazine buildings will as a minimum, be located in an area of <10 kWm2. Minimum separation area from grassland / pasture / crop will be 22.5 metres (<10 kWm2)					maintain a radiant heat flux of <4 kWm2. No storage of flammable items to be located less than 50 metres from the buildings.			
<u>Onsite fuel tanks, flammable liquids and electrical cabling.</u> The bushfire threat by ember attack and moderate radiant heat will be from the north and east.	Fuel tanks and other flammable onsite hazards comply with the relevant Acts and Regulations and guidelines (Refer section 2.2 of this Plan) Electrical cabling complies with relevant standards. Cable has been installed in above ground cradles, this system minimises the risk of fuel / debris accumulation, therefore reduces the risk of cabling being compromised by consequential fire.	Unlikely	Major	Medium (4B)	Yes	The classifiable vegetation surrounding the main processing production site separation distance has been increased from 22.5 metres (10kWm2) to 50 metres (<4 kWm2), therefore reducing radiant heat exposure and ember attack on fuel tanks, flammable liquids and electrical cabling. All containers that may become projectiles during a fire event, for example, gas bottles, will be stored in a cage.	Unlikely	Major	Medium (4B)
<u>A/N Storage Dome Shelters</u> The bushfire threat by ember attack and moderate radiant heat will be from the	The A/N storage domes are covered with fire retardant membrane (Heavy-duty fire retardant Armouretex 400gsm fabric). A Bushfire Management Plan (BMP) has included conditions to ensure	Possible	Major	High (3B)	Yes	The classifiable vegetation surrounding the dome shelters separation distance has been increased from 22.5 metres (10kWm2) to 50 metres (<4 km2), therefore reducing radiant heat	unlikely	Major	Medium (4B)

north, south, east and west	controlled development in respect to establishing Asset Protection Zones (APZ) around the site structures. Industry standard is to achieve <10kWm2 exposure as a minimum, if possible.					exposure and ember attack (Refer Figure 3). There is a risk of debris accumulating on the ground at the rear of the domes. Rear of the domes are to be checked regularly and any debris to be removed (Refer Section 6 of this Plan)			
<u>Offsite infrastructure</u> A bushfire igniting from an onsite ignition source (hazardous material)	A bushfire will impact the following: <ul style="list-style-type: none"> Mullewa-Wubin Road- movement of traffic: including commercial freight and light vehicles <p>The risk to Mullewa-Wubin Road users will be direct flame contact, extreme radiant heat and very high ember attack and smoke.</p> <p>Mullewa-Wubin Road may be compromised when the sealed surface is exposed to direct flame contact and extreme radiant heat – road requires maintenance.</p> <p>Mullewa-Wubin Road will be closed to traffic during a bushfire event.</p> <p>Mullewa-Wubin Road will be closed if there is a risk of a toxic plume impacting the road.</p>	Possible	Catastrophic	Very High (2B)	Yes	The facility has reduced the likelihood of ignition of onsite hazards that may potentially ignite a bushfire by: The facility has reduced the risk of exposure to radiant heat by reducing the level of exposure to <4kWm2 and ember attack through increasing separation distances between structures and classifiable vegetation. Onsite flammable hazards will comply with relevant Acts, Regulations and guidelines, and additional compliance requirements to reduce the likelihood of consequential fire are detailed in Section 6 of this Plan.	Unlikely	Catastrophic	High (3C)

	<p>Toxic plume may impact the following;</p> <ul style="list-style-type: none"> • Wubin townsite – residence and local water supply • Commercial – businesses including CBH wheat bin and road train parking. • Great Northern Highway – Traffic flow. 					Reduced likelihood of cylinders becoming projectiles by correct storage.			
<p><u>Exposure to Firefighters</u></p> <p>Rural Firefighters may be exposed to a toxic environment</p>	<p>Rural firefighters are not trained in suppression or containment of hazardous material. The majority of Bushfire Brigade members are local farmers with little or no experience in the containment of structural fires where chemical and explosives are stored.</p>	Possible	Catastrophic	Very High (2B)	No	<p>The risk to firefighters has been reduced by reducing the likelihood of ignition, erecting advisory sign at the entrance and inform brigades via the local government the site has hazardous substances and contains explosives.</p> <p>Sign placed at the entry of the facility advising "Hazardous Substances and explosives on site".</p> <p>Via local government, inform bushfire brigades on the dangers entering the facility during a bushfire event and the risk of a toxic plume emanating from the facility.</p>	Unlikely	Catastrophic	High (3C)

6. Risk Treatment Schedule

Item	Description	Action and Timing
People onsite	<p>Staff – Staff As part of staff induction, they will be made aware of bushfire requirements and ongoing maintenance.</p> <p>The expected people visiting the facility will be regular truck drivers who are familiar with the surroundings and will be onsite for the purpose of delivering or picking up products.</p>	<p>Ongoing (as required) Site management will ensure as part of staff induction, there is awareness of onsite hazards (flammable material) and the correct storage of the material and the need to ensure all debris (fuel accumulation) is reported and maintained to a minimum.</p>
CN processing and day storage building	<p>Building construction type – non-combustible shed. No flammable materials contained in the shed.</p>	<p>Weekly Ensure no flammable items or materials are stored in the shed or within 6 metres of the building.</p> <p>All debris accumulation to be removed.</p>
Onsite buildings (Office, Crib and onsite dome storage shelters (main processing production site)).	<p>Onsite buildings are constructed with metal cladding or fire-retardant material.</p> <p>Exposure from bushfire is primarily ember attack</p>	<p>Weekly Ensure no flammable items or materials are stored within 6 metres of the buildings.</p> <p>All debris accumulation to be removed.</p> <p>Annually (prior bushfire season) The separation distance from the buildings to the vegetation (APZ) will be a minimum 50 metres.</p> <p>Note: If areas outside the 50 metres (APZ) are revegetated, a BAL assessment must be carried out to determine and adjust the separation distance to maintain the current radiant heat flux level on the buildings (Refer Figure 3).</p>

Magazines (Proposed storage for explosives)	The buildings (Magazines) will store Class 1 Explosives. Explosive storage buildings will be constructed to AS 2187.1-1998 Explosives – Storage, transport and use Storage requirements.	<p>Annually (prior bushfire season) The separation distance from the buildings to the vegetation (APZ) will be a minimum 50 metres.</p> <p>Note: If areas outside the 50 metres (APZ) is revegetated, a BAL assessment must be carried out to determine and adjust the separation distance to maintain the current radiant heat flux level on the buildings.</p> <p>Ongoing No storage of flammable items to be located less than 50 metres from the buildings.</p>
Onsite fuel tanks, flammable liquids and electrical cabling.	<p>Fuel tanks and other flammable onsite hazards comply with the relevant Acts and Regulations and guidelines (Refer section 2.2 of this Plan)</p> <p>Electrical cabling complies with relevant standards. Cables have been installed in above ground cradles, this system minimises the risk of fuel / debris accumulation.</p>	<p>Annually (prior bushfire season) The separation distance from the buildings to the vegetation (APZ) will be a minimum 50 metres.</p> <p>Ongoing Ensure no flammable items or materials are stored within 6 metres of the buildings.</p> <p>All debris accumulation to be removed.</p>
A/N Storage Dome Shelters	<p>The A/N storage domes are covered with fire retardant membrane (Heavy-duty fire retardant Armouretex 400gsm fabric. The domes are for the storage of Ammonium Nitrate.</p> <p>There is a risk of debris accumulating on the ground at the rear of the domes. Rear of the domes are to be checked regularly and any debris to be removed.</p>	<p>Ongoing All debris accumulation to be removed that has accumulated against the dome.</p>
Exposure to Firefighters	Rural firefighters are not trained in suppression or containment of hazardous substances. The majority of Bushfire Brigade members are local farmers with little or no experience in the containment of structural fires where chemical and explosives are stored.	<p>Before storage of toxic materials and production Sign to be placed at the entry of the facility advising "Hazardous Substances and explosives on site".</p> <p>Via local government, inform bushfire brigades on the dangers entering the facility during a bushfire event and the potential of toxic plume emanating from the facility.</p>

7. Monitor and Review

The Ammonium Nitrate Plant and associated structures will be maintained from a high-risk bushfire perspective, and after implementing the recommended actions, refer Section 6, the inherent threat from bushfire and resultant risk of ignition from onsite flammable hazards will be reduced to a tolerable level of risk (residual risk), refer section 5.4. This report is to be reviewed annually or when there is a change in the threat or risk environment, or the operations (land use) of the facility.

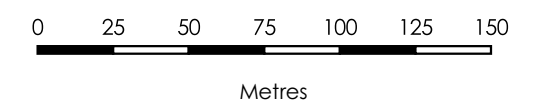
Figure 3

Proposed & Existing Buildings Asset Protection Zones

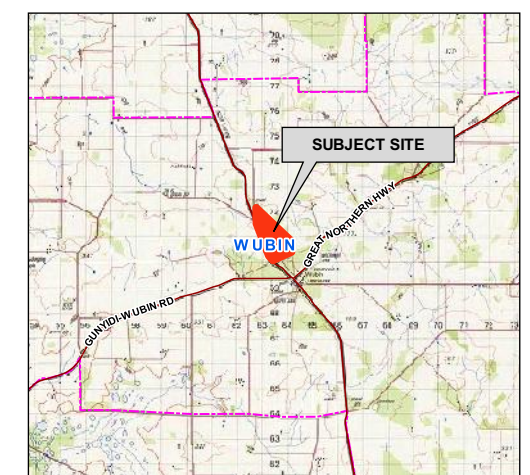
Lot 115 on Plan 148784 and
Lot 117 on Plan 150270
Mullewa-Wubin Road
WUBIN
SHIRE OF DALWALLINU

----- LEGEND -----

- Subject Lots
- Buildings**
 - Assembly Building
 - Base Cap Store
 - Final Product Store
 - Detonator Test Bldg
 - Proposed Magazine
 - Future Magazine
 - Existing Structure
- Asset Protection Zone (50m)
- ↔ APZ Distance (m)



----- LOCALITY -----



AERIAL IMAGERY: Landgate/SLIP



Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map by: Ian Macleod 06-03-2020
SCALE (A3): 1 : 2500

180091 Wubin Emulsion Plant Stage 2 APZ STG 1 & 2.qgz

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1.	CERTIFICATE OF TITLE
2.	DEVELOPMENT PLANS
3.	BUSHFIRE MANAGEMENT PLAN – LETTER OF ENGAGEMENT
4.	ENVIRONMENTAL MANAGEMENT PLAN
5.	EXPLOSIVES MANAGEMENT PLAN - COMMERCIAL IN CONFIDENCE
6.	TRAFFIC IMPACT ASSESSMENT

1. INTRODUCTION

Rowe Group acts on behalf of Hanwha Pty Ltd, the owners of Lots 115 and 117 (No. 29) Thomas Road, Wubin, located at the corner of Mullewa-Wubin Road and Thomas Road, Wubin.

This report has been prepared in support of an application for development approval for a proposed 'Detonator Manufacturing Facility and Associated Storage Magazines' at the existing Hanwha Ammonium Nitrate Emulsion manufacturing facility in Wubin.

This report includes a description of the following matters:

- ▲ Location of the subject site;
- ▲ Description of the existing land use;
- ▲ Overview of relevant planning issues;
- ▲ Detailed explanation of the proposed development; and
- ▲ Justification for the proposed development.

2. DESCRIPTION OF SITE

2.1 LOCATION

The subject site is located in the Municipality of the Shire of Dalwallinu, approximately 235 kilometres north east of the Perth.

Refer Figure 1 – Regional Location.

The subject site is located approximately 1.4 kilometre north of the existing Wubin townsite, and is bound by Mullewa-Wubin Road and Thomas Road. All of the aforementioned roads are sealed, gazetted roads.

Refer Figure 2 – Local Location.

2.2 CADASTRAL INFORMATION

The subject site comprises two (2) land parcels, being:

- ▲ Lot 115 on Deposited Plan 148784, Certificate of Title Volume 17 Folio 220A; and
- ▲ Lot 117 on Deposited Plan 150270 Certificate of Title 150270 Volume 19 Folio 75A.

The subject site has a total land area of 144.26 hectares, with frontages of 816 metres to Thomas Road and 1612 metres to Mullewa-Wubin Road.

Refer Figure 3 – Site Plan and Attachment 1 – Certificates of Title.

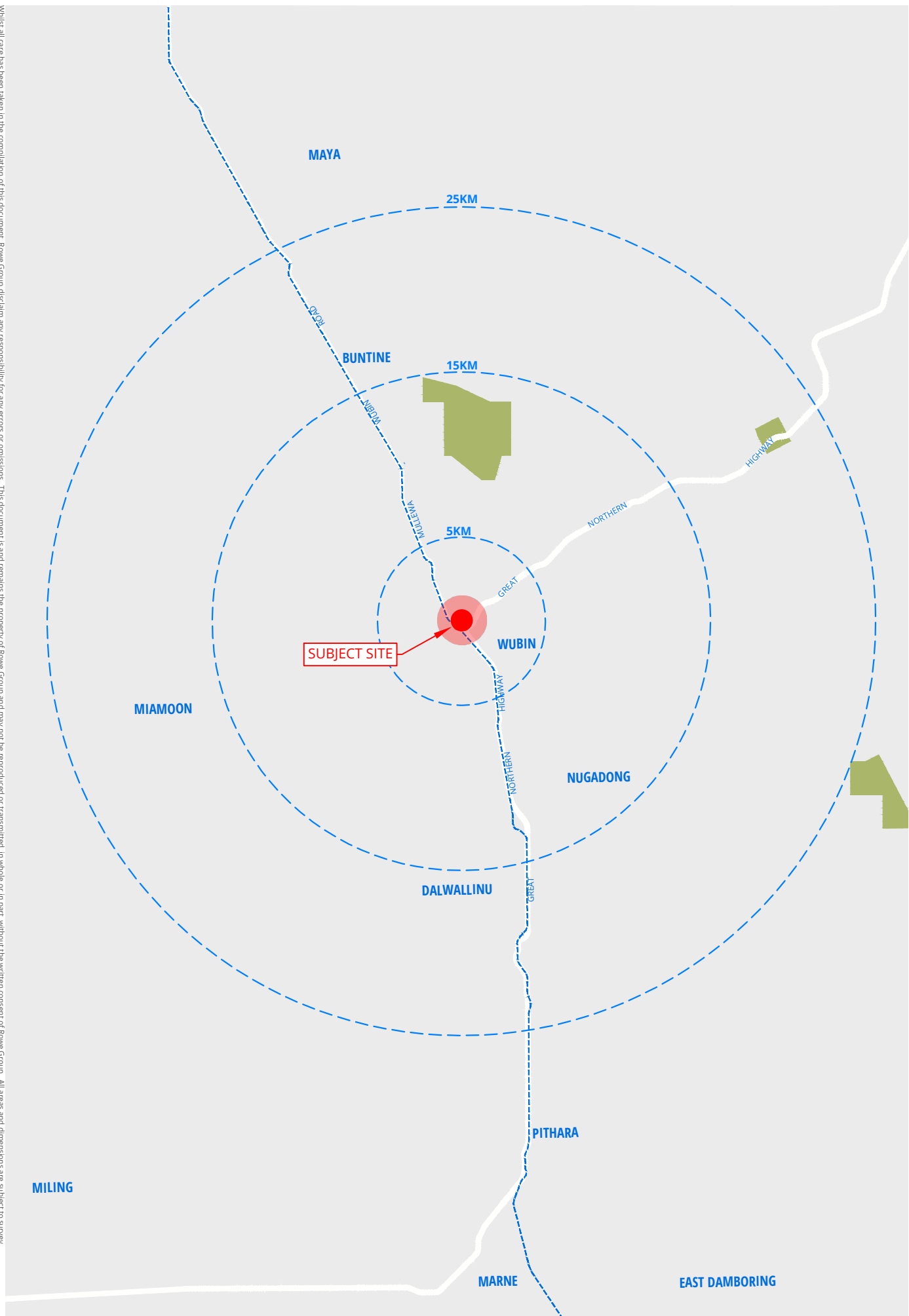
2.3 EXISTING IMPROVEMENTS

The site is utilised by Hanwha Mining Services for an Ammonium Nitrate Emulsion manufacturing facility, which was approved by the Shire of Dalwallinu on 26 June 2018 (DA Ref: DA 151718). The ANE plant produces an ammonium nitrate emulsion product which is used as a precursor ingredient in the mining industry. The facility supports mining operations across Western Australia and serves as a support/backup manufacturing facility for other Hanwha operations across Australia, as required. The balance of the site is comprised of predominantly cleared farmland.

2.4 SURROUNDING LAND USES

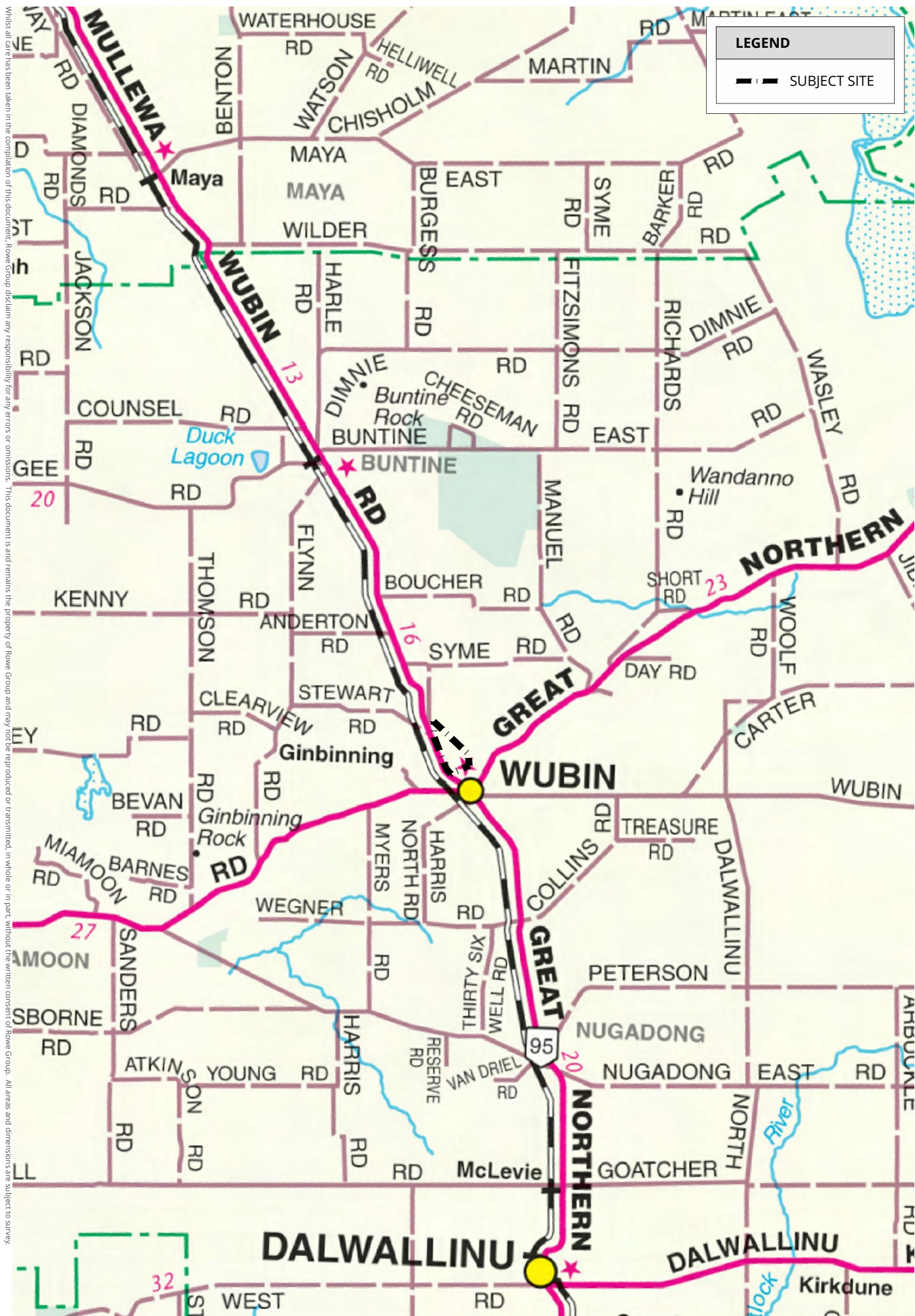
The nearest farmhouse is located approximately 2.0 kilometres north-east of the site, with the closest building within the Wubin townsite being located approximately 1.5km south of the site. Other neighbouring land uses within proximity of the site, include:

- ▲ Broad acre farming to the north, east and west;
- ▲ Wubin light aircraft strip to the immediate north;
- ▲ Remnant vegetation within the unallocated Crown land to the south; and
- ▲ Truck assembly area to the south along the northern side of Thomas Road.



0 7500 m
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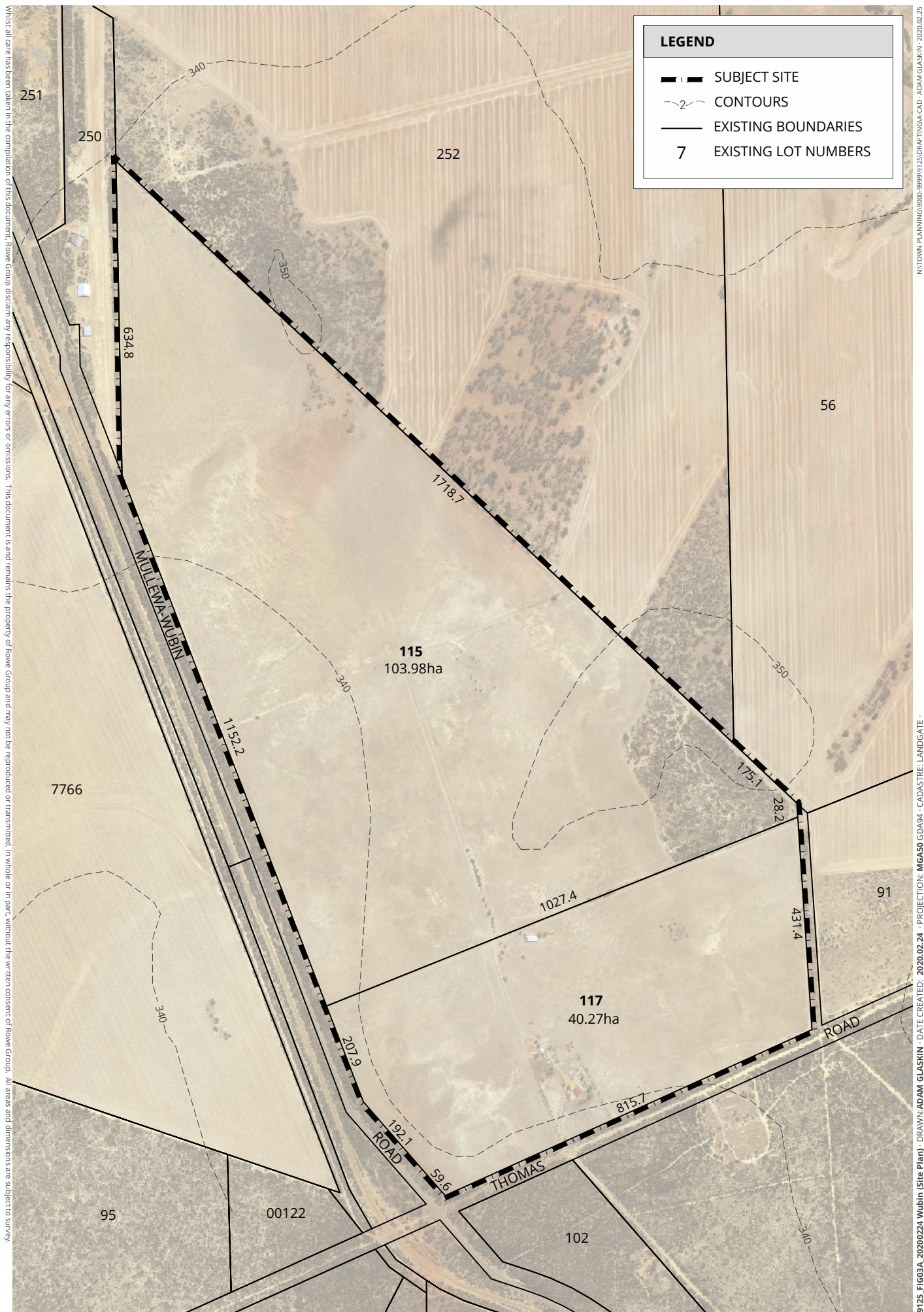




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9125_FIG02A_20200224 Wubin (Local Location) · DRAWN: ADAM GLASKIN · DATE CREATED: 2020.02.24 · PROJECTION: MGA50 GDA94 · CADASTRE: LANDGATE · N/TOWN PLANNING/9000-9999/9125/DRAFTING/GA-CAD · ADAM GLASKIN · 2020.02.25

FIGURE 2
LOCAL LOCATION



0 187.5 m
SCALE @ A4: 1:7500



FIGURE 3
SITE PLAN

3. DESCRIPTION OF THE PROPOSAL

Hanwha Mining Services ('Hanwha') have been constructing an Ammonium Nitrate Emulsion ('ANE') Manufacturing Facility in Wubin over the last 18 months to support their business in Western Australia. The development was approved by the Shire of Dalwallinu following an Amendment to the *Shire of Dalwallinu Town Planning Scheme No. 2* ('LPS 2') which provided for an 'Additional Use' over the land to permit the following additional uses at the subject site:

- ▲ Storage of Dangerous Goods and Associated Manufacturing; and
- ▲ Truck Assembly.

At the time Planning Approval was granted by the Shire of Dalwallinu, Hanwha envisaged that only ANE was to be kept on site, however, Hanwha's business operations now require the construction of a detonator manufacturing facility and storage sheds (for Class 1 Dangerous Goods) on-site. This Application therefore seeks approval for the construction of a detonator manufacturing facility and the storage sheds, for the storage of Class 1 Dangerous Goods.

The proposed new detonator assembly and storage facility includes the follows (refer Attachment 2 – Development Application Plans):

- ▲ Detonator Assembly Building (magazine)
- ▲ Base Cap Store
- ▲ Detonator Test Building
- ▲ Assembly Building (shed)
- ▲ Magazines
- ▲ Roads, drainage and fencing and hardstand areas.

The area containing the plant and storage areas will extend over approximately 1.3ha and will be surrounded by a security fence.

Gravel/dirt access roads will provide internal access through the site, which also includes a transport assembly area (already constructed).

The detonator plant will have capacity to produce six (6) million units per year, on the basis of two assembly machines running at three (3) million units per year each.

Refer Attachment 2 – Development Application Plans.

3.1 HOURS OF OPERATION

The Detonator Manufacturing Facility and associated development will operate for 12 hours per day, 6 days per week from 6.00am to 6.00pm Monday to Saturday. It is possible that the plant may operate up to 24 hours a day in order to meet peak demand on some occasions (consistent with the original Planning Approval DA Ref: DA 15718).

4. TOWN PLANNING CONSIDERATIONS

4.1 ZONING

4.1.1 SHIRE OF DALWALLINU LOCAL PLANNING SCHEME NO.2

The *Shire of Dalwallinu Local Planning Scheme No.2* ('LPS 2') guides land use and development within the Shire of Dalwallinu. Under the provisions of LPS 2, the subject site is zoned "Rural".

The objectives of the "Rural" zone, as stated in LPS 2, are as follows:

- *To provide for a range of rural pursuits that are compatible with the capability of the land and retain the rural character and amenity of the locality.*
- *To protect land from urban uses that may jeopardise the future use of the land for other planned purposes that are compatible with the zoning.*
- *To support sustainable farming practices and the retention of remnant vegetation.*
- *To prevent any development that may affect the viability of a holding.*
- *To encourage small scale, low impact tourist accommodation in rural locations.*
- *To encourage diversification of rural activities that will reduce the dependency of the rural sector on traditional crops.*
- *To support the creation of homestead lots in accordance with adopted Local Planning Policy.*
- *To support mining activities where an environmental management plan has been prepared and is acceptable to the Council and EPA.*
- *To preclude the disposal of used tyres or any other material that may be detrimental to the quality of land used.*

The proposed facility and uses do not compromise the objectives of the Rural Zone, or impact the viability of other rural land uses. As such, the proposal is capable of approval under the provisions of LPS 2.

The subject site is also identified as being subject to the 'Additional Use (A1)' provisions contained within Schedule 2 of LPS 2.

In this regard, Schedule 2 of LPS 2 sets out a series of conditions pertaining to 'Additional Use 1' regarding the use of the site for the 'Storage of Dangerous Goods and Associated Manufacturing' at the subject site. An assessment of the proposed development against the Additional Use provisions is provided at Section 4.2 of this report.

Refer Figure 4 - Zoning Plan.

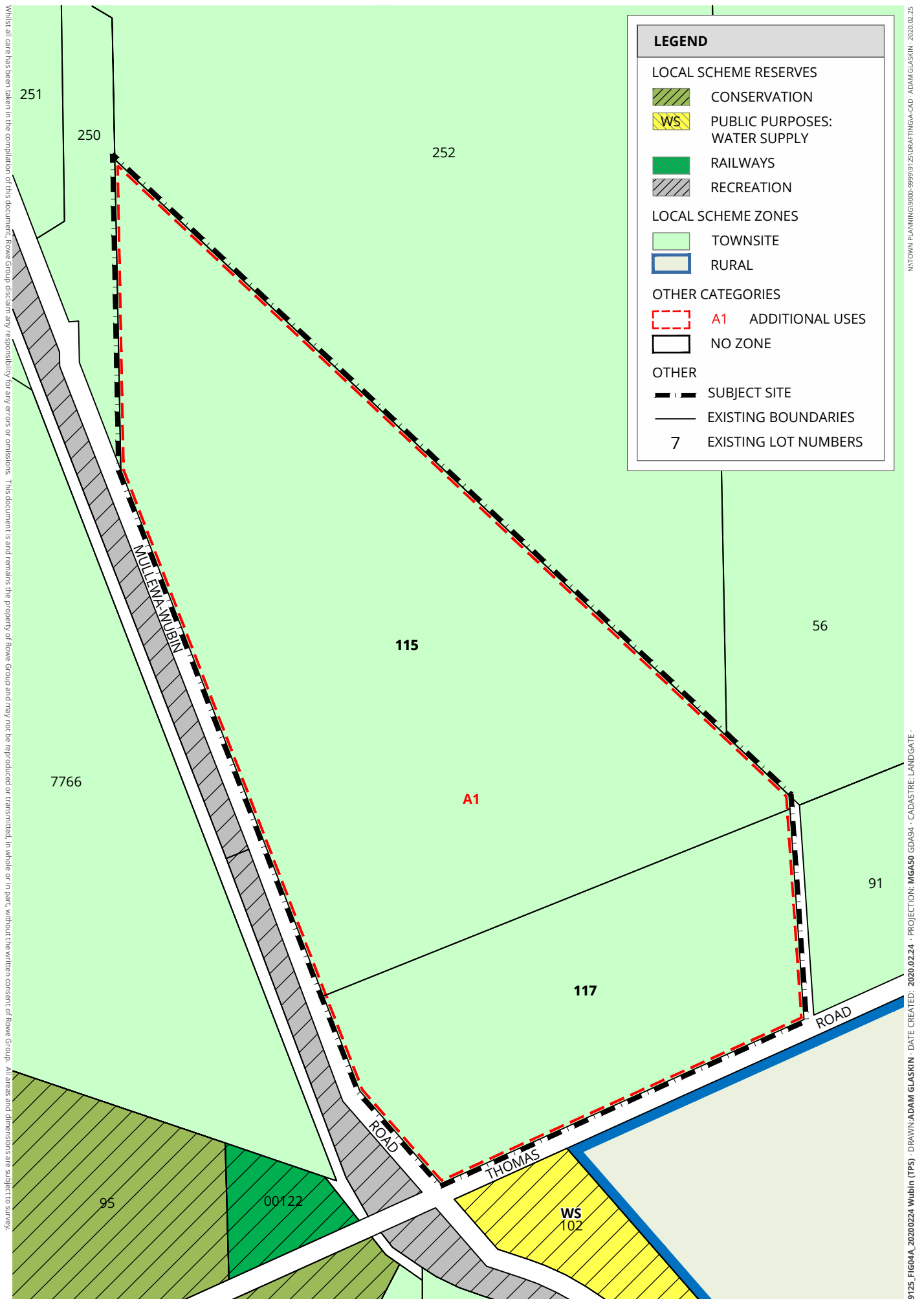
4.1.2 LAND USE PERMISSIBILITY

The proposed land use of detonator manufacturing facility and storage sheds (for Class 1 Explosives) falls within the use class definition of "Storage of Dangerous Goods and associated manufacturing", which is defined in the *Dangerous Goods Safety Act 2004* as:

"Means any substance that is –

- Prescribed by the regulations to be dangerous goods; or*
- Determined by the Chief Officer under the regulations to be dangerous goods"*

In accordance with Schedule 2 of LPS 2, Additional Use 1 (A1) allows for the 'Storage of Dangerous Goods and Associated Manufacturing' at the subject site. As such, the proposed development is capable of approval under the provisions of LPS 2.



0 250 m
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4.2 DEVELOPMENT STANDARDS

We note that a number of conditions were introduced as Scheme Provisions (contained within Schedule 2 of LPS 2) by the Shire of Dalwallinu, the Department of Mines and Petroleum and the Environmental Protection Authority with regard to the storage of Dangerous Goods at the subject site.

An assessment of the conditions contained within Schedule 2 of LPS 2 is provided in Table 1 below.

PROVISIONS	
1. <i>The use is not permitted unless the local government has exercised its discretion by granting development approval under Part 8 of the deemed provisions.</i>	The proposed use is permitted as an Additional Use in accordance with Amendment 2 to LPS 2. This Application seeks approval from the Shire of Dalwallinu for the proposed use, in accordance with Provision 1 of Schedule 2 of LPS 2.
2. <i>Development shall generally be in accordance with the development approval granted by the local government.</i>	The proposed development is consistent with the requirements set out in Schedule 2 of LPS 2 and provides supporting reports including an Environmental Management Plan, Traffic Impact Assessment, Bushfire Management Plan and Emergency Evacuation Plan.
3. <i>Minor variations may be permitted to the development approval by the local government after following the procedures in Clause 77 of the deemed provisions.</i>	No variations are requested to the existing approval. This application seeks approval for additional development for the proposed Detonator Manufacturing Facility and associated storage.
4. <i>All buildings and activities to comply with relevant Commonwealth, State and Local Government by-laws and regulations.</i>	All proposed buildings and activities comply with the relevant legislation as demonstrated in the supporting documents included as part of this application.
5. <i>Access and egress to the Mullewa-Wubin Road are to be at a location and at a standard of construction to the satisfaction of Main Roads WA and the local government.</i>	Access to the site from Mullewa-Wubin Road is in accordance with the previously approved access location. No additional access / egress points to Mullewa-Wubin Road are proposed as part of this Application.
6. <i>All stormwater drainage shall be accommodated on site and no direct discharge onto surrounding properties or road reserves.</i>	All stormwater drainage will be retained on site, refer to the Environmental Management Plan prepared by Coterra Environment. Refer Attachment 4 – Environmental Management Plan

<p>7. <i>The implementation of appropriate fire control and emergency evacuation and management measures as determined by the local government in consultation with relevant State authorities.</i></p>	<p>A Bushfire Management Plan ('BMP') and Risk Management Plan ('RMP') were prepared to support the original Development Application. The BMP and RMP are currently being updated by Bushfire Prone Planning and Coterra Environment as part of this Development Application submission. Finalisation of the BMP and RMP has been delayed as a result of the requirement for development of a Bushfire Risk Management Plan which was not a requirement of the original ANE Plant development. In this regard, the BMP and EEP will be submitted to the Shire of Dalwallinu as soon as possible, however, in order to expedite the planning approvals process, it is requested that a condition be imposed on the Planning Approval requiring the submission of a BMP and EEP to the Shire of Dalwallinu for approval by DFES and the Shire prior to any works commencing on-site.</p> <p>Refer Attachment 3 - Bushfire Management Plan (to be updated) and letter confirming engagement for Bushfire Prone Planning.</p>
<p>8. <i>Effluent disposal shall be undertaken to the satisfaction of the local government and the relevant State Government authority.</i></p>	<p>Effluent disposal is to be undertaken to the satisfaction of the Shire of Dalwallinu and the relevant State Government authority, refer Part 4.24 of the Environmental Management Plan prepared by Coterra Environment.</p> <p>Refer Attachment 4 – Environmental Management Plan</p>
<p>9. <i>The development, operation and management of the ammonium nitrate emulsion facility shall be undertaken in accordance with an Environmental Management Plan approved by the local government.</i></p>	<p>An Environmental Management Plan has been prepared by Coterra Environment to support the Application.</p> <p>Refer Attachment 4 - Environmental Management Plan.</p>
<p>10. <i>The plant must comply with the requirements of Dangerous Goods Safety Act 2004, the national code prepared by the Australian Explosives Industry Safety Group (AEISG) for the storage and handling of UN3375 ammonium nitrate emulsion) and the Department of Mines and Petroleum (DMP) code of practice on the safe storage of ammonium nitrate.</i></p>	<p>The proposed development is consistent with the requirements of the <i>Dangerous Goods Safety Act 2004</i>, Regulations and Codes of Practice pertaining to the storage of Class 1 Explosives. All relevant licences and permits will be obtained from the Department of Mines, Industry Regulation and Safety ('DMIRS') prior to operation of the proposed facility</p>

<p>11. <i>A Dangerous Goods Storage License and a Security Restricted Substance License must be obtained from the DMP prior to the commissioning and operation of the plant.</i></p>	<p>An Explosives Storage Licence and Explosives Management Plan is required as outlined in Section 76 and Section 161 of the Regulations. In this regard, an Explosives Management Plan has been prepared by Hanwha, contained at Attachment 5 to this report. Please note the contents of the Explosives Management Plan is COMMERCIAL IN CONFIDENCE and it is therefore requested that the contents of the report is not made available for public viewing without the prior written consent of Hanwha.</p> <p>All relevant licences will be obtained from the DMIRS prior to operation of the proposed development.</p> <p>Refer Attachment 5 – Explosives Management Plan (COMMERCIAL IN CONFIDENCE).</p>
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This Application is supported by the following documentation, in accordance with the requirements of Schedule 2 of LPS 2:

- ▲ Environmental Management Plan;
- ▲ Traffic Impact Assessment;
- ▲ Explosives Management Plan (Commercial in Confidence); and
- ▲ Bushfire Management Plan (currently being finalised at the time of lodgement).

4.3 DANGEROUS GOODS SAFETY ACT 2004

The proposed Detonator Manufacturing Facility and Storage Magazines must comply with the *Dangerous Goods Safety Act 2004* and associated regulations. The *Dangerous Goods Safety Act 2004* (the 'Act') relates to the safe storage, handling and transport of dangerous goods and for related purposes, and defines 'dangerous goods' as:

- Dangerous Goods*** *Means any substance or article that is –*
- *Prescribed by the regulations to be dangerous goods; or*
 - *Determined by the Chief Officer under the regulations to be dangerous goods.*

It is noted that the current (storage of ANE), and proposed uses (storage of Class 1 Explosives) of the subject site are defined as 'Dangerous Goods' under the Act and are therefore, consistent with the approved Additional Use contained with Schedule 2 of LPS 2.

All relevant licences and permits will be obtained from the Department of Mines and Petroleum prior to operation of the proposed facility in accordance with the Act. Part 1.3 of the Environmental Management Plan outlines the approval and licensing requirements for the proposed facility.

Refer Attachment 4 – Environmental Management Plan

4.4 OTHER CONSIDERATIONS

The proposal must be consistent with the requirements and recommendations of various codes of practice that relate to Dangerous Goods, outlined below.

4.4.1 CODE OF PRACTICE – STORAGE AND HANDLING OF UN3375

The 'Code of Practice -Storage and Handling of UN3375' (the 'Code') by the Australian Explosives Industry Safety Group ('AEISG') sets out the requirements and recommendations to control the risks arising from the storage, handling, transport and security of ANEs. The Code does not apply to Class 1 Explosives and therefore, is not relevant to the proposed Detonator Manufacturing Facility and Storage Magazines.

4.4.1.1 DEPARTMENT OF MINES AND PETROLEUM CODE OF PRACTICE FOR THE SAFE STORAGE OF AMMONIUM NITRATE

The Department of Mines and Petroleum Code of Practice for the Safe Storage of Ammonium Nitrate details the preferred safe work practices for storage and handling of ammonium nitrate. The Codes address the potential explosive risk associated with ammonium nitrate through safe storage and fire protection practices. The document does not apply to substances classed as Class 1 Explosives and as such is not relevant to the proposed Detonator Manufacturing Facility.

5. ENVIRONMENTAL MANAGEMENT

An Environmental Management Plan ('EMP') has been prepared by Coterra Environment in support of this Application. The EMP outlined the following key management actions for the existing ANE Plant and the proposed development to address the impacts of the development on site:

- ▲ Standard operating hours would be from 6.00AM to 6.00PM Monday to Saturday.
- ▲ Key actions in relation to chemical management include –
 - Installation on concrete for the floor material in key loading areas to contain any spills.
 - Undertake regulation inspections of the plant to detect damage, wear and tear, leaks and spills.
 - Fit alarms to ANE storage silos to prevent overflows.
 - Store ANSOL and diesel within bunded areas.
 - Keep chemical spill kits onsite.
- ▲ All plant operators will be appropriately trained in both operation of the plant and what to do in an emergency.
- ▲ Key action in relation to stormwater management will include:
 - Install an earth bund around the plant site to prevent surface water generated during rainfall events from flowing across the work site.
 - Drainage and stormwater will be directed towards a bio-infiltration basin to be located adjacent to the work site. The bio-infiltration basin will be vegetated to assist with the uptake of nutrients from the drainage water prior to infiltration through the sand profile.
- ▲ Non-contaminated waste will be collected in waste bins onsite and disposed to landfill via a local waste management contractor. Potentially contaminated waste will be disposed in accordance with the material's specific requirements.
- ▲ Discharge sewerage onsite through a septic tank and leach drain system.
- ▲ All lights installed at the site will be low in height and will be directed to the plant area to minimise any potential light spill.
- ▲ A Site Complaints Register will be established to record any complaints received in relation to construction or operation activities at the site. Any complaints received will be investigated and management/contingency actions implemented if required.

The proposed Detonator Manufacturing Facility and associated storage can be operated at the site in an environmentally sound manner. This will be monitored by DWER through the licencing and any associated monitoring or reporting requirements.

Refer Attachment 4 - Environmental Management Plan

6. TRAFFIC IMPACT ASSESSMENT

A Traffic Impact Assessment was prepared by Flyt to support the original approval for the ANE Facility at the subject site. A copy of the Traffic Impact Assessment is provided at Attachment 5 to this report.

The Traffic Impact Assessment concluded that the proposed development does not result in any undue impacts from a traffic management perspective, summarised as follows:

- ▲ The development site will be accessed from the Mullewa-Wubin Road, approximately 2km north of the Wubin townsite along the Mullewa-Wubin Road.
- ▲ There is sufficient sight distance available at this location, with the swept paths of the large vehicles being contained within the site as per Main Roads WA standards. No widening of the Mullewa-Wubin Road would be required.

The proposed development will not generate any additional truck movements. New vehicle movements will include the delivery of raw materials for detonator assembly and finished product going out to customers. These movements will be offset by a corresponding decrease in AN deliveries due to a change in the method Hanwha uses to produce AN emulsion.

No additional staff are required to run the facility from the previous approval.

Refer Attachment 6 - Traffic Impact Statement

7. CONCLUSION

In light of the above, it is our view that the proposed Detonator Manufacturing Facility and Storage Magazines are consistent with the provisions of the Additional Use of 'Storage of Dangerous Goods and Associated Manufacturing' contained within Schedule 2 of LPS 2.

The proposed facility will comply with the applicable Codes of Practice and Regulations supported by the Act and relevant licencing will be obtained from the Department of Mines and Petroleum. The Codes of Practice outlined in Conditions 10 and 11 are not relevant to Class 1 Explosives and as such, will not apply. More specific details relating to licencing and codes of conduct specific to other Dangerous Goods can be detailed as part of conditions of approval and are therefore are not limited by the conditions detailed in Schedule 2 of LPS 2.

ATTACHMENT 1

CERTIFICATE OF TITLE

WESTERN



AUSTRALIA

REGISTER NUMBER

115/DP148784DUPLICATE
EDITION**2**

DATE DUPLICATE ISSUED

7/9/2016

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

VOLUME
17FOLIO
220A

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 115 ON DEPOSITED PLAN 148784

REGISTERED PROPRIETOR:
 (FIRST SCHEDULE)

HMS AUSTRALIA PROPERTY HOLDINGS PTY LTD OF LEVEL 2 179 ST GEORGES TERRACE PERTH
 (T N428071) REGISTERED 6/9/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
 (SECOND SCHEDULE)

1. THE LAND THE SUBJECT OF THIS CERTIFICATE OF TITLE EXCLUDES ALL PORTIONS OF THE LOT DESCRIBED ABOVE EXCEPT THAT PORTION SHOWN IN THE SKETCH OF THE SUPERSEDED PAPER VERSION OF THIS TITLE.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
 * Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
 Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 17-220A (115/DP148784)
 PREVIOUS TITLE: 1229-437
 PROPERTY STREET ADDRESS: NO STREET ADDRESS INFORMATION AVAILABLE.
 LOCAL GOVERNMENT AUTHORITY: SHIRE OF DALWALLINU

- NOTE 1: A000001A LAND PARCEL IDENTIFIER OF NUGADONG AGRICULTURAL AREA LOT 115 (OR THE PART THEREOF) ON SUPERSEDED PAPER CERTIFICATE OF TITLE CHANGED TO LOT 115 ON DEPOSITED PLAN 148784 ON 13-JUN-02 TO ENABLE ISSUE OF A DIGITAL CERTIFICATE OF TITLE.
- NOTE 2: THE ABOVE NOTE MAY NOT BE SHOWN ON THE SUPERSEDED PAPER CERTIFICATE OF TITLE OR ON THE CURRENT EDITION OF DUPLICATE CERTIFICATE OF TITLE.

WESTERN



AUSTRALIA

REGISTER NUMBER

117/DP150270DUPLICATE
EDITION**2**

DATE DUPLICATE ISSUED

7/9/2016

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

VOLUME
19FOLIO
75A

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 117 ON DEPOSITED PLAN 150270

REGISTERED PROPRIETOR:
 (FIRST SCHEDULE)

HMS AUSTRALIA PROPERTY HOLDINGS PTY LTD OF LEVEL 2 179 ST GEORGES TERRACE PERTH
 (T N428071) REGISTERED 6/9/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
 (SECOND SCHEDULE)

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
 * Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
 Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 19-75A (117/DP150270)
 PREVIOUS TITLE: 1170-858
 PROPERTY STREET ADDRESS: 29 THOMAS RD, WUBIN.
 LOCAL GOVERNMENT AUTHORITY: SHIRE OF DALWALLINU

NOTE 1: A000001A LAND PARCEL IDENTIFIER OF NUGADONG AGRICULTURAL AREA LOT 117 (OR THE PART THEREOF) ON SUPERSEDED PAPER CERTIFICATE OF TITLE CHANGED TO LOT 117 ON DEPOSITED PLAN 150270 ON 13-JUN-02 TO ENABLE ISSUE OF A DIGITAL CERTIFICATE OF TITLE.

NOTE 2: THE ABOVE NOTE MAY NOT BE SHOWN ON THE SUPERSEDED PAPER CERTIFICATE OF TITLE OR ON THE CURRENT EDITION OF DUPLICATE CERTIFICATE OF TITLE.

ATTACHMENT 2

DEVELOPMENT PLANS

1. CHECK ALL DIMENSIONS ON SITE.
2. ALL MATERIAL AND WORK SHALL CONFORM TO THE BUILDING CODE OF AUSTRALIA. READ ALL ENGINEERING DRAWINGS IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS. ANY DISCREPANCIES BETWEEN ENGINEERING AND ARCHITECTURAL DRAWINGS SHALL BE CONFIRMED PRIOR TO COMPLETING TENDER/CONSTRUCTION.
3. DO NOT SCALE FROM THESE DRAWINGS.

1. LOADS INCLUDED IN THE DESIGN OF THE STRUCTURE ARE AS DEFINED IN AS1170 PART 1: 2002 - DEAD AND LIVE LOADS, AS1170 PART 2: 2002 - WIND LOADS AND AS1170 PART 4: 2002 - EARTHQUAKE LOADS AND LISTED BELOW.
2. IMPOSED LOADS:

LOCATION	LIVE LOAD (kN/sqm)
GROUND SLAB	15
ROOF	0.25

3. WIND REGION A, TERRAIN CATEGORY 2
 $M_s = 1.0$ (NO SHIELDING), $M_f = 1.0$ (NOT LOCATED ON WINDWARD SIDE OR CREST OF A HILL).
4. EARTHQUAKE LOADING: IMPORTANCE LEVEL 3, $Z = 0.13$ (WUBIN)
EDCII IN ACCORDANCE WITH AS1170.4 - EARTHQUAKE ACTIONS IN AUSTRALIA.
5. 150mm SLAB: MOVING VEHICLES NOT EXCEEDING 5T MAXIMUM AXLE LOAD (i.e. 2.4T SELF WEIGHT FORKLIFT, 2T RATED LIFTING CAPACITY) (UNLIMITED REPETITIONS)
6. DESIGN OF CONCRETE PADS IS TYPICALLY FOR A MINIMUM CALIFORNIA BEARING RATIO (CBR) OF FOUNDATION MATERIALS OF 40% IN ACCORDANCE WITH GEOTECHNICAL REPORT. MAXIMUM ALLOWABLE VERTICAL BEARING PRESSURES HAVE BEEN LIMITED TO 100kPa.
7. CONCRETE PADS ARE NOT DESIGNED FOR IN SERVICE CRANE LOADS. REFER BACK TO DESIGN ENGINEER WITH CRANE OUTRIGGER LOADS FOR ASSESSMENT OF BEARING REQUIREMENTS PRIOR TO ANY LIFTING ACTIVITY ON PADS.

4. ALL CONCRETE SHALL BE IN ACCORDANCE WITH AS 3600 - CONCRETE STRUCTURES CODE. BLENDED CEMENT SHALL CONFORM WITH AS 3972.
5. REFER TABLE BELOW FOR CONCRETE STRENGTH.
6. REINFORCEMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING STANDARDS:
 - R INDICATES PLAIN REINFORING BAR R250 TO AS/NZS 4671.
 - RI INDICATES PLAIN OR DEFORMED REINFORCER R500L OR D500L TO AS/NZS 4671.
 - RL INDICATES DEFORMED RECTANGULAR MESH D500L TO AS/NZS 4671.
 - SL INDICATES DEFORMED SQUARE MESH D500L TO AS/NZS 4671.
 - ND INDICATES DEFORMED BARS D500N TO AS/NZS 4671.
 - S INDICATES DEFORMED BARS D250N TO AS/NZS 4671.
 - TM SUFFIX INDICATES TRENCH MESH USING DEFORMED BARS D500L TO AS/NZS 4671.
7. REINFORCEMENT SHALL BE PLACED ON CHAIRS WITH ACCURATE COVER AS PER TABLE BELOW.
8. ALL GALVANIZED ITEMS WHICH ARE CAST INTO CONCRETE ARE TO BE PASSIVATED IN A 0.2% SODIUM DICHROMATE SOLUTION OR EQUIVALENT.
9. ALL FORMWORK SHALL BE RIGIDLY CONSTRUCTED OF APPROVED MATERIAL. FORMWORK AND SUPPORTS SHALL BE DESIGNED TO WITHSTAND ALL POSSIBLE LOAD COMBINATIONS DURING CONSTRUCTION.
10. UNLESS OTHERWISE SHOWN, CONSTRUCTION JOINTS IN CONCRETE SHALL ONLY BE MADE WITH THE APPROVAL OF THE ENGINEER.
11. ALL SLAB CONCRETE SHALL BE CURED BY APPROVED METHODS FOR AT LEAST THE PERIOD SHOWN IN THE BELOW.
12. PLACE 12L16 BARS x 200 LONG AT 200 CRS U AND O. ACROSS ALL RE-ENTRANT CORNERS, INCLUDING AT ALL STORMWATER & OTHER SERVICE MANHOLES AND AT BUILDING COLUMNS.
13. NO PENETRATION THROUGH CONCRETE WITHOUT PRIOR APPROVAL OF DESIGN ENGINEER.
14. NOT LESS THAN 24 HOURS MUST PASS BETWEEN ADJACENT SLAB POURS.
15. CONCRETE IS TO BE COMPACTED WITH IMMERSION TYPE VIBRATORS. PARTICULAR ATTENTION TO BE PAID TO AREAS AROUND ANY CAST-IN FIXTURES.
16. ALL JOINTS TO BE FILLED WITH BOSTIK SEAL-N-FLEX FC OR EQUIVALENT NOT LESS THAN 56 DAYS AFTER POURING OF SLAB. JOINT TO BE CLEAN AND DRY, AND SEALANT AND BACKING ROD INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION.
17. THE SLAB SHALL BE FINISHED TO THE LEVELS AND SURFACE FINISH REQUIREMENTS OF THE ARCHITECTS/CLIENTS SPECIFICATION. ALL INTERNAL SLABS TO HAVE A BURNISHED CONCRETE FINISH IN ACCORDANCE WITH AS3610 & CEMENT CONCRETE & AGGREGATES AUSTRALIA (CCAA) DATA SHEET 'THE SPECIFICATION OF BURNISHED CONCRETE FINISH' (AVG 2010). ALL EXTERNAL SLABS TO HAVE A BROOMED FINISH IN ACCORDANCE WITH AS3610 AND CCAA DOCUMENT T59 - 'GUIDE TO CONCRETE FLATWORK FINISHES'.

LOCATION	CONCRETE	TYPE OF CEMENT	COVER TO REINF.	MIN CURING TIME
GROUND SLAB	N40/20/80	GP ONLY	40	3 DAYS
FOOTINGS (UNO)	N25/20/100	GB OR GP	50	3 DAYS

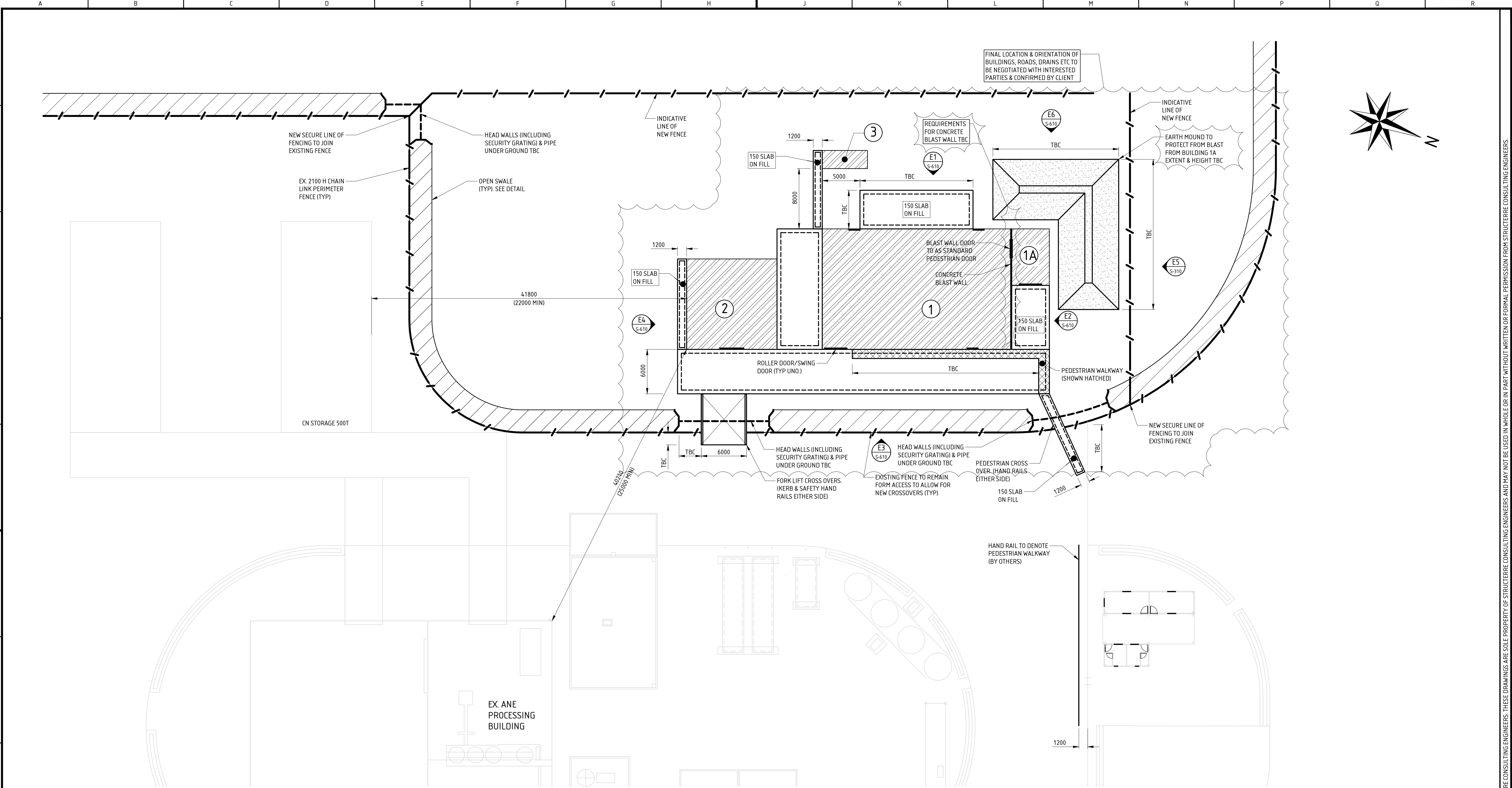
ALL CONCRETE IN CONTACT WITH AMMONIUM NITRATE TO HAVE CEMENTAID EVERDURE 'CALTITE' ADDITIVE INCORPORATED INTO THE MIX (OR APPROVED EQUIVALENT), IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. DOSE RATE FOR CALTITE 30L/m³ PLUS 3% SILICA FUME.

1. THE GEOTECHNICAL INVESTIGATION REPORT PREPARED BY STRUCTERRE, DATED 10/08/17 (REF No. D170375/1718453) – FORMS PART OF THIS SPECIFICATION AND IS TO BE READ IN CONJUNCTION. ANY DISCREPANCIES BETWEEN THAT REPORT AND THIS SPECIFICATION ARE TO BE RESOLVED WITH THE STRUCTURAL ENGINEER PRIOR TO CONSTRUCTION.
2. PRIOR TO CUTTING BASE, REMOVE ALL VEGETATION, TOPSOIL AND DELETERIOUS FILL MATERIAL. (NOTED AS APPROX 100 in GEOTECHNICAL REPORT. CHECK ON SITE)
3. NOTIFY THE ENGINEER OF ANY UNUSUAL FEATURES, DISCREPANCIES OR SIGNIFICANT VARIATIONS IN SOIL TYPE OVER THE BUILDING AREA WHICH MAY BECOME EVIDENT DURING EARTHWORKS. DO NOT PROCEED WITH CONSTRUCTION UNTIL PROPER ADVICE ACHIEVED.
4. PRIOR TO PLACING FILL, ENSURE PREPARED BASE IS DRY.
5. ALL FILL IS TO BE APPROVED BY THE PROJECT GEOTECHNICAL ENGINEER AND COMPACTED IN 300mm LAYERS. FILL IS TO BE TESTED FOR FULL DEPTH TO ACHIEVE TEST RESULTS AS SPECIFIED IN THE GEOTECHNICAL REPORT. NATURAL GROUND TO BE TESTED FOR AT LEAST TOP 750mm, TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER.
6. ROOF WATER AND STORMWATER TO BE TAKEN AWAY AND NOT ALLOWED TO PERCOLATE UNDER FOOTINGS. IF NECESSARY CONNECT INTO SUBSOIL DRAIN SYSTEM.
7. SURFACE WATER NOT TO POND IMMEDIATELY ADJACENT TO FOOTINGS.
8. WHERE PLUMBING PIPES PASS THROUGH THE FOOTINGS, INCREASE FOOTING DEPTH LOCALLY BY AN AMOUNT AT LEAST EQUAL TO THE PIPE DIAMETER.
9. BUILDER TO ENSURE THAT CLIENT BE INFORMED OF NECESSITY TO MAINTAIN DRAINS IN GOOD WORKING ORDER AT ALL TIMES.

- (a) ALL FABRICATION OF STEEL WORK AND TOLERANCES SHALL BE IN ACCORDANCE WITH AS 4100 - STEEL STRUCTURES CODE. MINIMUM WELD TO BE 6mm FILLET.
 - (b) ALL HOLLOW SECTIONS (CHS, RHS AND SHS) SHALL COMPLY WITH AS 1163 - STRUCTURAL STEEL HOLLOW SECTIONS
 - (c) ALL COLD FORMED SECTIONS OTHER THAN THOSE COMPLYING TO AS 1163, TO BE MANUFACTURED FROM CONTINUOUS GALVANIZED STEEL SHEET (GSS) CONFORMING TO AS 1397.
2.
 - (a) ALL WELDING SHALL BE MINIMUM WELD CATEGORY GP (GENERAL PURPOSE) IN ACCORDANCE WITH AS 1554 - STRUCTURAL STEEL WELDING.
 - (b) WHERE BOTH PLATES TO BE WELDED ARE GREATER THAN 2.5mm THICK, THE MINIMUM WELD IS TO BE 6mm FILLET.
 - (c) WHERE EITHER OF THE PLATES TO BE WELDED ARE LESS THAN 2.5mm THICK, WELDING SHALL BE BY THE METAL INERT GAS TECHNIQUE (MIG) CONFORMING TO AS 1554.
 - (d) ALL SITE WELDS TO BE MIN 6mm CONTINUOUS FILLET WELDS UNO, PROPERLY CLEANED AND PREPARED BEFORE WELDING. POWER TOOL CLEAN TO CLASS 2 FOLLOWING WELDING AND PAINT WITH 2 COATS OF ZINC RICH PAINT AND TOP COAT TO MATCH EXISTING.
3. THE CONTRACTOR SHOULD SUBMIT TO THE ENGINEERS FOR APPROVAL 2 COPIES OF THE SHOP DRAWINGS BEFORE COMMENCING FABRICATION.
4. ALL COLUMN BASE PLATES SHALL BE SET ON 20mm MIN OF 1:2 CEMENT AND SAND GROUT.
5. EXCEPT WHERE OTHERWISE SHOWN IN THE DETAILS ALL STEEL TO STEEL CONNECTIONS SHALL BE 10PL CLEAT AND SHALL HAVE A MINIMUM OF 2M16 (8.8/S) BOLTS.
6. ALL BOLTS SHALL BE IN ACCORDANCE WITH AS 1252 AND BE CADMIUM PLATED OR GALVANIZED, UNO.
7. PROVIDE HOLES OR FIXING CLEATS FOR OTHER TRADES AS DIRECTED IN THE SPECIFICATION OR SHOWN ON THE ARCHITECTURAL DRAWINGS.
8. SEAL ALL OPEN ENDS OF PIPES OR RHS MEMBERS, GRIND OFF ALL VISIBLE WELDS AND BRAND MARKS TO NEAT APPEARANCE WHERE SPECIFIED.
9.
 - (a) THE CONTRACTOR SHALL REMAIN RESPONSIBLE AT ALL TIMES FOR PROVIDING ALL NECESSARY TEMPORARY BRACING AND OTHER SUPPORTS DURING ERECTION, TO STABILISE THE PARTIALLY CONSTRUCTED BUILDING.
 - (b) PARTICULAR ATTENTION MUST BE PAID TO THE BUCKLING STABILITY OF BEAMS AND COLUMNS PRIOR TO THE CONNECTION OF PURLINS, GIRTS, FLYBRACES AND OTHER BRACING ELEMENTS.
 - (c) IT IS THE RESPONSIBILITY OF THE BUILDER TO OBTAIN PROFESSIONAL ADVICE WHEREVER NECESSARY TO ENSURE THE PARTIALLY COMPLETED STRUCTURE IS SAFE FROM COLLAPSE.
10.
 - (a) MASONRY AND CONCRETE ANCHORS WILL GENERALLY NOT BE CONSIDERED AS A SUITABLE ALTERNATIVE TO CAST-IN FERRULES EXCEPT AS SPECIFICALLY NOTED ON THE DRAWINGS.
 - (b) ALL MASONRY AND CONCRETE ANCHORS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. THE BUILDER MUST ENSURE THE ANCHOR LENGTH IS ADEQUATE TO ENSURE CORRECT EMBEDMENT, BEARING IN MIND THE THICKNESS OF THE PART BEING FASTENED (ALL ANCHORS FOUND TO BE INSTALLED INCORRECTLY WILL BE REJECTED).
11. THE INSTALLATION OF STATIC SAFETY LINE FIXING POINTS (WHERE REQUIRED BY THE RELEVANT AUTHORITIES) SHALL BE THE BUILDERS RESPONSIBILITY.
12. ALL STEEL TREATMENT TO BE IN ACCORDANCE WITH TABLE 3.4.2 OF THE BCA (VOLUME 2) AS A MINIMUM, OR AS PER ARCHITECT'S/BUILDER'S FURTHER SPECIFICATION. ALL HOLDING DOWN BOLTS TO BE HOT DIP GALVANIZED (600g/sqm) UNO. EPOXY COAT ALL STEELWORK BELOW GROUND LEVEL.
13. ALL DISSIMILAR METAL CONTACT TO BE ELECTRICALLY ISOLATED BY USE OF NON-CONDUCTIVE LOAD BEARING SPACERS TO MANUFACTURER'S SPECIFICATION.

[illegible]

ALL RIGHTS RESERVED. THESE DRAWINGS ARE SOLE PROPERTY OF STRUCTERRE CONSULTING ENGINEERS. NO PART OF THIS DOCUMENT MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT PERMISSION IN WRITING FROM STRUCTERRE CONSULTING ENGINEERS.

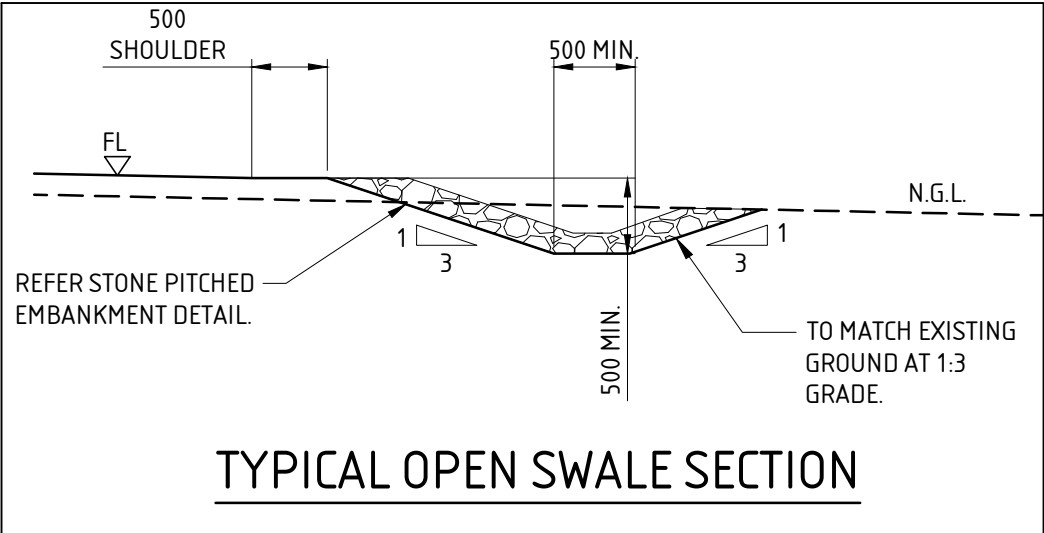
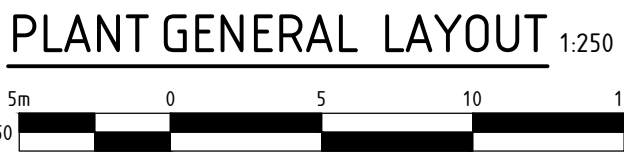


DISCLAIMER:
THE DIMENSIONS SHOWN ON THESE STRUCTURAL DRAWINGS ARE REPRODUCED FROM DRAWINGS SUPPLIED BY OTHERS. ALL RESPONSIBILITY FOR THE ACCURACY OF ANY OF THE BUILDING AND SET OUT DIMENSIONS REMAINS WITH THE CLIENT. WHILE ALL CARE HAS BEEN TAKEN TO REPRODUCE THIRD PARTY INFORMATION ACCURATELY, NO RESPONSIBILITY IS TAKEN BY STRUCTERRE FOR ANY OMISSION OR DISCREPANCY BETWEEN WHAT IS SHOWN AND REFERENCED DRAWING SUPPLIED BY OTHERS. IT IS STRONGLY RECOMMENDED THAT ALL DIMENSIONS SHOWN BE VERIFIED BY THE CLIENT AND THE CONTRACTOR PRIOR TO COMMENCING ANY CONSTRUCTION.

FALL & DRAIN ALL PAVEMENTS TO BUILDER'S DETAIL. MAINTAIN MIN SLAB THICKNESS & COVER TO REINFORCEMENT. (TYPICAL)

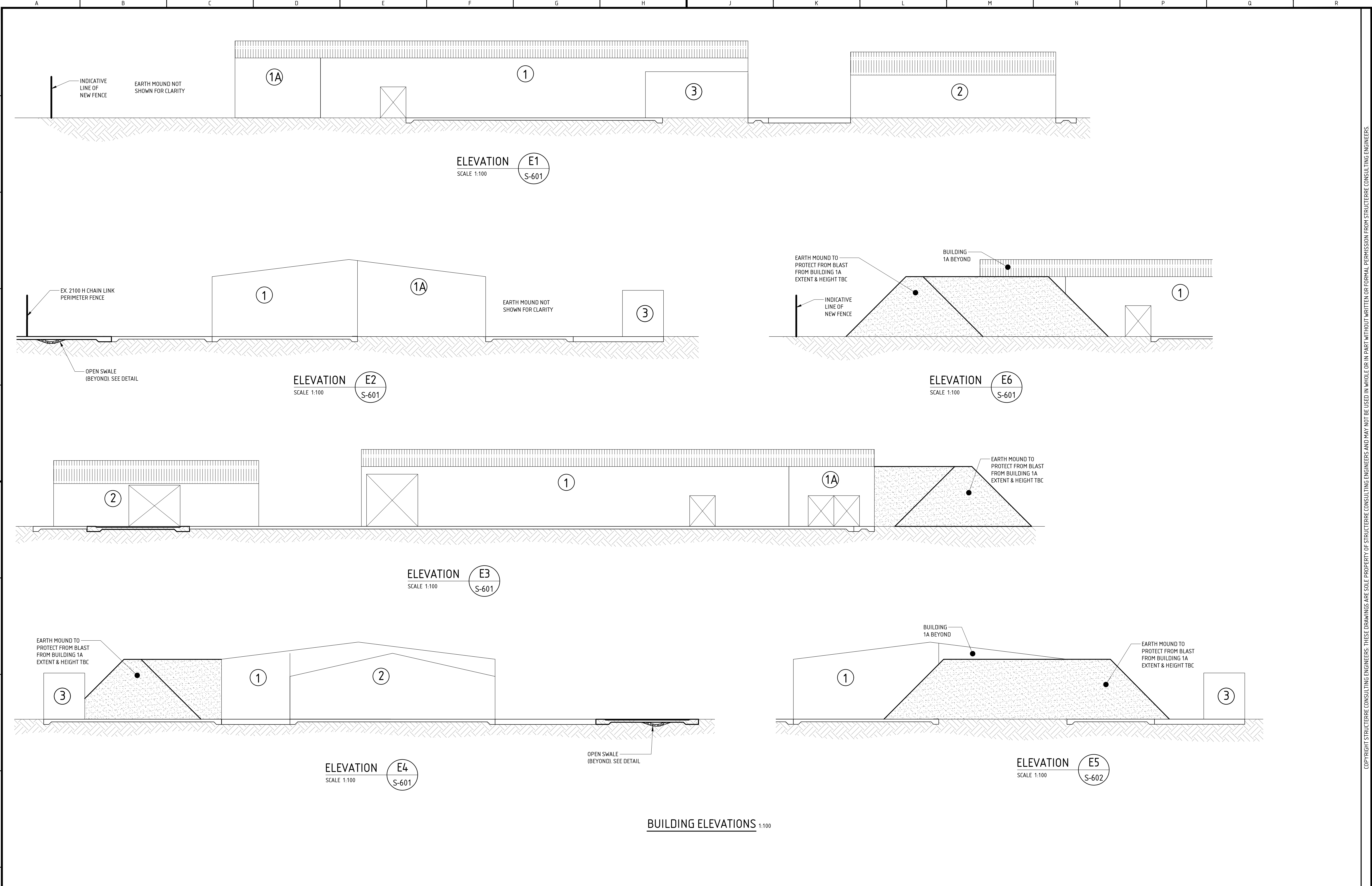
NOMINAL MINIMUM SLAB THICKNESS OF 150mm IS TO SUIT TYPICAL REQUIREMENTS FOR PLANT FIXING ANCHORS.



ALL SERVICES, PIPE STANDS & FOOTINGS TO BE DESIGNED BY IEE.

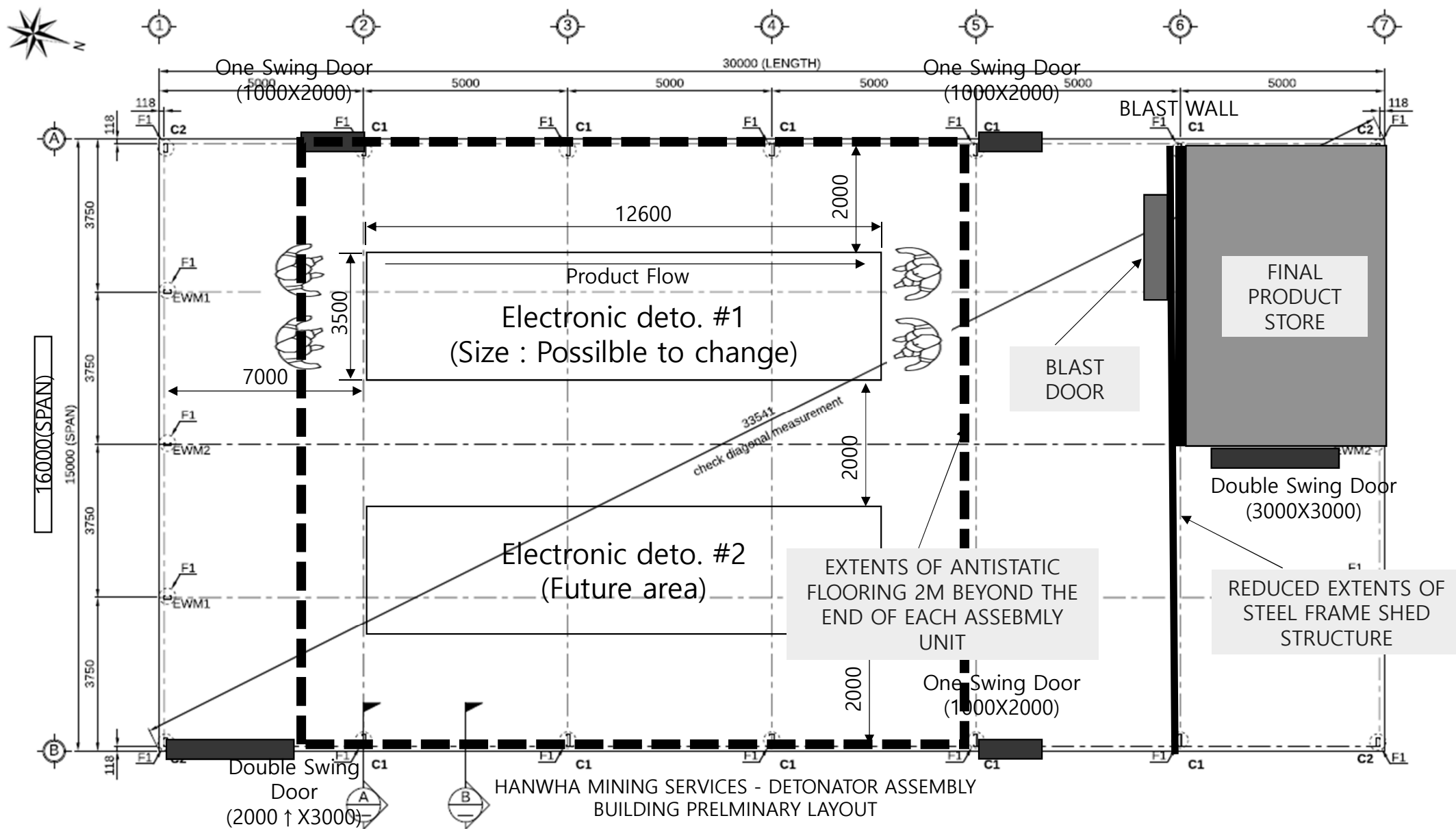


BUILDING No	TITLE	DESCRIPTION	EXPLOSIVE CLASSIFICATION	QUANTITY
1	ASSEMBLY BUILDING	25m x 16m x 4.5m (H-APEX) 3.5m (H-EAVES) SHED	1.1B	20kg NEQ
1A	FINAL PRODUCT STORE	5m x 7.5m x 4.5m (H) SHED		
2	BASE CAP STORE	12m x 12m x 3.85m (H-APEX) 2.5m (H-EAVES)	1.4S	40 PALLETS, 0 NEQ
3	DETONATOR TEST BUILDING	20ft (6m) SEA CONTAINER	1.1B	1kg NEQ
4	HE MAGAZINE	12m x 6m x 3.85m (H-APEX) 2.5m (H-EAVES) MAGAZINE	1.1D	10000kg NEQ
5	HE MAGAZINE	12m x 6m x 3.85m (H-APEX) 2.5m (H-EAVES) MAGAZINE	1.1D	10000kg NEQ
6	HE MAGAZINE	12m x 6m x 3.85m (H-APEX) 2.5m (H-EAVES) MAGAZINE	1.1D	10000kg NEQ
7	HE MAGAZINE	12m x 6m x 3.85m (H-APEX) 2.5m (H-EAVES) MAGAZINE	1.1D	10000kg NEQ
8	HE MAGAZINE	12m x 6m x 3.85m (H-APEX) 2.5m (H-EAVES) MAGAZINE	1.1D	10000kg NEQ
9	DETONATOR ASSEMBLY BUILDING	12m x 30m x 3.85m (H-APEX) 2.5m (H-EAVES) MAGAZINE	1.1B	1000kg NEQ

ISSUE/REVISIONS				ISSUE/REVISIONS				TITLE			CLIENT			PROJECT			STATUS	
REV	BY	DATE	DESCRIPTION	CHK	APP	REV	BY	DATE	DESCRIPTION	CHK	APP	DRAFTSPERSON:	NAME	DATE	WUBIN EXPLOSIVES OPERATIONS	L115 & L117 MULLEWA-WUBIN RD	DEVELOPMENT APPROVAL	SCALE
A	ROB	28.02.20	ISSUED FOR DEVELOPMENT APPROVAL ONLY	PC	PC							DESIGNER:	PAUL COLLEY	FEBRUARY 20	WUBIN AN EMULSION PLANT	WUBIN WA	AS NOTED	
			ISSUE / REVISION DESCRIPTION									ENGINEERING CHECK:	PAUL COLLEY	FEBRUARY 20			DRAWING REF. No.	1.17.23671-S-602
												AUTHORISED BY:					REV	A



ISSUE/REVISIONS										ISSUE/REVISIONS										CLIENT										PROJECT										STATUS										SHEET SIZE: A1									
																				DRAFTSPERSON: ROBERT BURNS FEBRUARY 20										WUBIN EXPLOSIVES OPERATIONS										DEVELOPMENT APPROVAL																			
																				DESIGNER: PAUL COLLEY FEBRUARY 20										L115 & L117 MULLEWA-WUBIN RD																													
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A										ROB										28.02.20										ISSUED FOR DEVELOPMENT APPROVAL ONLY										PC										PC									
REV										BY										DATE										ISSUE / REVISION DESCRIPTION										CHK										APP									



ATTACHMENT 3

BUSHFIRE MANAGEMENT PLAN – LETTER OF
ENGAGEMENT

Level 1 159-161 James Street Guildford WA 6055
PO Box 388 Guildford WA 6935
P: 6477 1144

Our Ref: 180091

21st February 2020

Martin Carroll
Project Manager
JLL, Project and Development Services
Level 29, 152-158 St Georges Terrace
Perth, WA 6000

Dear Martin

Re: Wubin Ammonium Nitrate Emulsion Plant Stage 2

This letter is to confirm that Bushfire Prone Planning are engaged by Hanwha, through Coterra Environment, to produce a Bushfire Management Plan and a Bushfire Risk Management Plan for Stage 2 of the Wubin Ammonium Nitrate Emulsion Plant.

The Bushfire Management Plan will address the requirements of SPP3.7 'Planning in Bushfire Prone Areas', specifically demonstrating whether compliance can be achieved in relation to the bushfire protection criteria.

As the development is considered a high risk land use, a Bushfire Risk Management Plan is required to be produced. The Bushfire Risk Management Plan will address flammable onsite hazards and their potential to ignite a bushfire, prolong its duration or increase its intensity, and to consider the effects on those hazards from a local bushfire event.

Yours Sincerely



Ian Macleod
Consultant
Bushfire Prone Planning

Bushfire Management Plan Coversheet

This Coversheet and accompanying Bushfire Management Plan has been prepared and issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme.

Bushfire Management Plan and Site Details

Site Address / Plan Reference: Lots 115 and 117 Mullewa-Wubin Road

Suburb: Wubin

State: W.A.

P/code: 6612

Local government area: Shire of Dalwallinu

Description of the planning proposal: Development of an Ammonium Nitrate Emulsion Plant

BMP Plan / Reference Number: 180091

Version: 1.0

Date of Issue:

Client / Business Name: Hanwha Mining Services

Reason for referral to DFES

	Yes	No
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the BPC elements)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is the proposal any of the following special development types (see SPP 3.7 for definitions)?		
Unavoidable development (in BAL-40 or BAL-FZ)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Strategic planning proposal (including rezoning applications)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Minor development (in BAL-40 or BAL-FZ)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
High risk land-use	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Vulnerable land-use	<input type="checkbox"/>	<input checked="" type="checkbox"/>

If the development is a special development type as listed above, explain why the proposal is considered to be one of the above listed classifications (E.g. considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?

Note: The decision maker (e.g. local government or the WAPC) should only refer the proposal to DFES for comment if one (or more) of the above answers are ticked "Yes".

BPAD Accredited Practitioner Details and Declaration

Name	Accreditation Level	Accreditation No.	Accreditation Expiry
Ian Macleod	1	BPAD39131	Nov 2018
Company		Contact No.	
Bushfire Prone Planning		6477 1144	

I declare that the information provided within this bushfire management plan is to the best of my knowledge true and correct

Signature of Practitioner



Date

14-3-18



Bushfire Management Plan

(Development Application)

Lot 115 on Plan 148784 and Lot 117 on Plan 150270
Thomas Road & Mullewa-Wubin Road, Wubin

Shire of Dalwallinu

Job Number:	180091
Assessment Date:	20 February 2018
Report Date:	15 March 2018

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Disclaimer

The measures contained in this Bushfire Management Plan are considered to be minimum standards and they do not guarantee that a building will not be damaged in a bushfire, persons injured, or fatalities occur either on the subject site or off the site while evacuating. This is substantially due to the unpredictable nature and behaviour of fire and extreme weather conditions. Additionally, the correct implementation of the required bushfire protection measures (and any associated response/evacuation plan if applicable) will depend, among other things, on the actions of the landowners or occupiers over which Bushfire Prone Planning has no control.

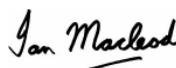
All surveys, forecasts, projections and recommendations made in this report associated with the project are made in good faith based on information available to Bushfire Prone Planning at the time.


All maps included herein are indicative in nature and are not to be used for accurate calculations.

Notwithstanding anything contained therein, Bushfire Prone Planning will not, except as the law may require, be liable for any loss or other consequences whether or not due to the negligence of their consultants, their servants or agents – arising out of the services provided by their consultants.

Document Control

Version	Version Details	Date Submitted
1.0	Initial Document	19-Mar-18
		-
		-

Author	Accreditation	Signature
Ian Macleod	BPAD Level 1 - No. 39131	
Co-author		

Reviewed/Approved		
Kathy Nastov	BPAD Level 3 - No. 27794	

Document Content Compliance Statement

This Bushfire Management Plan (the Plan) provides the required information to address State Planning Policy No. 3.7: Planning in Bushfire Prone Areas - December 2015 (SPP 3.7), the associated Guidelines for Planning in Bushfire Prone Areas - WAPC 2017 v1.3 (Guidelines), and any additional information as directed by the WA Planning Commission (WA Department of Planning, Lands and Heritage). It is fit for accompanying a planning application.

Complex DA BMP Template v1.0

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1 Executive Summary

This BMP is to accompany a development application for the construction of an Ammonium Nitrate Emulsion Plant to service the mining industry in Western Australia. The proposed development site is currently farm land used for grazing.

An Environmental Management Plan has been produced for this development. The Plan states that the proposed development is not considered likely to have significant impact on the environment. The proposed site is predominantly cleared pasture and construction will not require the clearing of native vegetation, with the exception of the removal of vegetation in the Mullewa-Wubin road reserve for a driveway crossover.

It has been determined that the proposed development is a 'high-risk land use'. The proposed development is assessed to contain dangerous goods (Ammonium Nitrate, Calcium Nitrate, Diesel, Mineral Oil).

As the proposed development is considered a high risk land use Bushfire Prone Planning recommend a maximum radiant heat flux level of 10 kW/m² for the future buildings.

All buildings are required to be a minimum of 22.5 metres from the grassland vegetation. In some instances this will be achieved by the construction of hardstand areas around the proposed buildings. Where this is not applicable an Asset Protection Zone must extend into the existing Grassland and managed to comply with the requirements for Asset Protection Zones.

The proposed development consists of Class 8 buildings. These are not required to comply with AS3959-2009 and associated construction specifications. However, it is recommended that the proposed buildings be constructed to the specifications for a BAL-12.5 rating. This will provide protection against ember attack in the event of a bushfire.

2 The Proposal and Purpose of the Plan

2.1 Details

Proponent: Hanwha Mining Services

Site Address: Lot 115 on Plan 148784 and Lot 117 on Plan 150270
Mullewa-Wubin Road, Wubin

Local Government: Shire of Dalwallinu

Lot Areas: Lot 115 – 103.98 ha
Lot 117 – 40.272 ha

Planning Stage: Development application

Development Type: Construction of a Class 4 - Class 9 building

Overview of the Proposal:

This BMP is to accompany a development application for the construction of an Ammonium Nitrate Emulsion Plant to service the mining industry. The proposed development site is currently farm land used for grazing.

Bushfire Prone Planning
Commissioned to Produce the Plan by: Hanwha Mining Services


Purpose of the Plan: To Accompany a development application


For Submission to: Shire of Dalwallinu


Figure 1.1
Proposed Development

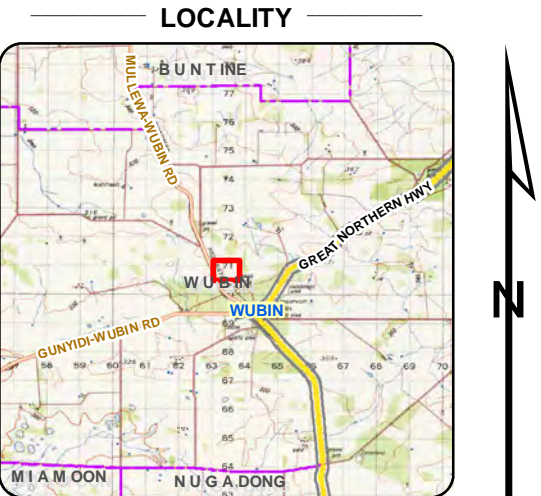
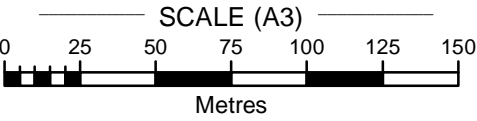
Lot 117 on Plan 150270
Thomas Road
&
Lot 115 on Plan 148784
"no street address"
WUBIN

LEGEND


 Subject Area: Lots 115 & 117

 Other Lots

 Proposed Infrastructure



Aerial Imagery : Landgate/SLIP
Image Date : Apr/Nov 2017



Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre

Map compiled by: Russell Wornes
Date map compiled/updated: 7/03/2018



Figure 1.2
Proposed Development
(SPATIAL CONTEXT)

Lot 117 on Plan 150270
Thomas Road
&
Lot 115 on Plan 148784
WUBIN

LEGEND

Subject Area: Lots 115 & 117

Other Lots

Proposed Infrastructure

Assessment Area

Vegetation - 150m

Reserves & UCL

Unallocated Crown Land

Reserve

Roads

National Highway	Sealed	<div></div>
State Highway/Freeway	Sealed - Unsealed	<div></div>
Main Road	Sealed - Unsealed	<div></div>
Minor Road	Sealed - Unsealed	<div></div>

SCALE (A3)

0 250 500 750 1,000

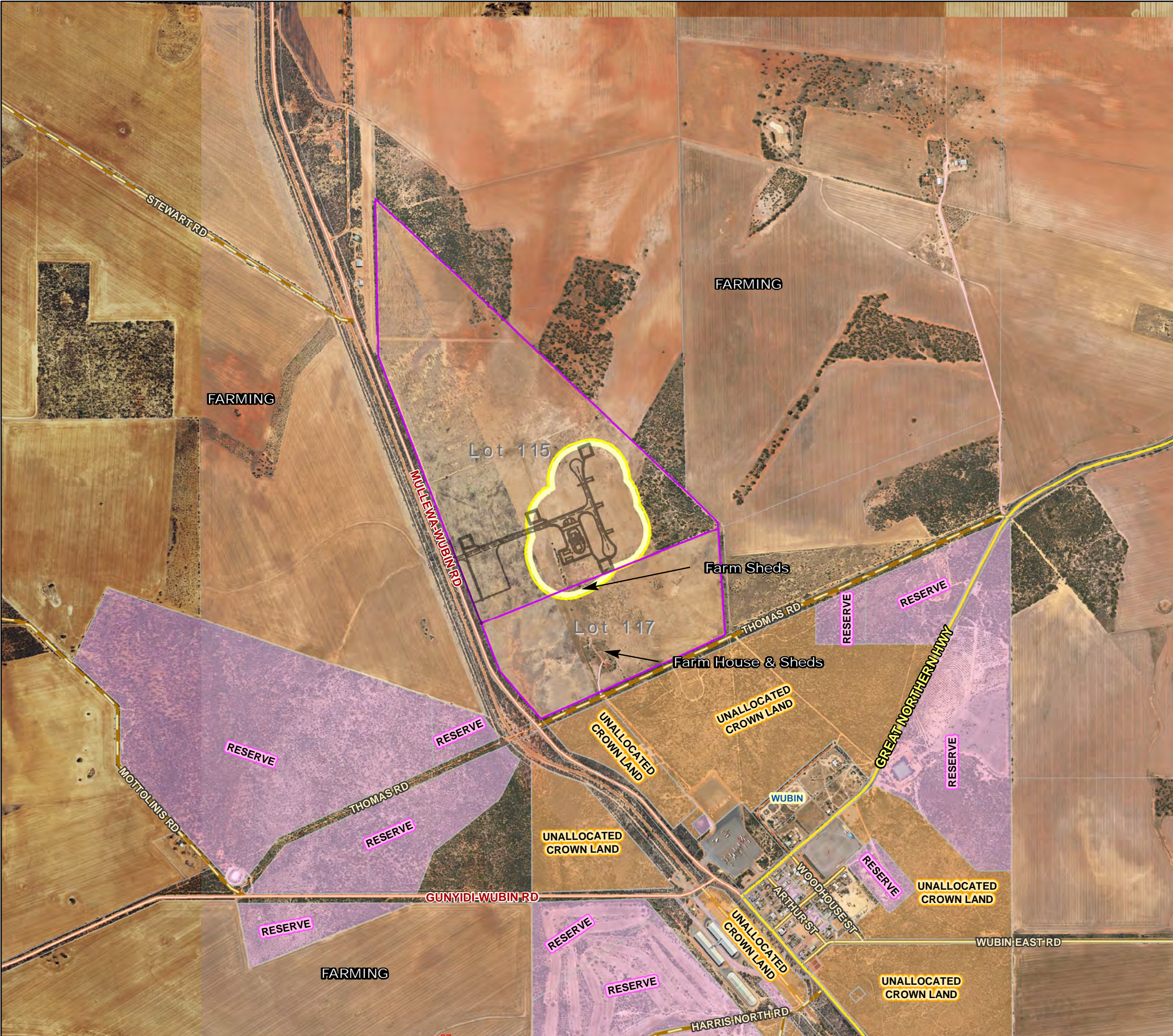
Metres

LOCALITY

Aerial Imagery : Landgate/SLIP
Image Date : Apr/Nov 2017
Nov 2016

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre

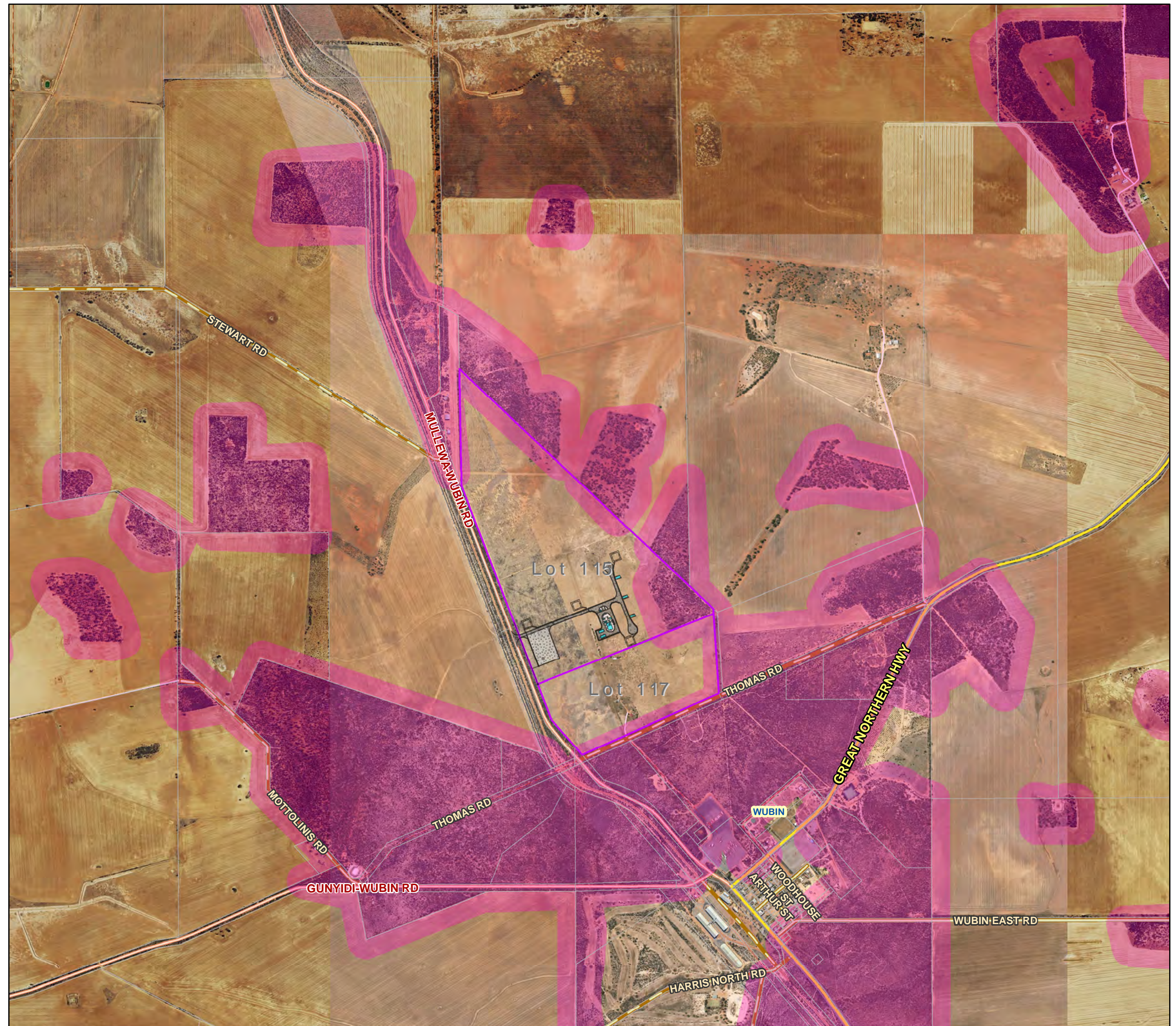
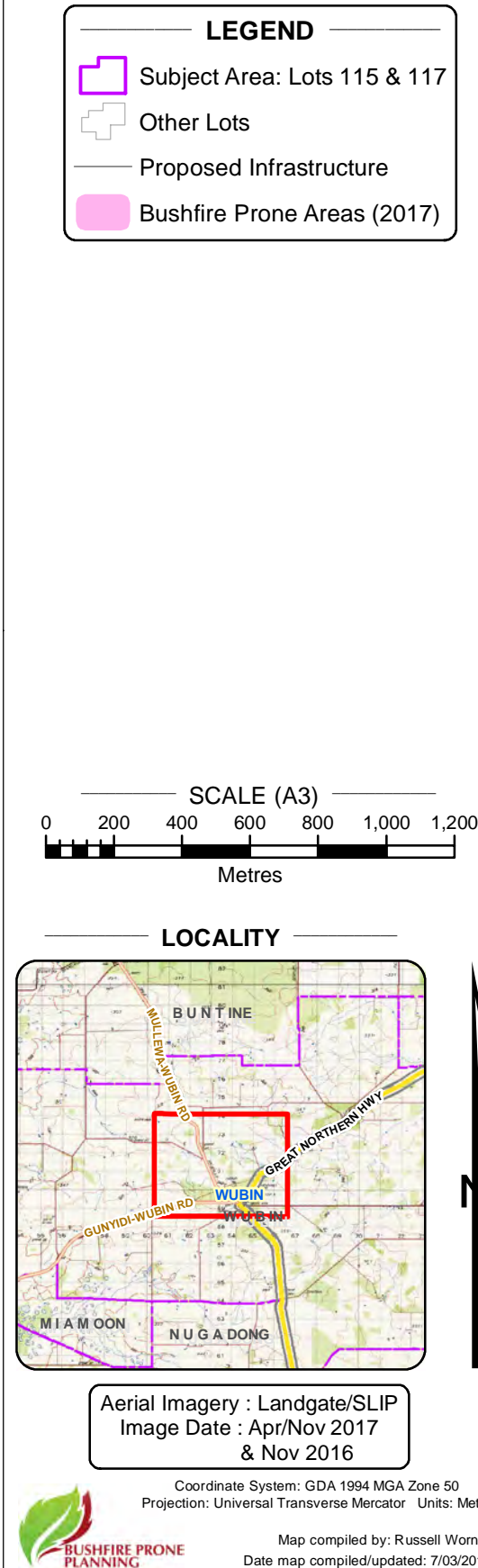
Map compiled by: Russell Wornes
Date map compiled/updated: 2/03/2018



Disclaimer and Limitation: This map has been prepared for bushfire management planning purposes only. All depicted areas, contours and any dimensions shown are subject to survey. Bushfire Prone Planning does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence which may arise from relying on any information depicted.
Document Path: G:\BushfireProne\Mapping\MXD's\180091_Lots 115 & 117, Mullewa - Wubin Road, Wubin_BMP(A3P)v18-3.mxd

Figure 1.3
Bushfire Prone Area

Lot 117 on Plan 150270
Thomas Road
&
Lot 115 on Plan 148784
"no street address"
WUBIN



2.2 Existing Documentation Relevant to the Construction of this Plan

This section acknowledges any known reports or plans that have been prepared for previous planning stages, that refer to the subject area and that may or will impact upon the assessment of bushfire risk and/or the implementation of bushfire protection measures and will be referenced in this Bushfire Management Plan.

Relevant Documents		
Existing Document	Copy Provided by Client	Title
Proposal for Scheme Amendment	Yes	Shire of Dalwallinu Town Planning Scheme No.2 Scheme Amendment No.2
Environmental Report	Yes	Ammonium Nitrate Emulsion Plant Environmental Management Plan
Landscaping (Revegetation) Plan	No	
Bushfire Risk Assessments	No	

The Proposal for Scheme Amendment is now approved for the Additional Use for “Storage of Dangerous Goods and Associated Manufacturing” to Lots 115 and 117 on the corner of Mullewa-Wubin Road and Thomas Road.

The environmental report addresses the environmental acceptability of the proposal against relevant standards and policies.

2.3 High Risk Land Use

Definition and Application

A 'high risk land use' is defined as "a land use which may lead to the potential ignition, prolonged duration and/or increased intensity of a bushfire. Such uses may also expose the community, firefighters and the surrounding environment to dangerous, uncontrolled substances during a bushfire event". The Guidelines provide examples of what constitutes a high-risk land use.

Required Additional Information – Flammable On-site Hazards

Development applications for a high-risk land use are to include a risk management plan that addresses the required bushfire risk management measures for any flammable onsite-hazards.

Required Additional Information - Inability to Comply with SPP 3.7

Proposed high risk land uses that cannot meet full compliance with SPP 3.7 and cannot fully comply with the bushfire protection criteria contained in the Guidelines, including if the proposed site is subject to BAL-40 or BAL-FZ, will generally not be supported unless:

1. Sufficient justification can be provided for support as 'unavoidable development' because the "development represents exceptional circumstances where full compliance with SPP 3.7 would be unreasonable as no alternative location exists and it can be proven that it is not contrary to the public interest", as determined by the decision maker.

(Source: State Planning Policy No. 3.7: Planning in Bushfire Prone Areas - December 2015 (SPP 3.7) s7 and pm6.6 and Guidelines for Planning in Bushfire Prone Areas - WAPC 2017 v1.3 (Guidelines) s5.6.

Determination of High-Risk Land Use

It has been determined that the proposed development is a 'high-risk land use' as the proposed development is assessed to contain dangerous goods (Ammonium Nitrate, Calcium Nitrate, Diesel, Mineral Oil).

Required Additional Information and its Location within this BMP

A risk management plan that addresses bushfire risk management measures for any flammable onsite-hazards to support the 'high-risk' land use.



To be provided as bushfire specific content added to the proponents site specific management plans.

Create a responsibility for the landowner/occupier to inform persons on site of the existence and application of a Risk Management Plan containing bushfire risk management measures for any flammable onsite-hazards. Also to create a responsibility update the plan and continue to comply with the requirements



Within Section 7

3 Environmental Considerations

3.1 Native Vegetation – Modification and Clearing

‘Guidelines’ s2.3: “Many bushfire prone areas also have high biodiversity values. SPP 3.7 policy objective 5.4 recognises the need to consider bushfire risk management measures alongside environmental, biodiversity and conservation values.”

Existing conservation areas that are potentially affected by the development proposal are required to be identified. This may result in vegetation removal/modification prohibition or limitations. These areas include National Parks, Nature Reserves, Wetlands and Bush Forever sites.

Environmental Protection Act 1986: “Clearing of native vegetation in Western Australia requires a clearing permit under Part V, Division 2 of the Act unless clearing is for an exempt purpose. Exemptions from requiring a clearing permit are contained in Schedule 6 of the Act or are prescribed in the Environmental Protection Regulations” (‘Guidelines’ s2.3).

The Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act): This Act administered by the Australian Government Department of Environment, provides a national scheme of environment and heritage protection and biodiversity conservation. Nationally threatened species and ecological communities are a specific matter of significance. Areas of vegetation can be classified as a Threatened Ecological Community (TEC) under the EPBC Act and consequently have removal restrictions imposed.

Vegetation Modification and Clearing Assessment

Will on-site clearing of native vegetation be required?	No
Does this have the potential to trigger environmental impact/referral requirements under State and Federal environmental legislation?	No
Identified environmental legislation applicable to the Proposal site - No.1:	N/A
Identified environmental legislation applicable to the Proposal site - No.2:	N/A
For the proposed development site, have any areas of native vegetation been identified as species that might result in the classification of the area as a Threatened Ecological Community (TEC)?	No
Potential TEC species identified:	N/A

An Environmental Management Plan has been produced for this development. The Plan states that the proposed development is not considered likely to have significant impact on the environment. The proposed site is predominantly cleared pasture and construction will not require the clearing of native vegetation, with the exception of the removal of vegetation in the Mullewa-Wubin road reserve for a driveway crossover.

Impact on Adjoining Land

Is this planning proposal able to implement the required bushfire measures within the boundaries of the land being developed so as not to impact on the bushfire and environmental management of neighbouring reserves, properties or conservation covenants?	Yes
---	-----

The proposed development can achieve Asset Protection Zone (APZ) requirements within the subject lot boundaries. Compliance is regulated via this Bushfire Management Plan for the site and the Shire of Dalwallinu annual Firebreak Order. Bushfire management measures external to the site are not required as part of this proposal.

3.2 Re-vegetation / Retained Vegetation / Landscape Plans

Riparian zones, wetland/foreshore buffers, road verges and public open space may have plans to re-vegetate or retain vegetation as part of the Proposal.
Vegetation corridors may join offsite vegetation and provide a route for fire to enter a development area.
When applicable, any such area will be identified in this Bushfire Management Plan and their impact on the assessment and future management accounted for.

Is re-vegetation of riparian zones and/or wetland or foreshore buffers and/or public open space a part of this Proposal?	No
Is the requirement for ongoing maintenance of existing vegetation in riparian zones and/or wetland or foreshore buffers and/or public open space a part of this Proposal?	No

4 Potential Bushfire Impact Assessment

4.1 Assessment Input

4.1.1 Fire Danger Index (FDI) Applied

AS 3959-2009 specifies the fire danger index values to apply for different regions as per Table 2.1. The values used in the model calculations are for the Forest Fire Danger Index (FFDI) and for which equivalent representative values of the Grassland Fire Danger Index (GFDI) are applied as per Appendix B. The values can be refined if appropriately justified.

Table 3.1: Applied FDI Value

FDI Value			
Vegetation Area	As per AS 3959 - 2009 Table 2.1	As per DFES for the Location	Value Applied
All vegetation areas	80	N/A	80

4.1.2 Existing Vegetation Identification, Classification and Effective Slope

Vegetation identification and classification has been conducted in accordance with AS 3959-2009 s2.2.3 and the Visual Guide for Bushfire Risk Assessment in WA (DoP February 2016).

When more than one vegetation type is present, each type is identified separately with the worst-case scenario being applied as the classification. The predominant vegetation is not necessarily the worst-case scenario.

The vegetation structure has been assessed as it will be in its mature state (rather than what might be observed on the day). Areas of modified vegetation are assessed as they will be in their natural unmodified state (unless maintained in a permanently low threat, minimal fuel condition, satisfying AS 3959-2009 s2.2.3.2-f and asset protection zone standards). Vegetation destroyed or damaged by a bushfire or other natural disaster has been assessed on its revegetated mature state.

Effective Slope: Is the ground slope under the classified vegetation and is determined for each area of classified vegetation. It is the measured or determined slope which will most significantly influence the bushfire behaviour in that vegetation as it approaches a building or site. Where there is a significant change in effective ground slope under an area of classified vegetation, that will cause a change in fire behaviour, separate vegetation areas will be identified, based on the change in effective slope, to enable the correct assessment.

Table 3.2: Vegetation identification and classification.

All Vegetation Within 150 metres of the Proposed Development				
Vegetation Area	Identified Classification Types ¹ or Description if 'Excluded'	Applied Classification ²	Effective Slope Under Classified Vegetation	
			degrees	description
1	Sparse Open Tussock G-24 Sparse Open Herbfield G-28	Class G Grassland	2	Undulating
2	Open Scrub D-14	Class D Scrub	1.2	Downslope
Representative photos of each vegetation area, descriptions and classification justification, are presented on the following pages. The areas of classified vegetation are defined, and the photo locations identified on the topography and classified vegetation map, Figure 3.1.				
Note ¹ : As per AS 3959-2009 Table 2.3 and Figures 2.3 and 2.4 a-g				
Note ² : As per AS 3959-2009 Table 2.3.				

Vegetation Area 1

Classification Applied: Class G Grassland

Classification Justification: Well grazed open paddocks, sparse grass ground cover.



Photo ID: 1a



Photo ID: 1b

Vegetation Area 1

Classification Applied: Class G Grassland

Classification Justification: Well grazed open paddocks, sparse grass ground cover.



Photo ID: 1c



Photo ID: 1d

Vegetation Area 1

Classification Applied: Class G Grassland

Classification Justification: Well grazed open paddocks, sparse grass ground cover.



Photo ID: 1e



Photo ID: 1f

Vegetation Area 1

Classification Applied: Class G Grassland

Classification Justification: Well grazed open paddocks, sparse grass ground cover.



Photo ID: 1g



Photo ID: 1h

Vegetation Area 2

Classification Applied: Class D Scrub

Classification Justification: Scrub and shrubs, <30% foliage cover, grass understorey sparse in places.



Photo ID: 2a



Photo ID: 2b

Vegetation Area 2

Classification Applied: Class D Scrub

Classification Justification: Scrub and shrubs, <30% foliage cover, grass understorey sparse in places.



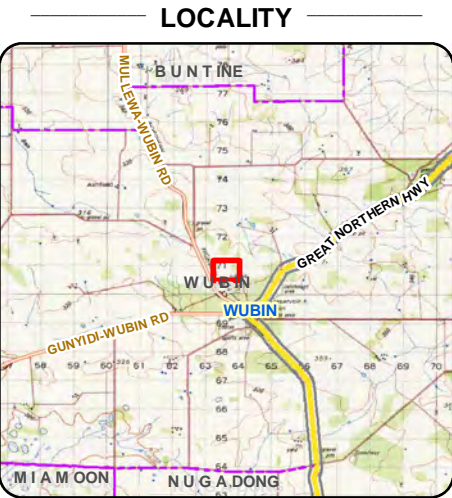
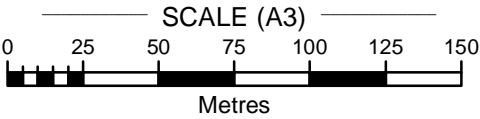
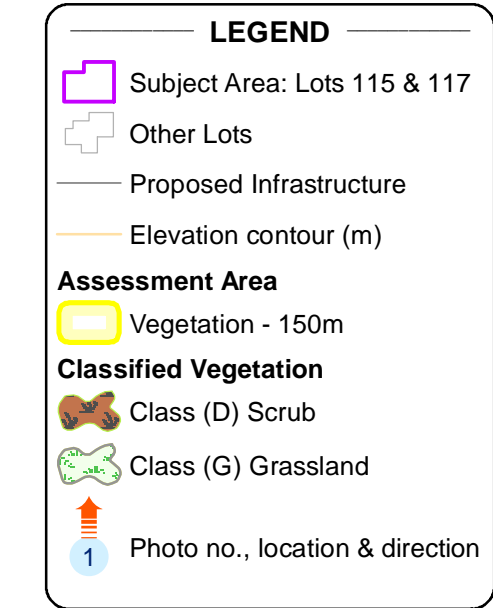
Photo ID: 2c



Photo ID: 2d

Figure 3.1
Topography &
Classified Vegetation

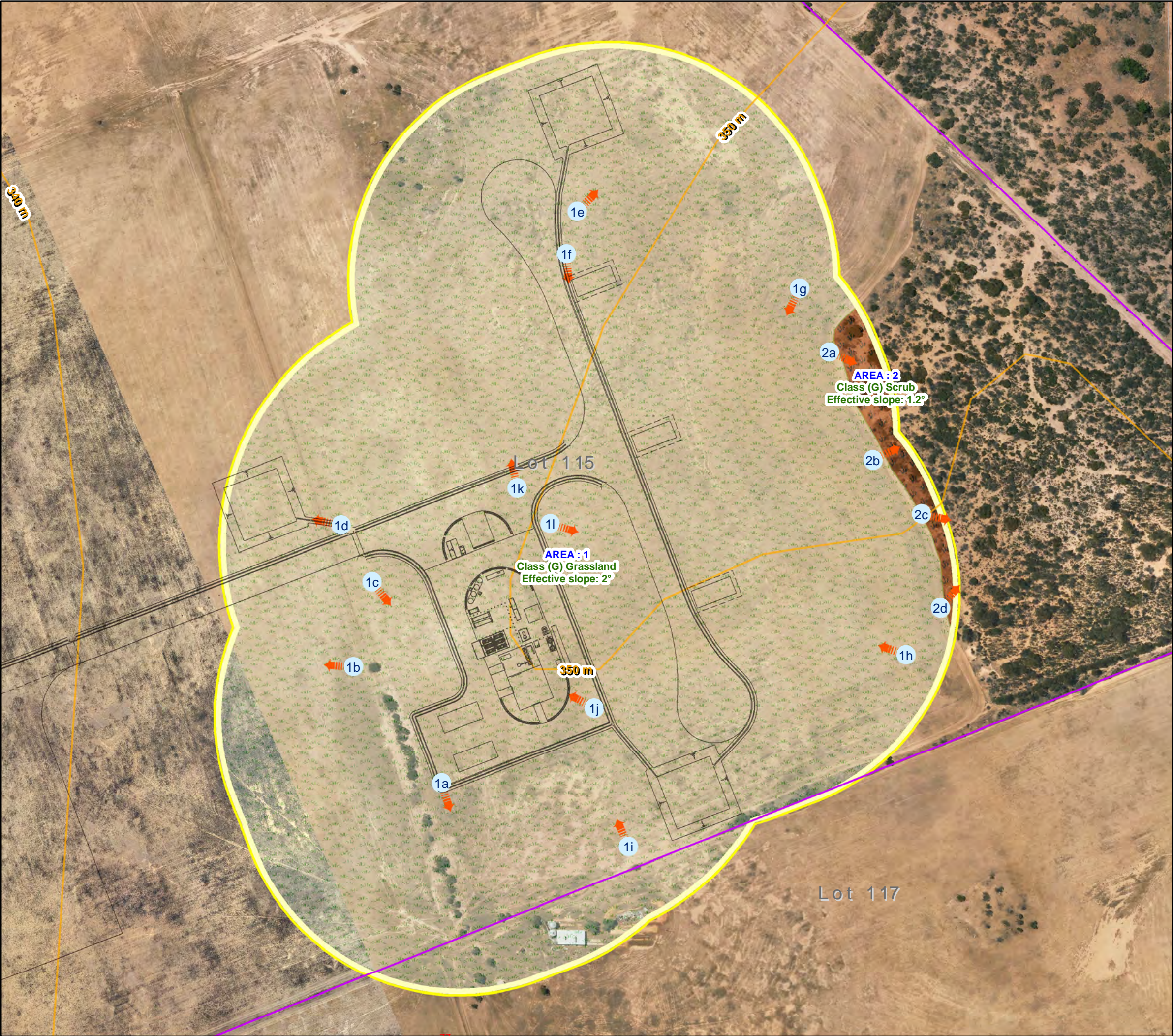
Lot 117 on Plan 150270
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"no street address"
WUBIN



Aerial Imagery : Landgate/SLIP
Image Date : Apr/Nov 2017

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre

Map compiled by: Russell Wornes
Date map compiled/updated: 7/03/2018



4.1.3 Vegetation Separation Distance

The vegetation separation distance is the horizontal distance from an existing building or planned building footprint to the start of an area of classified vegetation.

The separation distance can be:

- The actual distance – which will correspond to a single determined BAL rating. It can only be measured when the location of a building or building footprint is known; or
- A required distance or range of distances that correspond to a single BAL rating or varying BAL ratings. These calculated distances are used to indicate what BAL rating/s are achievable.

Required distances can be presented in this Plan in the following formats, dependant on the specific development proposal and the type of information most applicable:

- A distance that must be achieved to result in a stated BAL rating. This is presented as the Conditional BAL rating (conditional upon achieving the required separation distance);
- A table stating the separation distance range that, if achieved, would correspond to each BAL rating; or
- A map visually showing the separation distance range - from areas of classified vegetation that would remain post-development - that correspond to each BAL rating i.e. a BAL Contour Map.

Note:

Required (calculated) separation distances are presented in the 'Assessment Output' section as the BAL Contour Map and relevant tables to assist with its interpretation.

Required vegetation separation distances (calculated) to achieve stated BAL's are determined in this assessment and are presented in Section 3.2.



4.2 Assessment Output

Understanding the Bushfire Assessment Results - Application of Bushfire Attack Levels (BAL)

The BAL rating has a different application in the building environment compared to the planning environment and the BAL assessment can result in a determined BAL or an indicative BAL which have different implications.

Building versus Planning Applications

In the building environment, a determined BAL rating is required (for the proposed construction) at the building application stage. This is to inform approval considerations and establish the construction standards that are to apply if approved. An indicative BAL rating is not acceptable for a building application.

In the planning environment, assessing the ability of a proposed development site to achieve BAL-29 or less is the objective (as one of the bushfire protection criteria being assessed). The 'development site' is defined by the LPS Amendment Regulations 2015 as "that part of a lot on which a building that is the subject of development stands or is to be constructed".

Therefore, being able to show that a BAL rating of BAL-29 or lower is achievable for a proposed development site (i.e. the building footprint) is an acceptable outcome for that criteria, as established by the bushfire provisions, SPP 3.7 and the associated Guidelines. For planning purposes, this BAL rating could be either indicative or determined.

Determined BAL Ratings

A determined BAL rating is to apply to an existing or proposed construction site (building) and not to a lot or envelope. Its purpose is to state the potential radiant heat flux to which the building will be exposed.

A determined BAL cannot be given for a future building whose location, elevation design and footprint (on a given lot) are unknown. It is not until these variables have been fixed that a BAL can be determined (typically at the development application or building application stage).

The one exception is when a building of **any dimension** can be **positioned anywhere** on a proposed lot or within defined limits within the lot (i.e. building setbacks or building envelope) and always remain subject to the same BAL rating. For this to be the case, there needs to be no classified vegetation either onsite or offsite that if retained could impact upon the determined BAL rating.

Indicative BAL Ratings

When this Plan presents a single indicative BAL rating for a proposed construction site (building), this will be because the construction is still subject to a location within the lot being confirmed and/or a vegetation separation distance being achieved. That is, it will be conditional upon some factor being confirmed at a later stage.

For planning applications associated with proposed lots, the building location, elevation design and footprint have typically not been established. Therefore, indicative rather than determined BAL rating/s will be presented for each lot (with the exception as noted above under 'Determined BAL Ratings').

When this Plan presents a single indicative BAL rating for a lot or building envelope (i.e. an 'area' that is not a located building footprint) it will represent the highest BAL rating affecting that 'area'. The BAL rating of a future building on that 'area' will be dependent on its eventual location.

Otherwise, this Plan will present all BAL ratings for each lot and for each BAL rating, the vegetation separation distances from each area of classified vegetation that are to apply. These distances will be presented as either figures in a table or as a BAL contour map.

From this indicative BAL information, it can be assessed if acceptable BAL ratings (\leq BAL-29) can be achieved for future buildings.

4.2.1 Indicative BAL Results Presented as a BAL Contour Map

Interpretation of the Bushfire Attack Level (BAL) Contour Map

The contour map will present different coloured contour intervals constructed around the classified bushfire prone vegetation. These represent the different Bushfire Attack Levels that exist at varying distances away from the classified vegetation.

Each BAL represents a set range of radiant heat flux (as defined by AS 3959-2009) that can be generated by the bushfire in that vegetation at that location.

The width of each shaded contour (i.e. the distance interval) will vary and is determined by consideration of variables including vegetation type, fuel structure, ground slope, climatic conditions. They are unique to a site and can vary across a site. The width of each contour is a diagrammatic expression of the separation distances from the classified vegetation that apply for each BAL rating, for that site.

A building (or 'area') located within any given BAL contour will be subject to that BAL rating and potentially multiple BAL ratings of which the highest rating will be applied.

Separation Distances Calculated to Construct the BAL Contours

As the proposed development is considered a high risk land use Bushfire Prone Planning recommend a maximum radiant heat flux level of 10 kW/m² for the proposed buildings. The calculated vegetation separation distances required to achieve this rating are shown in Table 3.3 below.

Table 3.3: Vegetation separation distances applied to construct the BAL contours.

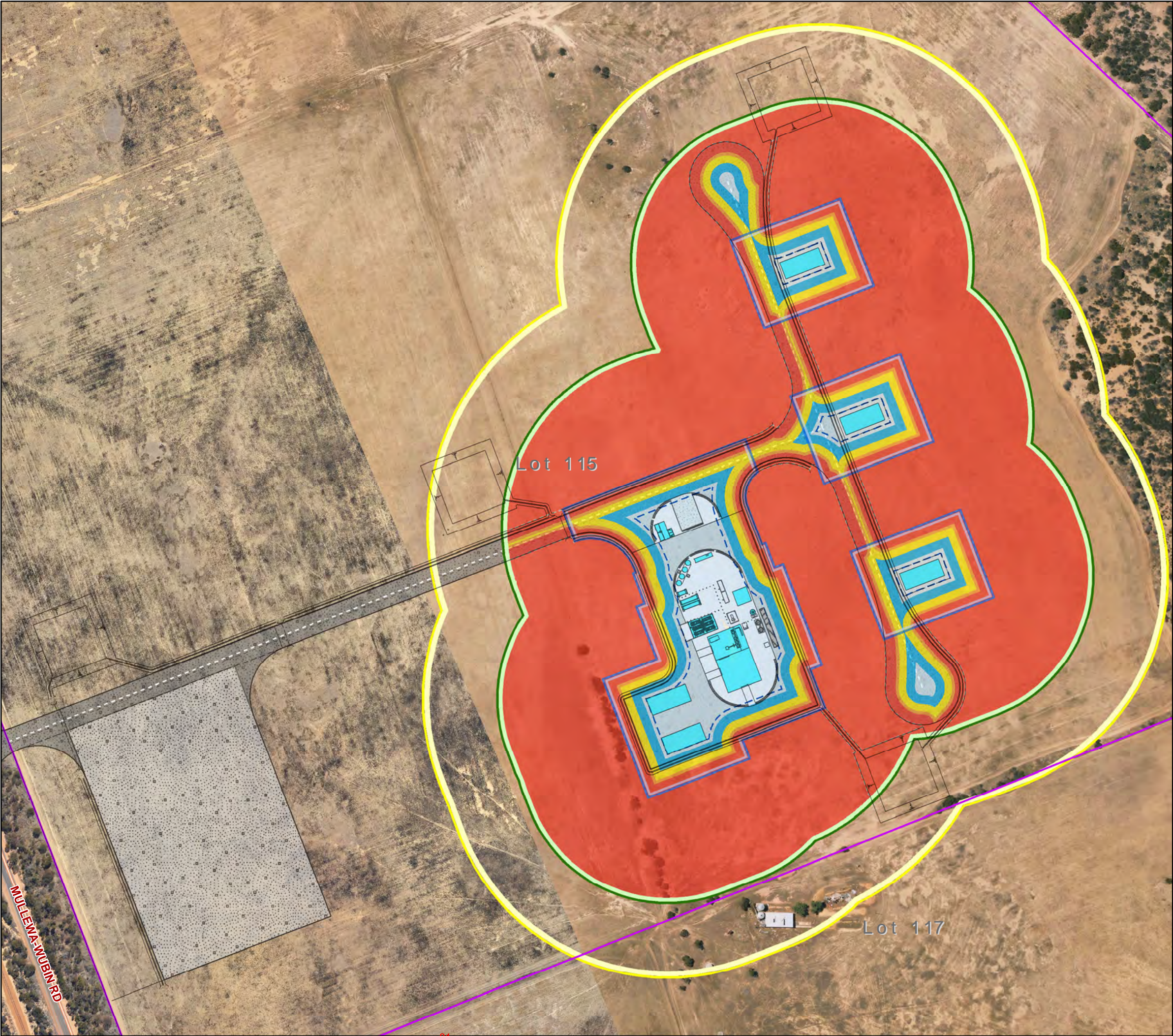
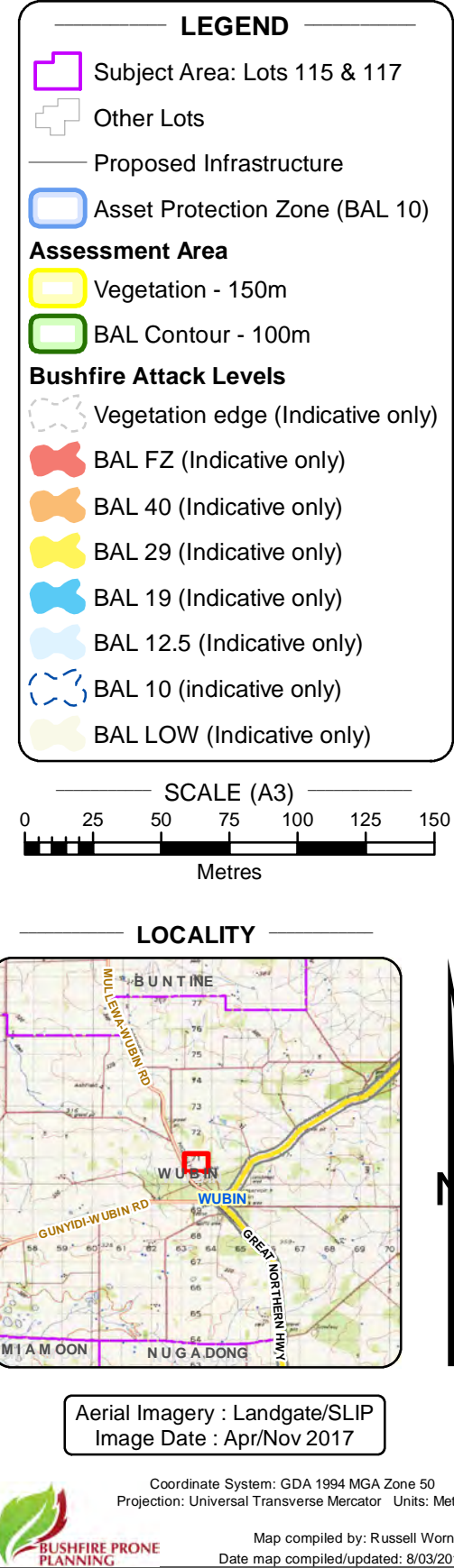
Calculated Vegetation Separation Distances										
Vegetation Area	Vegetation Classification	Effective Slope	Site Slope	BAL Assessment Method Applied ¹	BAL Rating and Corresponding Separation Distance ² (metres)					
		Degrees	BAL-FZ		BAL-40	BAL-29	BAL-19	BAL-12.5	10 kW/m ²	
1	Class G Grassland	2	0	Method 1	<7	7-<9	9-<14	14-<20	20-<22.5	22.5-<50
2	Class D Scrub	1.2	0	Method 1	<11	11-<15	15-<22	22-<31	31-<33.9	33.9-<100

¹ Method 1 as per AS 3959-2009 Table 2.4.3 and Method 2 as per AS 3959-2009 Appendix B. The input variables applied, other than the calculation model defaults, are presented in Section 3.1 of this Plan.

² Copies of the summaries of Method 2 calculation inputs and outputs are presented in Appendix 4

Figure 3.2
BAL Contour Map

Lot 117 on Plan 150270
Thomas Road
&
Lot 115 on Plan 148784
"no street address"
WUBIN



4.2.2 Bushfire Attack Levels (BAL) Derived from The Contour Map

Deriving a BAL Rating for a Future Construction Site (Building) from the BAL Contour Map Data (Capacity to Issue a BAL Certificate)

Key Assumptions: The actual location of a building within a lot or envelope (an 'area') has not been determined at this stage of planning; and the BAL ratings represent the BAL of an 'area' not a building.

The BAL Rating is Assessed as Indicative

If the assessed BAL for the 'area' is stated as being 'indicative', it is because that 'area' is impacted by more than one BAL contour interval and/or classifiable vegetation remains on the lot, or on adjacent lots, that can influence a future building's BAL rating (and this vegetation may have been omitted from being contoured for planning purposes e.g. Grassland or when the assumption is made that all onsite vegetation can be removed and/or modified).

In this report the indicative BAL is presented as either the highest BAL impacting the site or as a range of achievable BAL's within the site – whichever is the most appropriate.

The BAL rating that will apply to any future building within that 'area' will be dependent on:

1. vegetation management onsite; and/or
2. vegetation remaining on adjacent lots; and/or
3. the actual location of the future building within that 'area'.

A BAL Certificate cannot be provided for future buildings, within a lot or envelope with an indicative BAL, until the building location and in some instances building design (elevation), have been established and any required and approved vegetation modification/removal has been confirmed. Once this has occurred a report confirming the building location and BAL rating will be required to submit with the BAL certificate.

The required confirmation of the BAL rating must be done by a bushfire practitioner with the same level of accreditation as has been required to compile this Bushfire Management Plan. This is dependent on the type of calculations utilised (e.g. if performance based solutions have been used in the Plan BPAD Level 3 accreditation is required)

The BAL Rating is Assessed as Determined

If the assessed BAL for the lot or envelope is stated as being 'determined' it is because that lot or envelope is impacted by a single BAL contour interval. This BAL has been determined by the existence (or non-existence) of classified vegetation outside the lot or envelope, and no classifiable vegetation currently exists on the lot or envelope (i.e. it has been cleared to a minimal fuel, low bushfire threat state). In the situation where the BAL Contour Map has been constructed around multiple lots, there also needs to be no classifiable vegetation on an adjacent lot if this vegetation has not already been incorporated into the creation of the BAL Contour Map.

As a result, a determined BAL can be provided in this limited situation because:

1. No classified vegetation is required to be removed or modified to achieve the determined BAL, either within the lot/envelope or on adjacent lots (or if vegetation is excluded from classification, it is reasonable to assume it will be maintained in this state into the future); and
2. A future building can be located anywhere within the 'site' and be subject to the determined BAL rating; and
3. The degree of certainty is more than sufficient to allow for any small discrepancy that might occur in the mapping of the BAL contours.

For a determined BAL rating for a lot/envelope, A BAL Certificate (referring to this BMP) can be provided for a future building, if the BMP remains current.

Table 3.4: Indicative bushfire attack levels for the proposed development.

Indicative Bushfire Attack Levels for Future Buildings on Subject Lots (with required BAL-10 building setback stated)		
Relevant Fire Danger Index (AS 3959-2009 Table 2.1)		80
Highest Indicative BAL Impacting the Proposed Buildings	BAL Determination Method Applied (AS 3959-2009)	10 kW/m ² Building Setback (metres)
BAL-10 (10 kW/m ²)	Method 1 as per AS 3959-2009 s2.2.6 and Table 2.4.3. and Method 2 as per AS 3959-2009 Appendix B.	22.5

All buildings are required to be a minimum of 22.5 metres from Vegetation Area 1. In some instances this will be achieved by the construction of hardstand areas around the proposed buildings. Where this is not applicable the Asset Protection Zone must extend into the existing Grassland and be managed to comply with the requirements for Asset Protection Zones (See Appendix 1).

See Section 3.2.1 Figure 3.2 for indicative representation of the required Asset Protection Zones.

5 Identification of Bushfire Hazard Issues

With the exception of a relatively small area of scrub (7ha), which is greater than 100 metres from the proposed development, the whole of the subject lots are undulating grassland pasture ranging from 0-5 degrees in slope. This is considered a moderate bushfire hazard level.

The greater portion of land surrounding the subject lots is utilised for farming either stock or crops. Some local natural bush areas abut the subject lot boundaries. Areas of native vegetation exist in Crown Reserves and Unallocated Crown Land to the south of the subject lots but are over 500 metres from the proposed development.

6 Assessment Against the Bushfire Protection Criteria (BPC)

6.1 Bushfire Protection Criteria - Assessment Summary

Summarised Outcome of the Assessment Against the Bushfire Protection Criteria (BPC)				
Element	Basis for the Assessment of Achieving the Intent of the Element			
	Achieves compliance with the Element through meeting Acceptable Solutions		Achieves compliance with the Element by application of a Performance Based Solution	Minor or Unavoidable Development
	Meets all relevant acceptable solutions	One or more relevant Acceptable Solutions are not <u>fully</u> met. A <u>variation</u> of the solution is provided and justified.	One or more applicable Acceptable Solutions are not met. A solution is developed with the summary presented in this Plan in Section 5.5. The supporting document presenting Bushfire Prone Planning's detailed methodology is submitted separately to the decision makers.	The required supporting statements are presented in this Plan.
Location	✓			N/A
Siting and Design of Development	✓			
Vehicular Access	✓			
Water	✓			

The subject Proposal has been assessed against:

1. The requirements established in Appendix 4 of the Guidelines for Planning in Bushfire Prone Areas, WAPC 2017 v1.3 (the 'Guidelines'). The detail, including technical construction requirements, are found at <https://www.planning.wa.gov.au/8194.aspx>. A summary of relevant information is provided in the appendices of this Plan; and
2. Any endorsed variations to the Guideline's acceptable solutions and associated technical requirements that have been established by the relevant local government. If known and applicable these have been stated in Section 5.2 of this Plan with the detail included as an appendix if required by the relevant local government.

6.2 Local Government Variations to Apply

Local governments may add to or modify the acceptable solutions of the Bushfire Protection Criteria (BPC) and/or apply technical requirements that vary from those specified in the Guidelines for Planning in Bushfire Prone Areas (WAPC). In such instances, this Proposal will be assessed against these variations and/or any specific local government technical requirements for emergency access and water. Refer to Appendices 2 and 3 for relevant technical requirements.

Will local or regional variations to the acceptable solutions (endorsed by WAPC / DFES) and/or the technical requirements contained in the Guidelines, apply to this Proposal.	No
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6.3 Bushfire Protection Criteria – Acceptable Solutions Assessment Detail

6.3.1 Element 1: Location

Bushfire Protection Criteria Element 1: Location Assessment Statements and Bushfire Protection Measures to be Applied			
Intent: To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure.			
Acceptable Solution:	A1.1: Development Location	Method of achieving Element compliance and/or the Intent of the Element:	The acceptable solution will be fully met.

The proposed development achieves compliance by:

- Being located in an area where the bushfire hazard level assessment within 100m of the external boundary of the subject site is or will on completion, be moderate or low; and
- Managing the remaining bushfire risk to an acceptable level by the existence/implementation and ongoing maintenance of all required bushfire protection measures, as identified within this Plan. These measures include the requirements for vegetation management, vehicular access and firefighting water supply.

The proposed development is located within undulating grassland pasture of less than 10 degrees slope. The bushfire hazard level within 100 metres of the development site is assessed as moderate.

6.3.2 Element 2: Siting and Design of Development

Bushfire Protection Criteria Element 2: Siting and Design of Development Assessment Statements and Bushfire Protection Measures to be Applied			
Intent: To ensure that the siting and design of development (note: not building/construction design) minimises the level of bushfire impact.			
Acceptable Solution:	A2.1: Asset Protection Zone	Method of achieving Element compliance and/or the Intent of the Element:	The acceptable solution will be fully met.

The proposed development achieves compliance by:

- Ensuring future building work on the lots can have established around it an APZ of the required dimensions - to ensure that the potential radiant heat from a bushfire to impact future buildings, does not exceed 29 kW/m² (i.e. a BAL rating of BAL-29 or less will apply to determine building construction standards);
- The APZs can be established fully within the lot boundaries; and
- The landowner/s having the responsibility of continuing to manage the required APZ as low threat vegetation in a minimal fuel state, by maintaining the APZ to the required dimensions and standard, including compliance with the local government's annual firebreak notice.

The required APZ dimensions are set out in Section 3.2.2 Table 3.4. The APZ technical requirements (Standards) are detailed in Appendix 1.

As the proposed development is considered high risk land use and this development is additionally not required to comply with the construction standards of AS3959-2009, a maximum BAL rating of BAL-10 (10 kW/m²) is recommended for the buildings. This will reduce the radiant heat impact on the buildings and provide greater separation from ember attack.

6.3.3 Element 3: Vehicular Access

Bushfire Protection Criteria Element 3: Vehicular Access Assessment Statements and Bushfire Protection Measures to be Applied

Intent: To ensure that the vehicular access serving a development is available and safe during a bushfire event.

Acceptable Solution:	A3.1: Two access routes	Method of achieving Element compliance and/or the Intent of the Element:	The acceptable solution is fully met.
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The Mullewa-Wubin Road provides safe access and egress to two different destinations. As a sealed public road, it is available to all residents and the public at all times and under all weather conditions.

Acceptable Solution:	A3.2 Public Road	Method of achieving Element compliance and/or the Intent of the Element:	The acceptable solution is fully met.
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No new public roads are to be constructed for this development. The existing Mullewa-Wubin Road complies with the technical requirements.

Acceptable Solution:	A3.3 Cul-de-sacs (including a dead-end road)	Method of achieving Element compliance and/or the Intent of the Element:	N/A
Acceptable Solution:	A3.4: Battle-axe	Method of achieving Element compliance and/or the Intent of the Element:	N/A
Acceptable Solution:	A3.5: Private Driveways	Method of achieving Element compliance and/or the Intent of the Element:	The acceptable solution will be fully met.

The construction technical requirements established by the Guidelines and/or the local government will and will be complied with. These requirements are set out in Appendix 2.

Acceptable Solution:	A3.6 Emergency Access Way	Method of achieving Element compliance and/or the Intent of the Element:	N/A
Acceptable Solution:	A3.7 Fire Service Access Routes	Method of achieving Element compliance and/or the Intent of the Element:	N/A
Acceptable Solution:	A3.8 Firebreak Width	Method of achieving Element compliance and/or the Intent of the Element:	The acceptable solution will be fully met.

The proposed lots will comply with the requirements of the local government annual firebreak notice issued under s33 of the Bush Fires Act 1954. Firebreaks to be installed prior to development clearance.

6.3.4 Element 4: Water

Bushfire Protection Criteria Element 4: Water Assessment Statements and Bushfire Protection Measures to be Applied			
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Intent: To ensure water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.

Acceptable Solution:	A4.1 Reticulated Areas	Method of achieving Element compliance and/or the Intent of the Element:	N/A
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A reticulated water supply is not currently available to the site. The closest hydrant is located approximately 2.5 kilometres south of the proposed development on Glowrey Street in the Wubin townsite.

Acceptable Solution:	A4.2 Non-Reticulated Areas	Method of achieving Element compliance and/or the Intent of the Element:	N/A
Acceptable Solution:	A4.3 Non-reticulated Areas (Individual Lots)	Method of achieving Element compliance and/or the Intent of the Element:	The acceptable solution will be fully met in the future.

The proposed development will have installed a minimum of 50,000 litres of stored water for firefighting purposes, by the developer, prior to occupancy.

The construction technical requirements established by the Guidelines and/or the local government can and will be complied with. These requirements are set out in Appendix 3.

6.4 Additional Information for Required Bushfire Protection Measures

The purpose of this section of the Plan is:

- As necessary, to provide additional detail (to that provided in the tables of Section 5.3) regarding the implementation of the acceptable solutions for those persons who will have the responsibility to apply the stated requirements;
- As necessary, to detail specific onsite vegetation management requirements such as the APZ dimensions, management of Public Open Space or application of landscaping plans for onsite vegetation;
- To discuss how staged development will be handled, if applicable; and
- As relevant, for future planning stages, consider and discuss the requirements that may apply to future planning applications and the content of the associated BMP. In particular:
 - Any potential Vulnerable or High-Risk Land Uses.
 - Any additional content that will be required in the future BMP.

6.4.1 Vegetation Management

Asset Protection Zone (APZ) Dimensions that are to Apply

The required dimensions of the APZ will vary dependent upon the purpose for which the APZ has been defined. There are effectively three APZ dimensions that can apply:

1. An application for planning approval will be required to show that an APZ can be created which is of sufficient size to ensure the potential radiant heat impact of a fire does not exceed 29kW/m² (BAL-29); and
2. If the assessment has determined a BAL rating for an existing or future building is less than BAL-29, the APZ must be of sufficient size to ensure the potential radiant heat impact of a fire does not exceed the kW/m² corresponding to the lower assessed BAL rating; or
3. Complying with the relevant local government's annual firebreak notice may require an APZ of greater size than that defined by the two previous parameters.

The dimensions (vegetation separation distances) that are to apply to the APZ for this Proposal are presented in the tables below.

The ‘Determined BAL-10’ APZ					
Required Minimum Dimensions for the Subject Site					
Relevant Fire Danger Index (AS3959-2009 Table 2.1)					80
BAL Determination Method		Method 2 (as per AS 3959-2009 Appendix B)			
Vegetation Area	Applied Vegetation Classification	Effective Slope (degrees)	Determined Bushfire Attack Level	Minimum Separation Distance Required (metres)	Current Separation Distance (metres)
1	Class G Grassland	2	BAL-10 (10 kW/m²)	22.5	0
2	Class D Scrub	1.2		33.9	131

'Local Government Firebreak Notice APZ'	
Required Minimum Dimensions for the Subject Site	
Requirement Set By:	Shire of Dalwallinu
Minimum Dimensions:	See Shire of Dalwallinu Bush Fire Information notice.
Other Conditions:	If Asset Protection Zone technical requirements are defined in the Notice, the standards and dimensions may differ from the Guideline's APZ Standards, with the intent to better satisfy local conditions. When these are more stringent than those created by the Guidelines, or less stringent and endorsed by the WAPC and DFES, they must be complied with. Refer to Appendix 1.
This requirement has been established through the stated local government's annual fire break notice issued under the Bushfires Act 1954 s33.	

See Section 3.2.1 Figure 3.2 for indicative representation of the required Asset Protection Zones.

6.5 Recommended Bushfire Protection Measures

These recommendations are for measures that are not directly considered by SPP 3.7 and the associated Guidelines, including the bushfire protection criteria.

These measures are recommended by the bushfire consultant to improve the safety of property occupants and the resilience of buildings in the event of a bushfire impacting the property.

The proposed development consists of Class 8 buildings. These are not required to comply with AS3959-2009 and the associated construction specifications. However, it is recommended that the proposed buildings be constructed to the specifications for a BAL-12.5 rating. This will provide protection against ember attack in the event of a bushfire.

7 Responsibilities for Implementation and Management of the Bushfire Protection Measures

Table 6.1: BMP Implementation responsibilities prior to lot sale, occupancy or building for the Landowner (Developer).

LANDOWNER (DEVELOPER) - PRIOR TO LOT SALE, OCCUPANCY OR BUILDING	
No.	Implementation Actions
1	<p>The local government may condition a development application approval with a requirement for the landowner/proponent to register a notification onto the certificate of title (it may also need to be included on the deposited plan).</p> <p>This will be done pursuant to Section 70A Transfer of Land Act 1893 as amended ('Factors affecting use and enjoyment of land, notification on title:'). This is to give notice of the bushfire hazard and any restrictions and/or protective measures required to be maintained at the owner's cost.</p> <p>This condition ensures that:</p> <ol style="list-style-type: none"> 1. Landowners/proponents are aware their lot is in a designated bushfire prone area and of their obligations to apply the stated bushfire risk management measures; and 2. Potential purchasers are alerted to the Bushfire Management Plan so that future landowners/proponents can continue to apply the bushfire risk management measures that have been established in the Plan.
2	<p>Prior to occupancy and post planning approval, the entity responsible for having the BMP prepared should ensure that anyone listed as having responsibility under the Plan has endorsed it and is provided with a copy for their information and informed that it contains their responsibilities. This includes the landowners/proponents (including future landowners where the Plan was prepared as part of a subdivision approval), local government and any other authorities or referral agencies ('Guidelines' s4.6.3).</p>
3	<p>Prior to occupancy of the proposed development the subject lot it is to be compliant with the relevant local government's annual firebreak notice issued under s33 of the Bushfires Act 1954.</p>
4	<p>Prior to occupancy, establish the Asset Protection Zone (APZ) around the development and on the lot to the dimensions and standard stated in the BMP. This is the responsibility of the developer.</p>
5	<p>Prior to occupancy, install the required emergency static water supply (50,000 litre tank within the lot) and associated vehicle access, to the standards stated in the BMP.</p>
6	<p>Prior to occupancy, install the private driveways to the standards stated in the BMP.</p>
7	<p>Prior to use of the buildings, there is an outstanding obligation created by this Bushfire Management Plan to develop and have approved, the required risk management plan that addresses bushfire risk management measures for onsite flammable hazards, as directed in Section 1.3.</p>
8	<p>Prior to any building work, inform the builder of the existence of this Bushfire Management Plan and the responsibilities it contains, regarding the required construction standards. This will be:</p>

-
- | |
|---|
| <ul style="list-style-type: none">• The standard corresponding to the determined BAL rating, as per the bushfire provisions of the Building Code of Australia (BCA); and/or• A higher standard as a result of the BMP establishing that construction is required at a standard corresponding to a higher BAL rating. |
|---|
-

Table 6.2: Ongoing management responsibilities for the Landowner/Occupier.

LANDOWNER/OCCUPIER - ONGOING	
No.	Ongoing Management Actions
1	Maintain the Asset Protection Zone (APZ) to the dimensions and standard stated in the BMP.
2	Comply with the Shire of Dalwallinu Bush Fire Information notice issued under s33 of the Bush Fires Act 1954.
3	Maintain vehicular access routes within the lot to the required surface condition and clearances as stated in the BMP.
4	Maintain the emergency water supply tank and its associated fittings and vehicular access in good working condition.
5	Ensure that any builders (of future structures on the lot) are aware of the existence of this Bushfire Management Plan and the responsibilities it contains regarding the application of construction standards corresponding to a determined BAL rating.
6	Ensure all future buildings the landowner has responsibility for, are designed and constructed in full compliance with: <ol style="list-style-type: none"> 1. the requirements of the WA Building Act 2011 and the bushfire provisions of the Building Code of Australia (BCA); and 2. with any identified additional requirements established by this BMP or the relevant local government.
7	To consider, implement and maintain, as relevant and able, any bushfire protection measures that have been <u>recommended</u> by the bushfire consultant (refer to Section 5.5), in addition to the measures that are <u>required</u> to be implemented and maintained.
8	The Risk Management Plan containing bushfire risk management measures for flammable onsite hazards must be reviewed each year and relevant information updated. All required measures must continue to be complied with.

Table 6.3: Ongoing management responsibilities for the Local Government.

LOCAL GOVERNMENT - ONGOING	
No.	Ongoing Management Actions
1	Monitor landowner compliance with the Bushfire Management Plan and the annual Bush Fire Information notice.

Appendix 1 - Onsite Vegetation Management Technical Requirements

It is the responsibility of the landowner to maintain the established bushfire protection measures on their property. Not complying with these responsibilities can result in buildings being subject to a greater potential impact from bushfire than that determined by the assessed BAL rating presented in this Bushfire Management Plan.

For the management of vegetation within a lot (i.e. onsite) the following technical requirements exist:

1. **The APZ:** Installing and maintaining an asset protection zone (APZ) of the required dimensions to the standard established by the Guidelines for Planning in Bushfire Prone Areas (WA Planning Commission, as amended). When, due to the planning stage of the proposal to which this Bushfire Management Plan applies, defined APZ dimensions are known and are to be applied to existing or future buildings – then these dimensions are stated in Section 5.4.1 of this Plan.
2. **The Firebreak/Fuel Load Notice:** Complying with the requirements established by the relevant local government's annual firebreak notice issued under s33 of the Bushfires Act 1954. Note: If an APZ requirement is included in the Notice, the standards and dimensions may differ from the Guideline's APZ Standard – the larger dimension must be complied with.
3. **Changes to Vegetated/Non-Vegetated Areas:**
 - a. If applicable to this Plan, the minimum separation distance from any classified vegetation, that corresponds to the determined BAL for a proposed building, must be maintained as either a non-vegetated area or as low threat vegetation managed to a minimal fuel condition as per AS 3959-2009 s2.2.3.2 (e) and (f). Refer to Part 4 of this Appendix 1.
 - b. Must not alter the composition of onsite areas of classified vegetation (as assessed and presented in Section 3.1.2) to the extent that would require their classification to be changed to a higher bushfire threat classification (as per AS 3959-2009); and
 - c. Must not allow areas within a lot (i.e. onsite) that have been:
 - i. excluded from classification by being low threat vegetation or non-vegetated; and
 - ii. form part of the assessed separation distance that is determining a BAL rating -
 ...to become vegetated to the extent they no longer represent a low threat (refer to Part 4 of Appendix 1). Note: The vegetation classification exclusion specifications as established by AS 3959-2009 s2.2.3.2, are included at A1.4 below for reference.

1. Requirements Established by the Guidelines – the Asset Protection Zone (APZ) Standards

(Source: Guidelines for Planning in Bushfire Prone Areas - WAPC 2017 v1.3 Appendix 4, Element 2, Schedule 1 and Explanatory Note E2.1)

Defining the Asset Protection Zone (APZ)

Description: An APZ is an area surrounding a building that is managed to reduce the bushfire hazard to an acceptable level (by reducing fuel loads). The width of the required APZ varies with slope and vegetation. For planning applications, the minimum sized acceptable APZ is that which is of sufficient size to ensure the potential radiant heat impact of a fire does not exceed 29kW/m² (BAL-29). It will be site specific.

The APZ may include public roads, waterways, footpaths, buildings, rocky outcrops, golf courses, maintained parkland as well as cultivated gardens in an urban context, but does not include grassland or vegetation on a neighbouring rural lot, farmland, wetland reserves and unmanaged public reserves.

For subdivision planning, design elements and excluded/low threat vegetation adjacent to the lot can be utilised to achieve the required vegetation separation distances and therefore reduce the required dimensions of the APZ within the lot.

Defendable Space: The APZ includes a defendable space which is an area adjoining the asset within which firefighting operations can be undertaken to defend the structure. Vegetation within the defendable space should be kept at an absolute minimum and the area should be free from combustible items and obstructions. The width of the defendable space is dependent on the space which is available on the property, but as a minimum should be 3 metres.

Establishment: The APZ should be contained solely within the boundaries of the lot on which the building is situated, except in instances where the neighbouring lot or lots will be managed in a low-fuel state on an ongoing basis, in perpetuity.

Note: Regardless of whether an Asset Protection Zone exists in accordance with the acceptable solutions and is appropriately maintained, fire fighters are not obliged to protect an asset if they think the separation distance between the dwelling and vegetation that can be involved in a bushfire, is unsafe.

Schedule 1: Standards for APZ

Fences: within the APZ are constructed from non-combustible materials (e.g. iron, brick, limestone, metal post and wire). It is recommended that solid or slatted non-combustible perimeter fences are used.

Objects: within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e. windows and doors.

Fine Fuel Load: combustible dead vegetation matter less than 6 mm in thickness reduced to and maintained at an average of two tonnes per hectare (example below).

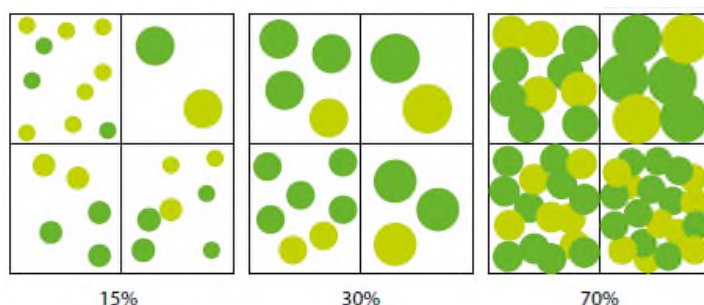
Example Fine Fuel Load of Two Tonnes per Hectare



(Image source: Shire of Augusta Margaret River's Firebreak and Fuel Reduction Hazard Notice)

Trees (> 5 metres in height): trunks at maturity should be a minimum distance of 6 metres from all elevations of the building, branches at maturity should not touch or overhang the building, lower branches should be removed to a height of 2 metres above the ground and or surface vegetation, canopy cover should be less than 15% with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy. Diagram below represents tree canopy cover at maturity.

Tree canopy cover – ranging from 15 to 70 per cent at maturity



(Source: Guidelines for Planning in Bushfire Prone Areas 2017, Appendix 4)

Shrubs (0.5 metres to 5 metres in height): should not be located under trees or within 3 metres of buildings, should not be planted in clumps greater than 5m² in area, clumps of shrubs should be separated from each other and any exposed window or door by at least 10 metres. Shrubs greater than 5 metres in height are to be treated as trees.

Ground covers (<0.5 metres in height): can be planted under trees but must be properly maintained to remove dead plant material and any parts within 2 metres of a structure, but 3 metres from windows or doors if greater than 100 mm in height. Ground covers greater than 0.5 metres in height are to be treated as shrubs.

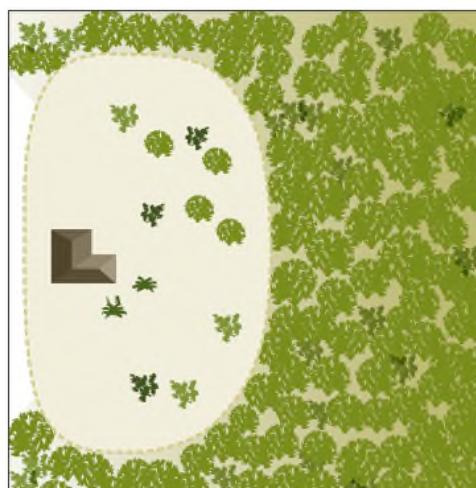
Grass: should be managed to maintain a height of 100 mm or less.

The following example diagrams illustrate how the required dimensions of the APZ will be determined by the type and location of the vegetation.

Hazard on one side
APZ



Hazard on three sides
APZ



2. Requirements Established by the Local Government – the Firebreak Notice

These requirements are established by the relevant local government's Firebreak Notice created under s33 of the Bushfires Act 1954 and issued annually (potentially with revisions). The Notice may include additional components directed at managing fuel loads, accessibility and general property management with respect to limiting potential bushfire impact.

The relevant local government's current Firebreak Notice is available on their website, at their offices and is distributed as ratepayer's information. It must be complied with.

If Asset Protection Zone technical requirements are defined in the Notice, the standards and dimensions may differ from the Guideline's APZ Standards, with the intent to better satisfy local conditions. When these are more stringent than those created by the Guidelines, or less stringent and endorsed by the WAPC and DFES, they must be complied with.

When, due to the planning stage of the proposal to which this Bushfire Management Plan applies, defined APZ dimensions are known and are to be applied to existing or future buildings – then these dimensions are stated in Section 5.4.1 of this Plan.

3. Requirements Recommended by DFES – Property Protection Checklists

Further guidance regarding ongoing/lasting property protection (from potential bushfire impact) is presented in the publication 'DFES – Fire Chat – Your Bushfire Protection Toolkit'. It is available from the Department of Fire and Emergency Services (DFES) website.

4. Requirements Established by AS 3959-2009 - Maintaining Areas within your Lot as 'Low Threat'

This information is provided for reference purposes. This knowledge will assist the landowner to comply with Management Requirement No. 3 set out in the Guidance Panel at the start of this Appendix. It identifies what is required for an area of land to be excluded from classification as a potential bushfire threat.

"Australian Standard - AS 3959-2009 Section 2.2.3.2: Exclusions - Low threat vegetation and non-vegetated areas:

The Bushfire Attack Level shall be classified BAL-LOW where the vegetation is one or a combination of the following:

- a) Vegetation of any type that is more than 100m from the site.*
- b) Single areas of vegetation less than 1ha in area and not within 100m of other areas of vegetation being classified.*
- c) Multiple area of vegetation less than 0.25ha in area and not within 20m of the site or each other.*
- d) Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site or each other, or other areas of vegetation being classified.*
- e) Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops.*
- f) Low threat vegetation, including grassland managed in a **minimal fuel condition** (i.e. insufficient fuel available to significantly increase the severity of a bushfire attack – recognisable as short cropped grass to a nominal height of 100mm for example), maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks."*

Appendix 2 - Vehicular Access Technical Requirements

Each local government may have their own standard technical requirements for emergency vehicular access and they may vary from those stated in the Guidelines.

Contact the relevant local government for the requirements that are to apply in addition to the requirements set out as an acceptable solution in the Guidelines. If the relevant local government requires that these are included in the Bushfire Management Plan, they will be included in this appendix and referenced.

Requirements Established by the Guidelines – The Acceptable Solutions

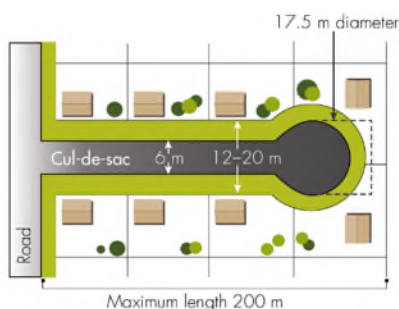
(Source: Guidelines for Planning in Bushfire Prone Areas WAPC 2017 v1.3, Appendix 4)

Vehicular Access Technical Requirements - Part 1

Acceptable Solution 3.3: Cul-de-sacs (including a dead-end road)

Their use in bushfire prone areas should be avoided. Where no alternative exists then the following requirements are to be achieved:

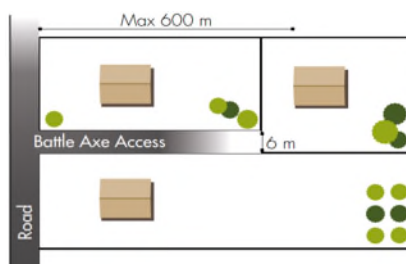
- Maximum length is 200m. If public emergency access is provided between cul-de-sac heads (as a right of way or public access easement in gross), the maximum length can be increased to 600m provided no more than 8 lots are serviced and the emergency access way is less than 600m in length;
- Turnaround area requirements, including a minimum 17.5m diameter head to allow type 3.4 fire appliances to turn around safely;
- The cul-de-sac connects to a public road that allows for travel in two directions; and
- Meet the additional design requirements set out in Part 2 of this appendix.



Acceptable Solution 3.4: Battle-axe

Their use in bushfire prone areas should be avoided. Where no alternative exists then the following requirements are to be achieved:

- Maximum length 600m and minimum width 6m; and
- Comply with minimum standards for private driveways.



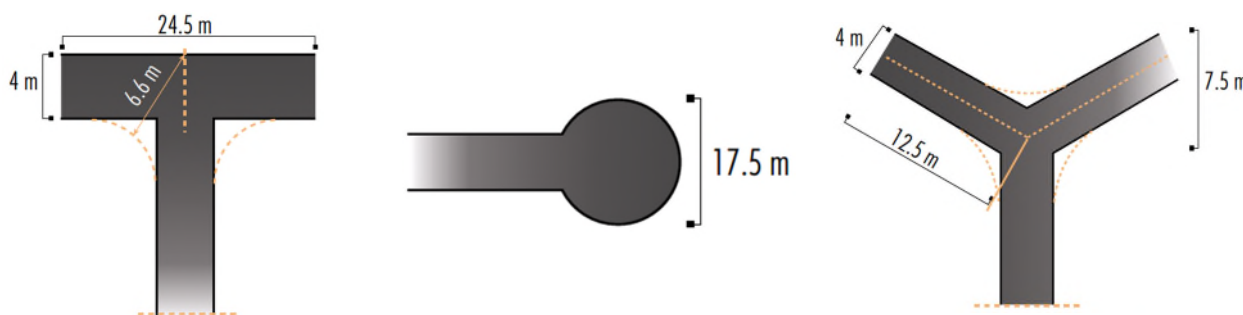
Acceptable Solution 3.5: Private Driveways

The following requirements are to be achieved:

- The design requirements set out in Part 2 of this appendix; and

Where the house site is more than 50 metres from a public road:

- Passing bays every 200 metres with a minimum length of 20 metres and a minimum width of two metres (ie combined width of the passing bay and constructed private driveway to be a minimum six metres);
- Turn-around areas every 500 metres and within 50 metres of a house, designed to accommodate type 3.4 fire appliances to turn around safely (ie kerb to kerb 17.5 metres);
- Any bridges or culverts are able to support a minimum weight capacity of 15 tonnes; and
- All weather surface (i.e. compacted gravel, limestone or sealed).

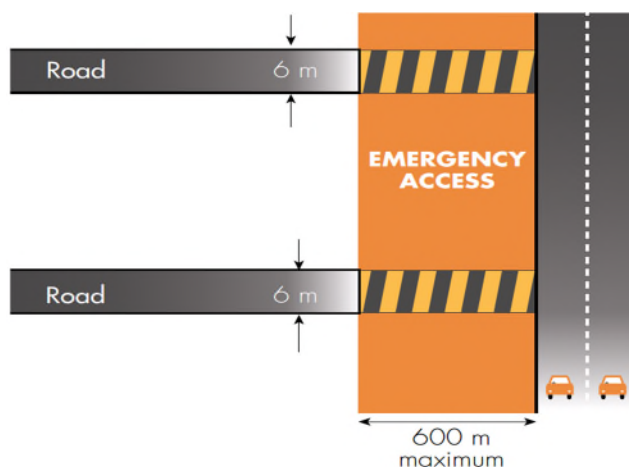


Acceptable Solution 3.6: Emergency Access Way

An access way that does not provide through access to a public road is to be avoided bushfire prone areas.

Where no alternative exists, an emergency access way is to be provided as an alternative link to a public road during emergencies. The following requirements are to be achieved:

- No further than 600 metres from a public road;
- Must be signposted including where they ajoin public roads;
- Provided as a right of way or public access easement in gross;
- Where gates are used they must not be locked and they must be a minimum width of 3.6 metres with design and construction approved by local government (refer to the example in this appendix); and
- Meet the additional design requirements set out in Part 2 of this appendix.



Acceptable Solution 3.7: Fire Service Access Routes (Perimeter Roads)

Are to be established to provide access within and around the edge of subdivision and related development and to provide direct access to bushfire prone areas for firefighters and link between public road networks for firefighting purposes. Fire service access is used during bushfire suppression activities but can also be used for fire prevention work. The following requirements are to be achieved:

- No further than 600 metres from a public road (driveways may be used as part of the designated fire service access;
- Dead end roads not permitted;
- Allow for two-way traffic (i.e. two 3.4 fire appliances);
- Provide turn-around areas designed to accommodate 3.4 fire appliances and to enable them to turn around safely every 500m (i.e. kerb to kerb 17.5 metres);
- All weather surface (i.e. compacted gravel, limestone or sealed) and have erosion control measures in place;
- Must be adequately sign posted;
- Where gates are used they must be a minimum width of 3.6 metres with design and construction approved by local government (refer to the example in this appendix) and may be locked (use a common key system);
- Meet the additional design requirements set out in Part 2 of this appendix;
- Provided as right of ways or public access easements in gross; and
- Management and access arrangements to be documented and in place.

Acceptable Solution 3.8: Firebreak Width

Lots greater than 0.5 hectares must have an internal perimeter firebreak of a minimum width of three meters or to the level as prescribed in the local firebreak notice issued by the local government.

Vehicular Access Technical Requirements - Part 2

Technical Component	Vehicular Access Types				
	Public Roads	Cul-de-sacs	Private Driveways	Emergency Access Ways	Fire Service Access Routes
Minimum trafficable surface (m)	6*	6	4	6*	6*
Horizontal clearance (m)	6	6	6	6	6
Vertical clearance (m)	4.5	4.5	4.5	4.5	4.5
Maximum grade <50 metres	1 in 10	1 in 10	1 in 10	1 in 10	1 in 10
Minimum weight capacity (t)	15	15	15	15	15
Maximum cross-fall	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius (m)	8.5	8.5	8.5	8.5	8.5

* A six metre trafficable surface does not necessarily mean paving width. It could, for example, include four metres of paving and one metre of constructed road shoulders. In special circumstances, where 8 lots or less are being serviced, a public road with a minimum trafficable surface of four metres for a maximum distance of ninety metres may be provided subject to the approval of both the local government and DFES.

- ***Design and construction to be approved by relevant local government.***
- Minimum width 3.6m
- Emergency access way gates must not be locked.
- Fire service access route gates may be locked but only with a common key that is available to local fire service personnel.
- Bollards will be to the relevant local government specifications



- ***Design and construction to be approved by the relevant local government.***
- Minimum height above ground of 0.9m.
- Lettering height to be 100mm.
- To display the words (as appropriate) “Emergency Access Only” or “Fire Service Access – No Public Access”.
- Size 600mm x 400mm.
- Sign colour red, base (white) area is reflective background.
- Rounded corners, radius 20mm.
- White key-line 3mm wide, 3mm from outside edge.
- Suggested mounting hole six 6mm diameter.



Appendix 3 - Water Technical Requirements

Requirements Established by the Guidelines - Acceptable Solution A4.1: Reticulated Areas

(Source: Guidelines for Planning in Bushfire Prone Areas WAPC 2017 v1.3, Appendix 4, Element 4)

The requirement is to supply a reticulated water supply and fire hydrants, in accordance with the technical requirements of the relevant water supply authority and DFES.

The Water Corporation's 'No 63 Water Reticulation Standard' is deemed to be the baseline criteria for developments and should be applied unless local water supply authority's conditions apply.

Key specifications in the most recent version/revision of the design standard include:

- **Residential Standard** – hydrants are to be located so that the maximum distance between the hydrants shall be no more than 200 metres.
- **Commercial Standard** – hydrants are to be located with a maximum of 100 metre spacing in Industrial and Commercial areas.
- **Rural Residential Standard** – where minimum site areas per dwelling is 10,000 m² (1ha), hydrants are to be located with a maximum 400m spacing. If the area is further subdivided to land parcels less than 1ha, then the residential standard (200m) is to be applied.

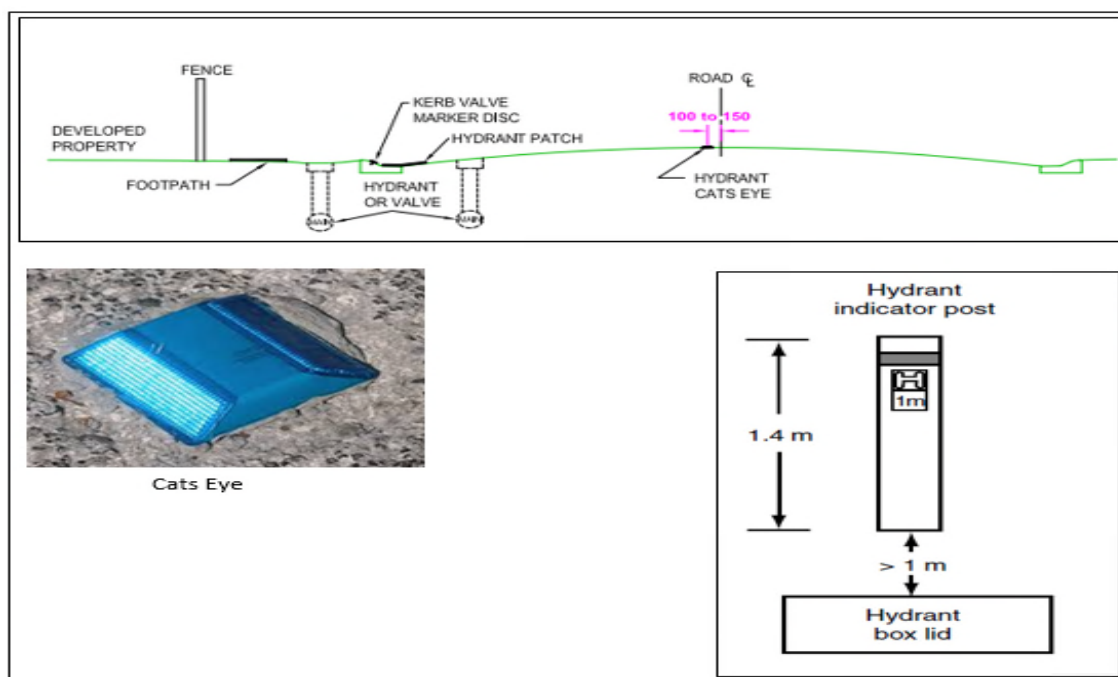


Figure A4.1: Hydrant Location and Identification Specifications

Contact the relevant water supply authority to confirm the technical requirements that are to be applied. They may differ from the minimum requirements of the 'baseline' Water Corporation's No. 63 Water Reticulation Standard.

Requirements Established by the Guidelines - Acceptable Solution A4.2: Non-Reticulated Areas

Each local government may have their own standard technical requirements for firefighting water supplies and they may vary from those stated in the Guidelines.

Contact the relevant local government for the requirements that are to apply in addition to the requirements set out as an acceptable solution in the Guidelines. If the relevant local government requires that these are included in the Bushfire Management Plan, they will be included in this appendix and referenced.

Table A4.1: The acceptable solution as contained in the Guidelines for Planning in Bushfire Prone Areas WAPC 2017 v1.3, Appendix 4, Element 4 – with example construction / coupling requirements from various sources including FESA (DFES) Operational Circular 07/2011 and Planning for Bushfire Protection Guidelines WAPC 2010.

Technical Requirements for Static Water Supply (example only – check with local government)	
Volume:	50,000 litres per tank
Ratio of tanks to lots:	1 tank per 25 lots (or part thereof)
Location:	No more than two kilometres to the furthest house site within the residential development to allow a 2.4 fire appliance to achieve a 20-minute turnaround time at legal road speeds.
Tank Construction:	Above ground tanks constructed using concrete or metal. Stands of raised tanks are constructed using non-combustible materials and heat shielding where applicable (required for metal stands).
Pipe Construction:	Galvanised or copper (PVC if buried at least 300mm below ground).
Access:	Hardstand and turnaround areas suitable for a 3.4 appliance (i.e. kerb to kerb 17.5metres) are provided within three metres of each tank.
Couplings:	Hydrant or standpipe to be provided. Tanks can be fitted with a full flow valve gate (not ball valve) and a 100mm cam-lock coupling of metal/alloy construction (examples below).
Ownership and Responsibility:	Water tanks and associated facilities are vested in the relevant local government. A procedure must be in place to ensure that water tanks are maintained at or above designated capacity always.



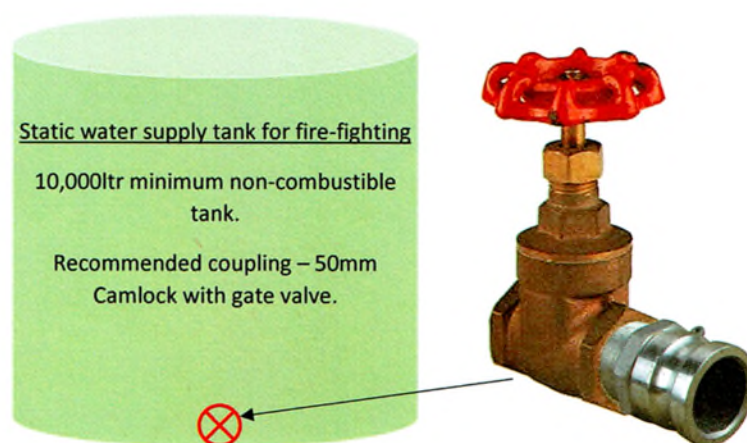
Requirements Established by the Guidelines - Acceptable Solution A4.3: Non-Reticulated Areas – Single Lot

Each local government may have their own standard technical requirements for firefighting water supplies and they may vary from those stated in the Guidelines.

Contact the relevant local government for the requirements that are to apply in addition to the requirements set out as an acceptable solution in the Guidelines. If the relevant local government requires that these are included in the Bushfire Management Plan, they will be included in this appendix and referenced.

Table A4.1: The acceptable solution as contained in the Guidelines for Planning in Bushfire Prone Areas WAPC 2017 v1.3, Appendix 4, Element 4 – with example construction / coupling requirements from various sources including FESA (DFES) Operational Circular 07/2011 and Planning for Bushfire Protection Guidelines WAPC 2010.

Technical Requirements for Static Water Supply (example only – check with local government)	
Application:	Single lots above 500 m ² need a dedicated static water supply on the lot. This solution is only for use if creating one additional lot and cannot be applied cumulatively.
Volume:	Minimum 10,000 litres per tank dedicated to firefighting purposes. The storage tank must not facilitate sharing the water for domestic use due to the danger of contamination.
Tank Construction:	Above ground tanks constructed using concrete or metal.
Pipe Construction:	Galvanised or copper (PVC if buried at least 300mm below ground).
Vehicle Access:	Hardstand and turnaround area suitable for a 3.4 appliance (i.e. kerb to kerb 17.5metres) is provided at the tank.
Couplings:	Tanks are to be fitted with a full flow gate valve (not ball valve) and a 50mm or 100mm cam-lock coupling of metal/alloy construction (example below).
Responsibility:	A procedure must be in place to ensure that water tanks are maintained at or above designated capacity always.



Appendix 4 – Method 2 Calculations

Minimum Distance Calculation for Vegetation Area 1 Grassland



Calculated February 22, 2018, 7:19 pm (MDc v.4.7)

Wubin Emulsifier Plant

Minimum Distance Calculator - AS3959-2009 (Method 2)			
Inputs		Outputs	
Grassland Fire Danger Index	110	Rate of spread	16.41 km/h
Vegetation classification	Grassland	Flame length	7.36 m
Surface fuel load	4.5 t/ha	Flame angle	54 °, 64 °, 73 °, 78 °, 80 ° & 85 °
Overall fuel load	4.5 t/ha	Elevation of receiver	2.97 m, 3.3 m, 3.52 m, 3.6 m, 3.62 m & 3.66 m
Vegetation height	n/a	Fire intensity	38,167 kW/m
Effective slope	2 °	Transmissivity	0.886, 0.875, 0.858, 0.837, 0.825 & 0.752
Site slope	0 °	Viewfactor	0.5842, 0.4326, 0.2907, 0.1956, 0.1588 & 0.0435
Flame width	100 m	Minimum distance to < 40 kW/m ²	6.3 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	8.5 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	12.6 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	18.5 m
		Minimum distance to < 10 kW/m ²	22.5 m
		Minimum distance to < 2.5 kW/m ²	62.6 m

Rate of Spread - Noble et al. 1980

Flame length - Purton, 1982

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Minimum Distance Calculation for Vegetation Area 2 Scrub



Calculated March 6, 2018, 5:58 pm (MDc v.4.7)

Wubin Emulsifier Plant

Minimum Distance Calculator - AS3959-2009 (Method 2)			
Inputs		Outputs	
Fire Danger Index	80	Rate of spread	4.52 km/h
Vegetation classification	Scrub	Flame length	12.07 m
Surface fuel load	25 t/ha	Flame angle	53 °, 63 °, 71 °, 76 °, 78 ° & 83 °
Overall fuel load	25 t/ha	Elevation of receiver	4.82 m, 5.38 m, 5.71 m, 5.86 m, 5.9 m & 5.99 m
Vegetation height	m	Fire intensity	58,461 kW/m
Effective slope	1.2 °	Transmissivity	0.877, 0.86, 0.837, 0.812, 0.798 & 0.733
Site slope	0 °	Viewfactor	0.5973, 0.442, 0.298, 0.202, 0.1642 & 0.0447
Flame width	100 m	Minimum distance to < 40 kW/m ²	10.1 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m ²	13.6 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	19.9 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	28.4 m
		Minimum distance to < 10 kW/m ²	33.9 m
		Minimum distance to < 2.5 kW/m ²	84.1 m

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

ATTACHMENT 4

ENVIRONMENTAL MANAGEMENT PLAN



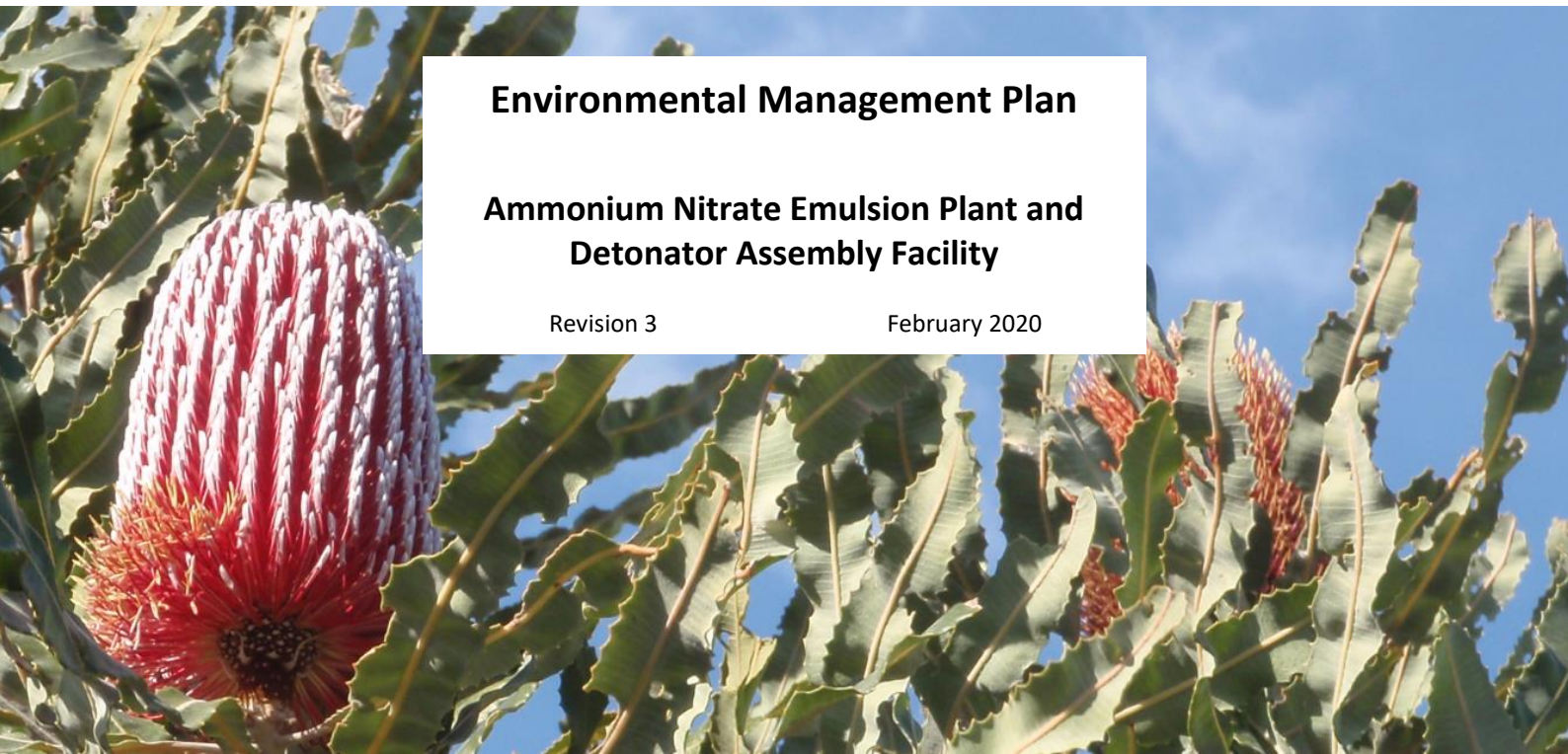
COTERRA
ENVIRONMENT

Environmental Management Plan

Ammonium Nitrate Emulsion Plant and Detonator Assembly Facility

Revision 3

February 2020



CALIBRE | COMMITMENT | COLLABORATION

This report was prepared by: Coterra Pty Ltd trading as COTERRA ENVIRONMENT
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Report Version: Revision 3
Date: February 2020

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Appendix 11	Aspects and Impacts Register
Appendix 12	Hanwha Separation Distances Report - Wubin

1 Introduction

1.1 Site Overview

Hanwha Mining Services Australia Pty Ltd (HMSA) has constructed and is currently commissioning a new Ammonium Nitrate Emulsion (ANE) Plant on Lots 115 and 117 located on the corner of the Mullewa-Wubin Road and Thomas Road, Wubin (the site) (Figure 1). HMSA are proposing to construct a detonator assembly facility on the same site.

The site has been historically used for farming purposes and is located approximately 1.4km north of the Wubin town site. Wubin is located 235 km north east of Perth within the Shire of Dalwallinu.

1.2 Project Background

The site is zoned 'Rural' under the Shire of Dalwallinu Town Planning Scheme No. 2 (TPS). An amendment to the TPS was approved gazetted in December 2016 (Scheme Amendment No. 2) which allowed for the following additional uses on the site:

- Storage of dangerous goods and associated manufacturing
- Truck assembly

This amendment was subject to several conditions including:

9. The development, operation and management of the ammonium nitrate emulsion facility shall be undertaken in accordance with an Environmental Management Plan approved by the local government.

A full copy of the amendment documentation is provided in Appendix 1.

HMSA are proposing to expand the facility to include a detonator assembly facility and magazine which requires a Development Application to be submitted to the Shire of Dalwallinu.

1.3 Approval Requirements

1.3.1 Works Approval and Licencing

Under Part V of the *Environmental Protection Act 1986* (EP Act) a Works Approval for the construction of the ANE plant and a Licence or Registration for the operation of the facility is required.

The purpose of a Works Approval is to allow the Department of Water and Environmental Regulation (DWER) to assess the environmental acceptability of a proposal against standards and policies. Works Approvals also contain conditions to ensure the premises can operate in an environmentally acceptable manner and that the works themselves do not cause unacceptable environmental impacts (DER, 2013).

Work Approval Number W6148/2018/1 (Appendix 2) for the ANE plant was issued by DWER on 11/7/2018 with a duration to 10/7/2021 for a prescribed premises Category 75. The description of Category 75 is detailed in Table 1-1. A copy of the Works Approval is provided in Appendix 2.

Table 1-1 Environmental Protection Regulations 1987 – Category Table

Cat. Number	Description of Category	Production or Design Capacity Triggering Licencing
75	Chemical blending or mixing not causing discharge: premises on which chemicals or chemical products are	5,000 tonnes or more per year

Cat. Number	Description of Category	Production or Design Capacity Triggering Licencing
	mixed, blended or packaged in a manner that does not cause or is not likely to cause a discharge of waste into the environment.	

It is estimated that the project will produce approximately 50,000 tonnes of product per year.

Steam for processing is generated by the onsite boiler. The boiler is fuelled by diesel, but the maximum fuel consumption is below the prescribed premises (Category 67) threshold of 500 kg per hour.

The following conditions on Work Approval Number W6148/2018/1 are applicable.

1. The Works Approval Holder must install and undertake the Works for the infrastructure and equipment:
 - (a) specified in Column 1.
 - (b) to the requirements specified in Column 2; of Table 2 below.
2. The Works Approval Holder must not depart from the requirements specified in Column 2 of Table 2 except:
 - (a) where such departure does not increase risks to public health, public amenity or the environment; and
 - (b) all other Conditions in this Works Approval are still satisfied.
3. Subject to Condition 2, within 14 days of the completion of the Works specified in Column 1 of Table 2, the Works Approval Holder must provide to the CEO a report by an Engineer confirming each item of infrastructure or component of infrastructure specified in Column 1 of Table 2 below has been constructed with no material defects and to the requirements specified in Column 2.
4. Where a departure from the requirements specified in Column 2 of Table 2 occurs and is of a type allowed by Condition 2, the Works Approval Holder must provide to the CEO a description of, and explanation for, the departure along with the certification required by Condition 3.

DWER Table 2: Infrastructure and equipment requirements table

Column 1	Column 2
Infrastructure/Equipment	Requirements (design and construction)
Ammonium nitrate storage dome	With concrete floor and intact external cladding to prevent wind blown dust emissions
Calcium Nitrate Storage Dome	With concrete floor and intact external cladding to prevent wind blown dust emissions
36 kl Diesel storage tank with a concrete bund	Bund has impervious walls and floor.
2 x 75 kl Mineral oil storage tanks and a concrete bund	Bund has impervious walls and floor.
Ammonium nitrate solution (ANSOL) storage area including 6 x 26 kl storage tanks with a concrete bund.	Bund has impervious walls and floor

Column 1	Column 2
Emulsifier storage area tank shed with concrete floor and wall bund.	Bund has impervious walls and floor.
IBC storage area with concrete bund	Bund has impervious walls and floor.
Emulsion manufacturing plant comprising a boiler, diesel generator, fuel makeup area ANE blending plant.	Constructed inside a shed with concrete floor and intact external cladding to prevent wind blown dust emissions
Bund and spoon drain surrounding the site to prevent stormwater ingress onto or off the site.	Earth bund and stone pitched spoon drain directing water to bio-infiltration basins.
Bio-infiltration basins	Constructed in sandy gravel base with a not less than 500mm filter media layer
Hardstand	Covering areas marked on site plan in Schedule 1 and constructed of concrete for all sheds, domes and tank footings with compacted earth between. Unsealed hardstand to consist of not less than 150 mm compacted crushed rock over sub base of not less than 200mm compacted sandy gravel.

Emissions

5. The Works Approval Holder must not cause any Emissions from the Works authorised through this Works Approval except for specified Emissions and general Emissions described in Column 1 of Table 3, subject to the exclusions, limitations or requirements specified in Column 2, of Table 3.

DWER Table 3: Authorised Emissions table

Column 1	Column 2
General Emissions (excluding Specified Emissions)	
Emissions which arise from undertaking the Works set out in Schedule 2.	<p>Unreasonable Emissions; or</p> <ul style="list-style-type: none"> • Emissions that result in, or are likely to result in, Pollution, Material Environmental Harm or Serious Environmental Harm; or • Discharges of Waste in circumstances likely to cause Pollution; or • Emissions that result, or are likely to result in, the Discharge or abandonment of Waste in water to which the public has access: or • Emissions or Discharges which do not comply with an Approved Policy; or • Emissions or Discharges which do not comply with prescribed standard; or • Emissions or Discharges which do not comply with the conditions in an Implementation Agreement or Decision; or • Emissions or Discharges the subject of offences under regulations prescribed under the EP Act, including materials discharged under the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>.

Record-Keeping

6. The Works Approval Holder must maintain accurate Books including information, reports and data in relation to the Works and the Books must:
 - (a) be legible;
 - (b) if amended, be amended in such a ways that the original and subsequent amendments remain legible or are capable of retrieval;
 - (c) be retained for at least 3 years from the date the Books were made; and
 - (d) be available to be produced to an Inspector or the CEO.
7. The Works Approval Holder must comply with a Department Request within 14 days from the date of the Department Request or such other period as agreed to by the Inspector or the CEO.

1.3.2 Other Approval Requirements – Environmental Matters

1.3.2.1 Referral under s.38 of the Environmental Protection Act 1986

Based on the potential environmental impacts associated with the plant and the proposed management procedures on site, this facility is not considered likely to have a significant impact on the environment, therefore referral to the DWER under s.38 of the EP Act was not required.

It was assessed that the proposed expansion to include a detonator assembly facility and magazine and the potential environmental impacts associated with the proposed facility can adequately be addressed through the update of the Environmental Management Plan.

1.3.2.2 Environmental Protection (Clearing of Native Vegetation) Regulations 2004

The site is predominately cleared however some clearing of vegetation was required for the construction of the ANE facility onsite and the road cross over. Limited clearing of vegetation was required for the access onto the Mullewa-Wubin Road which has now been completed. This is discussed further in Section 5.0.

No additional clearing of remnant vegetation is required to construct the proposed detonator assembly facility.

1.3.2.3 Dangerous Goods

The following Acts, Regulations and supporting code of practices apply for dangerous goods:

- Dangerous Goods Safety Act 2004
- Dangerous Goods Safety (Explosives) Regulations 2007
- Australian Code for the Transport of Explosives by Road and Rail, 3rd Edition (AE Code)
- AS 2187.0 – 1998 Explosives Storage, Transport and Use Part 0 Terminology
- AS 2187.1 – 1998 Explosives Storage, Transport and Use Part 1 Storage
- AS 2187.2 – 2006 Explosives Storage, Transport and Use Part 2 Use.

A Dangerous Goods (DG) and Security Risk Substance Licences (SRS) must be obtained from the Department of Mines, Industry Regulation and Safety (DMIRS) for the storage of the following onsite:

Type(s) of Explosives to be stored and handled	Proper shipping name: Blasting Explosives Dangerous Goods Class: 1.1D Product or common name: Blasting Explosives	Proper shipping name: Detonator Dangerous Goods Class: 1.1S Product or common name: Blasting Caps
Quantity usually stored and handled:	D1 Detonator Assembly Building – Classification 1.1B, 20 kg NEQ. D2 Base Cap Store Building – Classification 1.4S, 40 pallets, 0 NEQ D3 Detonator Test Building Classification 1.1B – 1 kg NEQ M1 High Explosive Magazine – Classification 1.1D, 10,000 kg NEQ. M2 High Explosive Magazine– Classification 1.1D, 10,000 kg NEQ. M4 High Explosive Magazines– Classification 1.1D, 10,000 kg NEQ. M5 High Explosive Magazines – Classification 1.1D, 10,000 kg NEQ. M6 High Explosive Magazines– Classification 1.1D, 10,000 kg NEQ. M3 Detonator Magazine – Classification 1.1B, 1000 kg NEQ	

1.4 Stakeholder Consultation

HMSA have undertaken consultation with the following groups and individuals as part of the project planning and approvals undertaken to date:

- Shire of Dalwallinu (Key contact: Doug Burke)
- Immediate neighbours
- Service providers including Western Power, Water Corporation and Main Roads
- Local trades and service providers
- DWER Regulatory Services.

1.5 Proponent Details

1.5.1 Company and Contact Details

The proponent and landowner of the facility is Hanwha Mining Services Australia Pty Ltd. Company details for HMSA are as follows:

- Office Address: Suite 2/179 St Georges Terrace, Perth WA 6000
- Postal Address: PO Box 7067, Cloisters Square WA 6850
- Telephone: +61 8 9322 6065
- Australian Business Number (ABN): 49 169 067 252

Key contacts at HMSA are listed below.

Table 1-2 Hanwha Mining Services Key Contacts

Name	Position	Contact Details
Karl Bohmke	General Manager Western Australia	Mob: 0488 600 551 karl.bohmke@Hanwha.com
Graham Morgan	General Manager SHEC and Training Manager	Mob: +61 401 714 949 graham.morgan@Hanwha.com
Minseok Jegal	Management Accountant	Mob: +61407994179 ms.jegal@Hanwha.com

Minseok Jegal is authorised to act as the company representative in relation to this project.

A copy of the Hanwha Mining Services Australia Pty Ltd ASIC company extract as required by DWER is provided in Appendix 3.

The primary point of contact from Coterra Environment regarding the preparation of this EMP is:

Merrilyn Barnes
Principal Scientist
Ph: (08) 9381 5513
Email: merrilyn.barnes@coterra.com.au

1.5.2 History with Similar Works

HMSA has extensive experience within Australia and Internationally with the construction and operation of ANE plants including the following Australian plants:

- Blackwater Ammonium Nitrate Emulsion facility – Queensland
- Gunnedah Ammonium Nitrate Emulsion facility – New South Wales (under construction)

The company operates a number of chemical production facilities, in addition to Ammonium Nitrate Emulsion Plants. The proposed Detonator Assembly Plant will be the first in Australia and HMSA operates a similar facility in Boeun, South Korea. Information about the company's operations can be found on the HMSA website:

www.hanwhaminingservices.com

1.5.3 Corporate SHEC Policy

HMSA is committed to achieving a workplace that protects people, respects the environment, is valued by the community and sets the basis for a long term successful and sustainable organisation. A copy of the Safety, Health, Environment and Community (SHEC) Policy is provided in Appendix 4.

1.5.4 Organisational Structure

The organisational Structure of HMSA is shown in Appendix 5.

The Wubin Plant operations will be the responsibility of the future Site Supervisor, who will report to the Manufacture and SHEC manager.

The site supervisor will have primary responsibility for environmental management on site. The key roles and responsibilities of this position in relation to environmental management and performance on the site are:

- Arranging for updates of the EMP as required
- Implementing controls for targeting significant impacts and follow up
- Reporting incidents
- Make sure people on site understand their role in environmental management.

1.5.5 Responsibilities

The following list shows the site's internal and external communication process and responsible personnel for environmental matters:

- Receiving, documenting and responding to regulatory authorities and interested parties
 - Responsible: Site supervisor
 - Process: verbal communication when authority comes onsite for inspection
- Escalating important environmental or compliance matters to senior management
 - Responsible: Site supervisor
 - Process: report to line manager, record incident, advise SHEC manager and Environmental manager
- Reporting general non-compliance events
 - Responsible: Site supervisor
 - Process: report to line manager, record event
- Reporting environmental harm
 - Responsible: Site supervisor
 - Process: report to line manager, record incident, advise SHEC manager and Environmental manager.
- Reporting environmental risks or performance results
 - Responsible: Site supervisor
 - Process: report to line manage, advise SHEC manager and Environmental manager
- Reporting updates or new environmental legal requirements
 - Responsible: SHEC or Environmental manager
 - Process: responsible person communicates updates to site.

1.6 External Contacts

Table 1-3 below provides the contact details for regulatory agencies and service authorities who have had or may have involvement with the approval and implementation of the project:

Table 1-3 External Contact Details

Authorities / Services	Company / Contact	Phone
Shire of Dalwallinu	Manger of Regulation and Developer Services	+61 (08) 9661 0500
WA Department of Water and Environmental Regulation	Industry Regulation division	+ 61 (08) 6364 7000
WA Department of Mines, Industry Regulation and Safety	Dangerous Goods Licensing Branch	+61 (08) 9358 8046

1.7 Purpose and Structure of this Document

1.7.1 Purpose

The document has been prepared to fulfil multiple purposes as follows:

- Address the requirements of Condition 9 of the Scheme Amendment approval (see Section 1.2)
- Provide updated technical information on the proposed detonator assembly facility
- Address the HMSA standard EMP requirements for project sites.

1.7.2 Document Structure

The document is generally structured as follows:

- Section 2 – Description of the environmental features of the site
- Section 3 – Description of the operations proposed for the site
- Section 4 – Identification of Potential Environmental Impact and Description of the management actions which will be undertaken to address these impacts
- Section 5 – Discussion of the vegetation clearing requirements

2 Existing Environment

2.1 Climate

Wubin has a climate typical of Mediterranean areas, characterised by a dry summer and a wet winter. The mean January temperature for the Dalwallinu weather station (approximately 20km from Wubin) ranges from 18°C (minimum) to 35°C (maximum). The mean July temperature ranges from 7°C (minimum) to 17°C (maximum). The average annual precipitation for Dalwallinu is approximately 357.5mm, with the majority of this rainfall falling between the months of May and August (BoM, 2017) (see Plate 2-1).

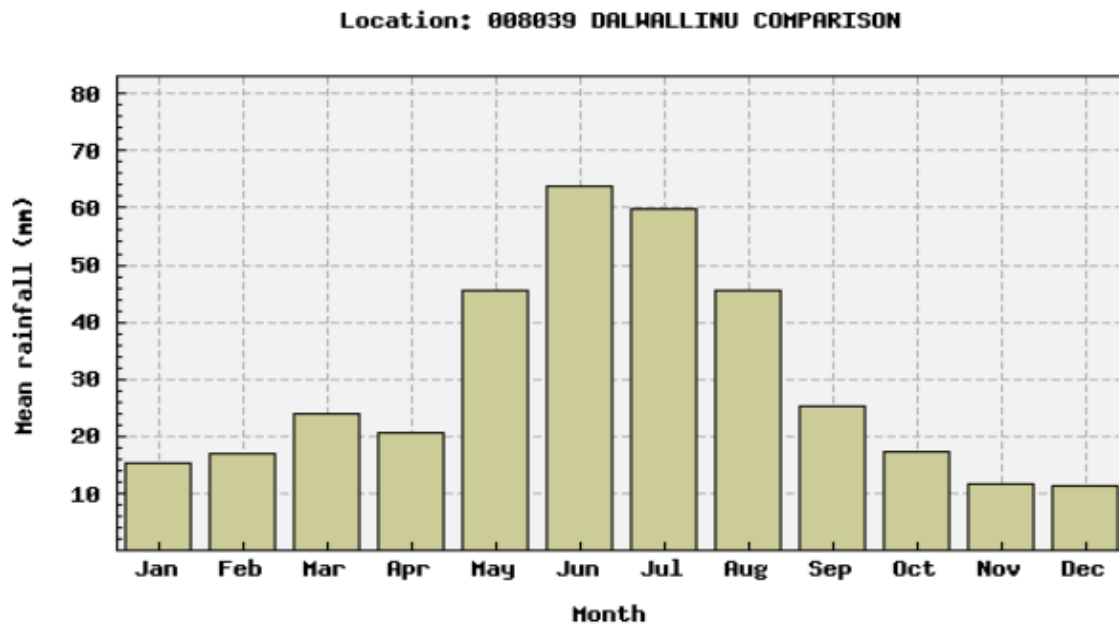


Plate 2-1 Mean Monthly Rainfall (Source: BoM, 2017)

The dominant winds experienced in this area are south easterly in summer (strongest in the mornings) and north westerly in winter. Wind roses for the Dalwallinu weather stations are provided on Plate 2-2.

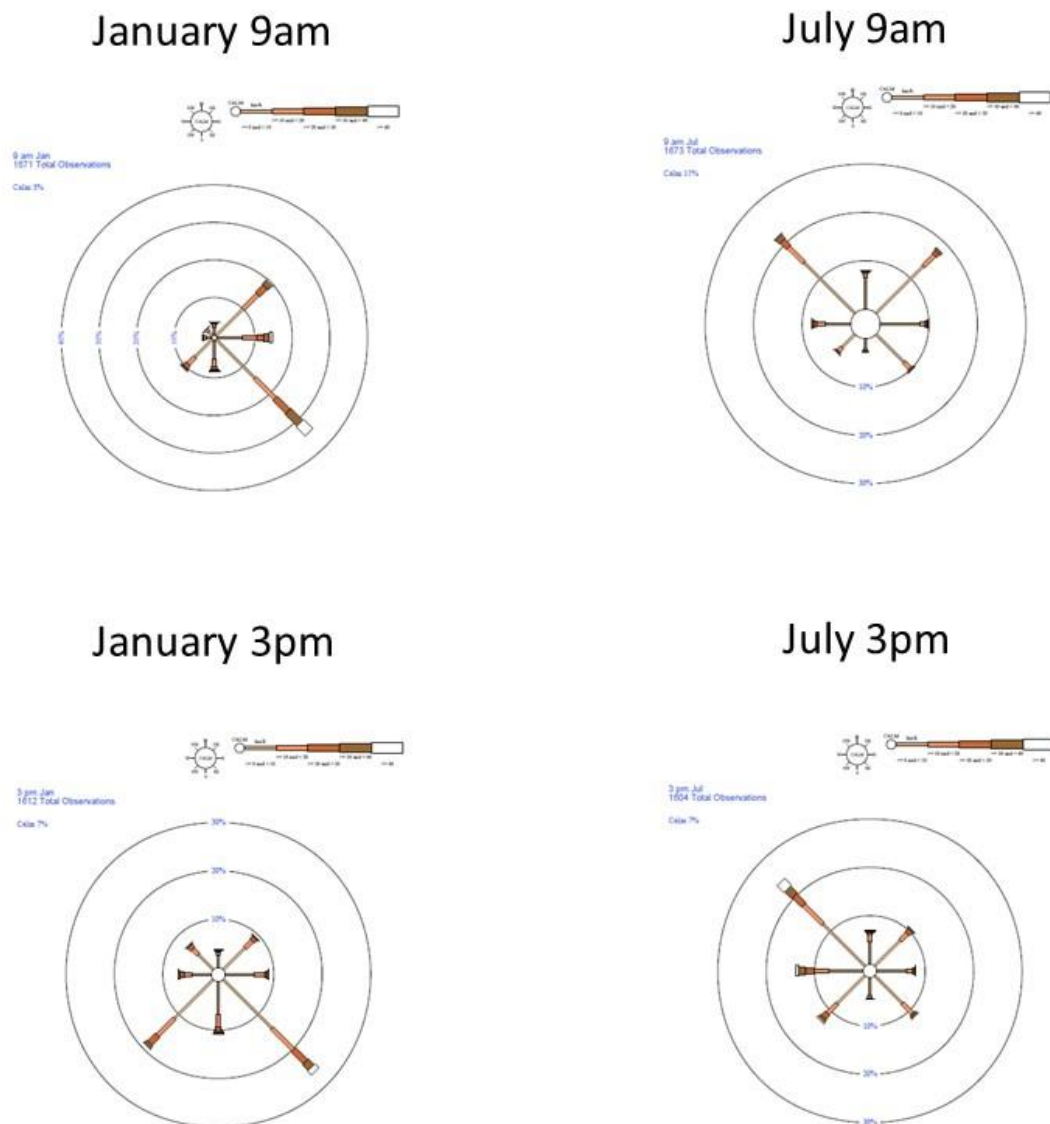


Plate 2-2 Mean Wind Conditions (Source: BoM, 2017)

2.2 Topography, Soils and Geology

The topographic elevation of the landholdings varies from approximately 335 to 350mAHD (Landgate, 2017). The ground surface level at the proposed plant site is approximately 335-347mAHD.

The site is located within the Ballidu land system as mapped by the Department of Agriculture (Payne & Leighton, 2004). This system is described as:

- Gently undulating sandplain with narrow flat valleys, from weathered granite, yellow to brown sands to earths with some gravel on rises and red to brown earths to duplexes in valleys.

The site geotechnical investigation found that that the proposed plant site contained topsoil (0.1m depth) overlying gravelly sand and silty sand (fine to medium grained) dense to very dense (Structerre, 2017).

2.3 Hydrology

The geotechnical investigation undertaken onsite in July and August 2017 did not encounter groundwater. The maximum depth of excavations undertaken as part of this investigation was 2.5m below ground level (Structerre, 2017).

2.4 Vegetation and Flora

As can be seen from the aerial photograph the site is predominantly cleared of native vegetation (Figure 2). No additional clearing is necessary for the construction of the detonator assembly facility or magazines.

Vegetation is present within the Wubin-Mullewa Road reserve located adjacent to the western boundary of the site. The remnant vegetation in this location forms part of the Jibberding vegetation type which is described as 'Wattle, casuarina and teatree *acacia-allocasuarina-melaleuca* alliance' (Landgate, 2017).

This vegetation also forms part of Beard Vegetation Association 435 which is described as: 'Shrublands; *Acacia neurophylla*, *Acacia beauverdiana* & *Acacia resinomarginea* thicket' (Beard, 1981). This vegetation associated is noted to have 76.66% of the pre-European extent remaining (Phoenix Environmental, 2016; DPaW, 2014).

The vegetation onsite is not mapped as being within an Environmentally Sensitive Area (Landgate, 2017).

Vegetation and flora surveys in the Wubin area have identified the presence of the following conservation significant flora within approximately 2km of the site (DPaW, 2017):

- *Acacia isoneura* subsp. *nimia* (Priority 3)
- *Acacia scalena* (Priority 3)
- *Banksia benthamiana* (Priority 4)
- *Beyeria disciformis* (Priority 1)
- *Grevillea asparagoides* (Priority 3)
- *Lechenaultia galactites* (Priority 3)

None of these species are listed as Threatened Species under the *Biodiversity Conservation Act 2016*.

2.5 Fauna and Habitat

The conservation significant fauna which is known to occur in the Wubin area (as identified through a search of the NatureMap database and the *Environment Protection and Biodiversity Conservation Act 1999* Protected Matters database for a 10km radius of the site) is shown in Table 2-1. Codes for conservation status are shown in Table 2-2.

Table 2-1 Conservation Significant Fauna Search Results

Common Name	Scientific Name	WA Status (Ranking)	EPBC Status (Ranking)	Habitat and Distribution	Likelihood of being present near site
Australian Painted Snipe	<i>Rostratula australis</i>	EN	EN	Occupies shallow wetlands and flooded plains, usually requiring areas of bare, wet mud and dense undergrowth and canopy cover. Occurs throughout the Northern Territory and north-western Western Australia with patchy distribution in the south-west of WA.	Unlikely to occur within or near the site due to lack of habitat.
Barking Owl	<i>Ninox connivens subsp. connivens</i>	P3	-	Occurs across most Australian states except Tasmania and the Northern Territory. In WA, the species only occurs in the south-west. Mostly found in forested riparian vegetation where they nest in large tree hollows.	Unlikely to occur within or near the site due to lack of habitat.
Carnaby's Black Cockatoo	<i>Calyptorhynchus latirostris</i>	EN	EN	Inhabits remnant native eucalypt woodlands, primarily in the semi-arid region and southern jarrah-marri forests. It is a seasonal visitor to pine plantations where it feeds on pine seeds. It nests in tall eucalypts with hollows for breeding. Occurs in subpopulations across the south-west of Western Australia. Residential in high-rainfall areas, but where it occurs in eastern areas, it migrates to coastal areas where rainfall is higher after the breeding season (winter to spring).	Unlikely to occur within or near the site due to lack of habitat.
Chuditch	<i>Dasyurus geoffroii</i>	VU	VU	Inhabits eucalypt forests (particularly jarrah), dry woodland and mallee shrubland. Utilises fallen hollow logs and burrows for dens in wooded habitats. Ranges from Cape Arid in the south to Kalbarri in the north. Only known to occur in Western Australia and is generally restricted to the south-west with some	Unlikely to occur within or near the site due to lack of habitat.

Common Name	Scientific Name	WA Status (Ranking)	EPBC Status (Ranking)	Habitat and Distribution	Likelihood of being present near site
				populations in the Wheatbelt and scattered in the Goldfields.	
Curlew Sandpiper	<i>Calidris ferruginea</i>	CR	CR & MI	Inhabits intertidal mudflats in sheltered coastal areas, such as estuaries, inlets, bays, as well as swamps and lakes. Breeds in Siberia and migrates south during Australia summer. Commonly observed on the Kimberley coast, Ningaloo and Barrow Island. Less common in south-western Australia, but still numerous on large wetlands.	Unlikely to occur within or near the site due to lack of habitat.
Malleefowl	<i>Leipoa ocellata</i>	VU	VU	Inhabits shrublands and low woodlands that are dominated by mallee vegetation and/or low-growing multi-stemmed Eucalypt species. Occasionally inhabit Acacia shrublands. Forages on the ground amongst leaf litter most of the time, when not building a nesting mound. Omnivorous with a generalist diet.	May traverse vegetation in road reserve or inhabit nearby vegetated reserves. Recorded from vegetation north of the Wubin town site in 2010. Two other records within 10 km of site in 1992.
Peregrine Falcon	<i>Falco peregrinus</i>	OS	-	Inhabits woodlands, watercourses, grasslands and coastal cliffs, preferring tall structures on which to perch and nest. Nests in recesses of cliff faces, tree hollows or in large abandoned nests of other birds. Widespread distribution across much of Australia but is uncommon. Distribution often depends on the abundance of prey. Predates heavily on other birds.	May occur in a transitory capacity.
Shield-backed Trapdoor Spider	<i>Idiosoma nigrum</i>	EN	VU	Typically inhabits heavy clay soils and is associated with eucalypt woodland and acacia shrubland where found in the Wheatbelt. Occurs primarily in sheltered positions	May occur in road reserve or nearby nature reserves.

Common Name	Scientific Name	WA Status (Ranking)	EPBC Status (Ranking)	Habitat and Distribution	Likelihood of being present near site
				with increased moisture retention properties. Requires leaf litter and twigs for burrow creation. Endemic to semi-arid south-west Western Australia, ranging from the Wheatbelt to the Midwest in fragmented populations.	Three records 12 km north of the site (2008).
Western Spiny-tailed Skink	<i>Egernia stokesii subsp. badia</i>	VU	EN	Occurs in open eucalypt woodlands and Acacia-dominated shrublands in semi-arid to arid areas of south-western WA. It tends to shelter in logs, in cavities in the trunks and branches of shrubs, as well as in houses and ruins, especially in accumulations of old corrugated iron. There are three records of this species in the Wubin area.	May occur in road reserve or nearby nature reserves. Was previously recorded within 2km of the site (1977 and 1998).

Information Sources:

Garnett & Crowley, 2000

Johnstone & Storr, 1998

Phoenix Environmental, 2016

DotEE, 2017

Atlas of Living Australia, 2017

Several migratory and marine birds are also listed in the Protected Matters database as potentially occurring within the site. However, given the lack of wetland habitat available within or near the site, these have not been included in Table 2-1 as conservation significant species likely to occur.

Given the lack of vegetation and other fauna habitats present onsite (such as unusual geological features, leaf litter), it is concluded that the site would not provide significant habitat for the conservation significant fauna listed in Table 2-1.

The adjacent road reserve may be utilised as a movement corridor for some species, however given the narrow width of the vegetation, this is unlikely to provide valuable permanent habitat to these species.

2.5.1 Levels of Conservation Significance

The conservation status of Australian fauna and flora species is identified at a federal level under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and at a state level under the Western Australian *Biodiversity Conservation Act 2016* (BC Act).

Table 2-2 Conservation Code Definitions

Conservation Codes for WA Flora and Fauna	Definition
Threatened species	<p>Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the Biodiversity Conservation Act 2016 (BC Act).</p> <p>Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna.</p> <p>Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for Threatened Flora.</p> <p>The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.</p>
(CR) Critically endangered species	<p>Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines".</p> <p>Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.</p> <p>Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.</p>
(EN) Endangered species	<p>Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines".</p> <p>Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines.</p> <p>Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.</p>

Conservation Codes for WA Flora and Fauna	Definition
(VU) Vulnerable species	<p>Threatened species considered to be “facing a high risk of extinction in the wild in the medium term future, as determined in accordance with criteria set out in the ministerial guidelines”.</p> <p>Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines.</p> <p>Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.</p>
Extinct Species	Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.
(EX) Extinct species	<p>Species where “there is no reasonable doubt that the last member of the species has died”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).</p> <p>Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.</p>
(EW) Extinct in the wild	<p>Species that “is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).</p> <p>Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.</p>
Specially protected species	<p>Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.</p> <p>Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.</p>
(MI) Migratory species	<p>Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).</p> <p>Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.</p> <p>Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.</p>

Conservation Codes for WA Flora and Fauna	Definition
(CD) Species of special conservation interest (conservation dependent fauna)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.
(OS) Other specially protected fauna	Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.

2.6 Surrounding Land Uses

The site is located approximately 1.4km north of the Wubin town site. Neighbouring land uses include:

- Broad acre farming to the north, east and west
- Wubin light aircraft airstrip to the immediate north
- Remnant vegetation within with unallocated crown land to the south
- Truck assembly area to the south along the northern side of Thomas Road

These land uses are shown on Figure 2.

The nearest farmhouse to the proposed Emulsion Plant site is located approximately 1.9km to the north-east. The closest building within the Wubin town site is located approximately 1.5km south of the site (Landvision, 2016).

2.7 Cultural Heritage

A search of the Department of Aboriginal Affairs heritage sites database did not identify any site of Aboriginal heritage significance within the surrounding the landholdings.

The State Heritage Office InHerit database identified one site of European heritage significance within this general area. The Pioneer Graves within the Wubin Cemetery are part of the Shire of Dalwallinu municipal heritage inventory. This site is located south of Thomas Road and east of the Mullewa-Wubin Road. This site would not be impacted by the AN Emulsion Plant or the proposed Detonator Assembly Facility.

3 Proposed Site Usage and Development

3.1 Site Details

The site is described as Lot 117 on Deposited Plan 150270 and Lot 115 on Deposited Plan 148784 on the corner of Mullewa-Wubin Road and Thomas Road, Wubin. Copies of the Certificates of Title are provided in Appendix 6. The total area of the property is approximately 144ha. The access road and transport assembly area is approximately 5.6ha and is located within Lot 115.

3.2 Overview of the facility

3.2.1 ANE Plant

The ANE plant produces an ammonium nitrate emulsion product which is used as a precursor ingredient in explosives used in the mining industry. The product is created by mixing dry calcium nitrate with ammonium nitrate solution, mineral oil and an emulsifier to create the end product.

Activities that take place on site include the unloading and storage of raw materials. Transfer of materials around the site, combining of materials to make the end product and storage of the end product.

Key components of the site and the operations are as follows:

- The facility will store and blend a range of non-explosive calcium nitrate and class 5.1 ammonium-nitrate products that ultimately, when a series of ingredients are added at the mine locations become an explosive for blasting.
- Some 50,000 tonnes of precursor (non-explosive material) will be produced per year based on existing contracts. This figure may rise to approximately 90,000 tonnes per year with an additional contract.
- Blended products will be transported directly to mine sites with the precursor raw materials being handled in “big-bag” packages and bulk to improve handling abilities.
- Truck transport will be restricted to movements to the facility and between the facility and the mining areas.
- The operational area will be surrounded by earth bunds to prevent any stormwater flow onto or away from this area.

Ancillary activities which occur on site include administrative functions and training as well as maintenance of equipment.

3.2.1.1 Production Volume

Initially the plant will produce 50,000 tonnes per annum of Ammonium Nitrate Emulsion product. It is estimated that this volume may rise to 90,000 tonnes per annum should additional contracts be obtained.

3.2.1.2 Workforce and Hours of Operation

Up to six people who would live locally would be employed in the operation. The standard operating hours of the plant would be 6.00AM to 6.00PM Monday to Saturday. It is possible that the plant may operate up to 24 hours a day in order to meet peak demand on some occasions.

3.2.1.3 Plant Maintenance

If and when general maintenance of the site and facility is required, this will be undertaken via the onsite workshop (Figure 4). The maintenance programs are supported by safety standards and maintenance systems and will be compliant with any relevant Dangerous Good regulations.

3.2.1.4 Power Supply

The plant will be powered by an onsite 450 kW diesel generator. The steam boiler will also be diesel powered. Diesel will be stored onsite in an above ground fuel storage tank to fuel the generator and boiler. Diesel consumption at peak demand will be approximately 70L/hour.

3.2.1.5 Truck Movements

It is estimated by the plant will be accessed by 5 to 6 trucks per day for delivery of goods or collection of products based on initial estimated demand. This may increase in peak periods to 10 trucks/day.

3.2.2 Proposed Detonator Assembly Facility

HMSA is proposing to build a new Detonator Assembly Facility at the AN Emulsion Plant site which will require the addition of the following buildings:

- Assembly building
- Base Cap Store
- Detonator Test Building
- High Explosive Magazines (quantity 5)
- Detonator Assembly Magazine

The assembly building will be located close to the main gate and away from the AN Emulsion Plant storage domes. Antistatic flooring will be required in the production room. The high explosive magazines and base cap store have been located within the site according to the revised separation distances compliance review (see 4.2.8) and are shown on Figure 4.

3.3 Site Layout

The site layout including the proposed new detonator assembly facility and magazines is shown on Figure 4. This includes the following:

- Ammonium nitrate (AN) storage domes
- Calcium nitrate (CN) storage domes
- Mineral Oil storage area
- Ammonium nitrate solution (ANSOL) storage area
- Emulsifier storage area
- Water storage tanks
- Emulsion plant facility comprising boiler, diesel generator, fuel makeup area, store, workshop and Ammonium Nitrate Emulsion (ANE) transport/storage area
- Administration area comprising reception, offices, training room, lunchroom and ablution facilities.
- Weighbridge
- Detonator Assembly Building
- Base Cap Store
- Detonator Test Building
- Detonator Magazine

- 5 High Explosive Magazines
- Roads, drainage and fencing and hardstand areas.

The area containing the plant and storage areas will extend over approximately 1.3ha and will be surrounded by a security fence.

There will be gravel/dirt access roads within the site and a transport assembly area. These areas are estimated to extend over a further 4.3ha.

The only existing buildings (prior to construction of the ANE Plant) on the property are the farmhouse and sheds which will remain and be utilised by HMSA to accommodate a site manager/caretaker.

The prescribed premises identification is to extend over the plant and access areas only rather than the entire landholdings, (refer Appendix 2 Works Approval).

3.4 Construction/Commissioning Phase

The construction phase of the ANE plant is near completion and commissioning is about to commence.

The plant commissioning process will generally include:

- Commissioning of any specialist plant components by specialist installation companies as needed.
- Undertake an inert plant test run using water.
- Undertake an alpha and beta test runs of the plant and test products (part of commissioning plan and procedure).

HMSA have a commissioning procedure and plan which will apply to these works.

If required, DWER can be advised of the commissioning dates and times and will be able to attend the site during this period if desired.

Power to the plant will be supplied from the onsite generator.

The site will not be connected to reticulated water or sewer infrastructure. Provision of water required for the site will be sourced from a local water supply operator and trucked into the site.

A septic tank and leach drain system will be provided onsite for connection to the ablution facilities. Given the limited number of personnel proposed to work onsite (i.e. up to 6 people) a domestic capacity system will be utilised onsite.

3.5 Operation Phase of the ANE Plant

3.5.1 Process Description

The process to be undertaken at the site is presented in Appendix 7. In general, the process will involve:

- Heating of the solution tank
- Purge the ANSOL and AN/CN lines and prepare the plant
- Transfer the heated ANSOL, ANSOL seed, CN and water into the solution tank
- Transfer the AN/CN solution into the batch tank
- Add mineral oil and emulsifier to the batch tank to create the AN emulsion (ANE)
- Transfer the ANE into the storage tank ready for dispatch offsite

The following materials are stored onsite for use in this process:

- 110kL AN emulsion stored in 2 x 55kL tanks
- 1,500 tonnes of AN prill stored in three stockpiles, within dome like buildings
- 156 kL ANSOL stored in 6 x 26 kL tanks in a bunded area
- 143kL of mineral oil stored in self bunded tanks
- 1,000 tonnes of CN product stored in bulka bags
- 50 kL of emulsifier in 50 x 1 kL IBC
- 35.9 kL of diesel stored in self bunded tanks for use in the generator and diesel steam boiler
- 5 x 25,000L tanks of water

Material Safety Data Sheets for the material to be stored onsite are provided in Appendix 8.

3.6 Construction of the Detonator Assembly Facility and Magazines

On receipt of a building license the following works will be undertaken on the site for the construction of the Detonator Assembly Facility and Magazines.

- Site preparation including install of temporary site fencing and accommodation, removal of minor items of waste (i.e. scrap cars and remove silo footings)
- Pad preparation for new buildings
- Construction of the new internal roads
- Construction of new building foundations and structures
- Fit out of the main assembly shed
- Erection of permanent security fencing
- Installation of solar CCTV to HE magazine areas
- Installation of HMSA's assembly equipment

Construction of the works for the Detonator Assembly Facility and Magazines is anticipated to take approximately four months with works commencing approximately mid-2020.

In parallel with construction HMSA will be submitting a license for the storage of Class 1 explosives with DMIRS. Objectives and Targets

The site objectives and targets for the facility are shown on Table 3-1 below.

Table 3-1 Site Objectives and Targets

Objective	Target	Related aspect
Prevent material spills	0 spills	Spill/leak
Manage waste properly	All waste streams managed through appropriate waste management contractors or reused/recycled as appropriate	Generation of waste

3.7 Timing for Construction and Operation Commencement

Table 3-2 shows the timeframes proposed for commencement of site works for the Detonator Assembly Facility and Magazines.

Table 3-2 Construction and Operation Timeframes

Stage	Anticipated Timing
General Site Works	
Site Establishment	June 2020
Earthworks	June-July 2020
Plant Construction (once Works Approval has been granted)	
Install concrete	August 2020
Install fencing	September 2020
Install sheds and magazines	September/ October 2020
Install equipment onsite	November 2020
Commissioning	
Assembly Operations Commence	November 2020

4 Potential Impacts and Proposed Management

4.1 Commissioning/Construction Phase

The activities and potential impacts associated with site construction and the commissioning are:

- Dust generation from the limited earthworks to be undertaken as part of the site preparation.
- Noise generation from site preparation: including ground works, construction machinery/tools and construction vehicles.
- Spills from temporary storage of liquids on site.
- Stormwater drainage management.
- Light emissions.

4.1.1 Dust Emissions

The DWER guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities (DEC 2011) is applicable. The guidelines provide advice for the management and monitoring of dust and other air pollutants and applies to all projects in Western Australia with the potential to generate significant levels of dust from diffuse sources.

For sites generating uncontaminated dust, the DWER site classification chart is applicable. This identifies the level of dust management and monitoring required depending on the outcome of the site risk assessment.

A site risk assessment/classification for activities generating uncontaminated dust for the site (construction works) was completed and results are presented in Appendix 9. The site classification score for the site was 98. In accordance with the DEC (2011) assessment chart the site is categorised into Classification 1 (i.e. classification scores < 199) and is considered to be a 'negligible risk'.

Classification 1 sites do not require dust provision or contingency arrangements (DEC 2011).

Irrespective of this requirement the following management actions in minimise the chance of dust generation and associated issues will be applied to the site:

- Speed of vehicles onsite will be restricted to a maximum of 10 km/hour to minimise dust generation.
- Visual monitoring of dust generation will be undertaken onsite throughout the construction period. A record of observations will be maintained and available for inspection if required.
- Immediate neighbours of the site will be notified on the proposed commencement date and duration of construction works prior to works onsite commencing.
- A Site Complaints Register will be established to record any complaints received in relation to construction or operation activities at the site. Any complaints received will be investigated and management/contingency actions implemented if required.
- A notice will be erected on the site boundary advising of the contact details for the personnel responsible for the construction program.

4.1.2 Noise Emissions

No significant noise emissions which would differ from standard construction noise from the site preparation and installation of the facility are expected. Given this and the large separation distance between the site and sensitive land uses, no specific noise management actions are proposed.

The following general environmental management actions will be undertaken onsite which would be applicable to noise matters:

- Construction hours will be limited to between 7.00AM and 7.00PM Monday to Saturday (no construction work to be undertaken on public holidays).
- Immediate neighbours of the site will be notified on the proposed commencement date and duration of construction works prior to works onsite commencing.
- A Site Complaints Register will be established to record any complaints received in relation to construction or operation activities at the site. Any complaints received will be investigated and management/contingency actions implemented if required.
- A notice will be erected on the site boundary advising of the contact details for the personnel responsible for the construction program.

4.1.3 Spills

Construction vehicles and equipment have the potential to spill or leak hydrocarbons. The highest risk times are during re-fuelling, servicing or equipment breakdown. In order to minimise this risk, the following management measures are proposed:

- All vehicles and equipment to be utilised onsite are to be regularly serviced and maintained.
- Hydrocarbon spill clean-up kits to be available onsite during the construction and operation phases of the project.
- Any storage of hydrocarbons onsite to be undertaken in an appropriately bunded location(s). The integrity of the bunds is to be inspected regularly.
- Where practical, re-fuelling of vehicles and equipment is to be undertaken offsite. In the event of refuelling activities occurring onsite, spill catchment trays shall be deployed to capture any leaks and spills during the process.
- Any spills and associated clean-ups are to be documented.

Fuel/chemical storage requirements and spill clean-up and reporting procedures are to be made available to all personnel onsite and are to be included within the site induction package.

4.1.4 Stormwater Management

Rainfall intersecting the site during the construction period will be infiltrated within the landholdings.

As part of the initial civil construction works spoon drains will be installed onsite. These will be located around the edge of the plant site and will direct drainage water in the settlement/bio-infiltration ponds. Refer Appendix 10 for the stormwater drainage plan.

4.1.5 Light Emissions

Construction work will not be undertaken prior to sunrise or after sunset. As such artificial lighting will not be utilised during the construction period.

4.2 Operation Phase

4.2.1 Aspects and Impacts Register

The activities which have been identified to have a potential impact on the site or surrounding environment include:

- Loading and unloading of chemicals and hydrocarbons
- Stormwater intersecting the work area

- Equipment and machinery repairs - There will be no truck maintenance undertaken onsite.
- Waste generation within the office
- Sewerage generation
- ANE infrastructure failure or breakdown
- ANE residues

The aspects and impacts summary register are provided in Appendix 11. Discussion of the impacts and management proposed in relation to the potential emissions is provided below.

Separation distances associated with the storage of ANE and AN have also been assessed for the site and are reported below.

4.2.2 Chemical Management

Chemical spills have been identified as a possibility from the following activities:

- Spill while loading/unloading of CN and ANSOL
- Spill while loading ANE onto the transport truck, including burst hoses leading to loss of product
- Valve failure leading to loss of ANE product
- Leaking seal on the ANE pump leading to loss of product
- ANE storage silo overflow during loading or due to equipment failure
- Transfer line failure leading to loss of AN, CN or ANE solution
- Leaks from the emulsifier storage boxes (IBC's)
- Leaks from storage and transfer of Mineral Oil for emulsion manufacture
- Leaks from storage and transfer of diesel fuel for the onsite generator
- Leaks from storage tanks of ANSOL. Diesel, mineral oil or emulsion.

The concern regarding liquid spills or leaks is the possible contamination of soil and/or groundwater through seepage into the soil profile. For spills of solid materials, this is more likely to impact soil quality prior to clean-up of the material.

In order to minimise the chance of these occurrences, in addition to routine maintenance, the following design and management practices will be enacted:

- Install concrete in the CN, ANSOL and ANE loading areas to contain any spilled material before it reaches the natural soil.
- Ensure operators of the plant are appropriately trained in both operation of the facility and in spill management.
- Undertake regular inspections of the ANE plant valves and replace any valves if found to be leaking. Visual inspections will be undertaken daily.
- Undertake regular inspection of the ANE pump seals and replace any seal if they are found to be leaking. Inspections will be undertaken bi-annually, with a re-build undertaken every 2 years.
- The ANE storage silos will have built in alarms to detect overflows which is part of the triple check system. The alarms will be checked quarterly to ensure there are no maintenance issues.
- AN, CN and ANE transfer lines will be inspected for leaks, including inspection of the flange on a quarterly basis. Any leaks will be immediately repaired.

- The ANE transfer hoses will be will regulatory inspected for leaks or deterioration quarterly. The hose will be repaired or replaced if concerns are identified. Hoses are replaced every two years.
- The emulsifier storage area will be inspected for leaks daily.
- The ANSOL storage area will be bunded.
- The diesel storage tanks will be bunded (either self-bunded tank or within a bunded area).
- The Mineral Oil storage tanks will be bunded (either self-bunded or within a bunded area).
- The emulsion storage tanks will be un-bunded, but due to the viscous nature of the material, should a leak or spill occur this can be easily recovered.
- Vehicle and equipment refuelling will be undertaken over catchment trays (or similar device) to capture any leaks or spills during the process.
- Chemical spill kits will be kept onto for use if needed. A plan will be prepared showing the location of spill kits and included as part of the site induction package. Spill kits will also be highly visible onsite. All operators will be trained in the correct use of spill kits as part of the site induction.
- Raw material waste will be captured in specific and labelled containers for each raw material separately.

4.2.3 Stormwater Management

Based on the properties of the product which will be stored and used onsite, there is potential that any spills or leaks from the plant could be washed into the soil or groundwater through stormwater drainage or washdown of the plant and equipment.

The following design initiatives will be provided relevant to the plant area to minimise the potential generation of nutrient-impacted drainage water.

- Install an earth bund around the plant site to prevent surface water generated during rainfall events from flowing across the work site.
- A sub-soil drainage system may be installed below the plant site to control potential perching of water based on the low permeability of soils in this location.
- Drainage and stormwater from all hardstand areas within the work site and the sub-soil drainage system (if installed) will be directed towards bio-infiltration basin(s) to be located adjacent to the work site. The bio-infiltration basin(s) will be vegetated to assist with the uptake of nutrients from the drainage water prior to infiltration through the sand profile.
- It is noted that the natural soils in this area comprise sand and gravel. The average permeability of the top 1m of these soils assessed as part of the geotechnical investigation onsite was 1.25m/day. Soils tested within the plant site had an average permeability of 0.55m/day (Structerre, 2017).
- The bio-infiltration basin soils will be topped with a 500mm deep filter media to help manage drying as recommended by New Water Ways (2016). The hydraulic conductivity of the filter media will be between 100-300 mm/hr.

The species which have been identified as being potentially suitable to plant within the bio-infiltration basin(s) are identified on Table 4-1. These species have been identified based on their ability to remove nitrogen and their suitability for the climatic conditions present in Wubin. They have also been identified as having tolerance to temporary inundation or dry conditions, drought tolerance and the ability to removal nutrients. The site stormwater management plan is attached in Appendix 10.

Table 4-1 Bio-infiltration Basin Preliminary Plant Species

Plant Species	Plant Form and Characteristics	Comments
<i>Frankenia cinerea</i>	Shrub, 0.1-0.3m high	Naturally occurs within 2km of the site
<i>Juncus bufonius</i>	Annual, grass-like or herb, 0.04-0.3 m high	Naturally occurs within 10km of the site
<i>Juncus pallidus</i>	Herb, 0.5-2m high	Widespread occurrence in WA.
<i>Lepidosperma costale</i>	Tufted perennial, grass-like or herb, 0.2-0.7m high, clumps to 0.7m wide	Naturally occurs within 10km of the site
<i>Lepidosperma scabrum</i>	Tufted perennial, grass-like or herb, 0.3-1.5m high, clumps to 0.8m wide	Naturally occurs within 2km of the site
<i>Lepidosperma squamatum</i>	Tufted perennial, grass-like or herb (sedge), 0.15-1 m high	Naturally occurs within 10km of the site

Typical planting densities recommended for bio-infiltration swales are as follows:

- Clumping sedges and rushes – 6-9 plants/m²
- Spreading sedges and rushes – 4-6 plants/m²
- Shrubs and trees (over sedges and rushes) – 1 plant/2m² for small shrubs and 1 plant/5m² for larger trees

The final species list will be submitted to the Shire for input/suggestions prior to planting commencing.

Maintenance of the bio-infiltration basin(s) will comprise the following:

- Visual inspection of plant health and coverage twice per year to ensure there is adequate plant health and coverage for the basin to function effectively.
- Removal of weeds from the basin on an annual basis. This is to be done either via hand removal, or by use of a selective herbicide which does not impact native vegetation (e.g. fusillade).

If the plant coverage targets are not met, or the plant health appears to be in decline additional planting will be undertaken within the basin to restore optimum conditions.

4.2.4 Waste Generation

4.2.4.1 Waste Types and Disposal

Waste will be generated onsite from the following activities:

- Waste materials from the plan, workshop and Detonator Assembly Facility (e.g. packaging, used containers, broken parts and equipment).
- Waste from the office and amenities room (e.g. stationary, packaging and food waste).
- Sewerage from the washrooms.

Waste management onsite will be undertaken as follows:

- Non-contaminated waste will be collected in waste bins onsite and disposed to landfill via a local waste management contractor. The closest landfill is located on the Dalwallinu West Road, Dalwallinu.
- Potentially contaminated waste will be handled as summarised on Table 4-2.

Table 4-2 Potentially Contaminated Waste Disposal

Waste Material	Potentially Contaminating Substances	Disposal
AN storage bags and containers	Ammonium Nitrate	Disposed using an accredited waste contractor
CN storage bags and containers	Calcium Nitrate	Disposal as general waste as CN is not classified as a Dangerous Good
Used hoses and fittings which have been in contact with the CN, AN, ANSOL, emulsifier or ANE products	Nitrates	Materials to be decontaminated and thoroughly cleaned onsite, then disposed as general waste
Soils which have been impacted by a chemical or hydrocarbon spill	Nitrates Hydrocarbons	Disposed using an accredited waste contractor

4.2.4.2 Onsite Effluent Treatment

The site will be serviced by a septic tank and leach drain system. The system is being designed by Alphazeta Group and the associated plans will be submitted to the Shire for approval prior to construction.

The characteristics of the site which supports onsite effluent disposal include:

- Soils as tested near the plant site (20-100mm depth) had an average Phosphorus Retention Index (PRI) of 49.6.
- The estimated depth to groundwater is over 2m.
- There are no surface water features within or adjacent to the site.

The design calculations which have been utilised to size the septic system include:

- 6 staff @ 30L/person
- 5 staff @ 10L/person
- Total daily hydraulic load = 230L
- Septic tank size required = 2,050L

Based on the above and assuming the site is operated for 6 days/week it is estimated that the annual wastewater volume which may be treated through this system would be approximately 72 kL/year.

The average concentration of nitrogen and phosphorus in the wastewater from septic tanks is estimated to be approximately TN 60mg/l (Toor *et al.*, 2011) and TP 10mg/l (Lusk *et al.*, 2011a) respectively. As such it is estimated that 4.32 kg of total nitrogen and 0.72 kg of total phosphorus would be discharged from the onsite leach drains* each year. (*Please note:* the nitrogen and phosphorus concentrations cited are derived from domestic wastewater systems which include kitchen sinks, sinks, toilets, and appliances. Therefore, the concentrations used above may be slightly higher than produced on site).

* It is important to note that these loads are indicative of the effluent leaving the leach drains, not what is entering the groundwater. Transformations, retention, loss and movement of nitrogen in the natural soil system are governed by the nitrogen cycle within the soil profile. Research shows that approximately 10 to 50% of nitrogen in septic tank effluent may be removed while flowing through the water unsaturated soil zone (Toor *et al.*, 2011) before effluent reaches the groundwater. Likewise, phosphorus can be attenuated in the soil after percolating out of the leach drains. Research shows biofilms frequently form within the topsoil layers beneath leach drains. These biofilms increase in microbial activity and lead to effective removal of

contaminants including phosphorus and microbes (Lusk *et al.*, 2011a). The rate of removal is heavily influenced by the local conditions.

The presence of microorganisms; bacteria, protozoa, and viruses in wastewater is also an important consideration in onsite septic tank systems. There are too many types of bacteria present in wastewater to enumerate so in most cases indicator bacteria such as faecal coliforms, faecal streptococci and *Escherichia coli* (*E. coli*) are measured in wastewater. The use of indicator bacteria is based on the assumption that faecal bacteria in the wastewater are survivors of the intestinal flora and can be used to reflect the possible presence of all human pathogens. Average *E. coli* concentrations from septic tank effluent (before entering the soil profile) can be 10^5 - 10^8 /100ml (Lusk *et al.*, 2011b).

4.2.5 Noise Emissions

Noise emissions are regulated by the Environmental Protection Act 1986 and the Environmental Protection (Noise) Regulations 1997.

The Regulations require that noise emitted from any premises must comply with assigned noise levels when received at any other premises and be free of the intrusive characteristics of tonality, modulation and impulsiveness. In addition, the noise emissions must not “significantly contribute” to an exceedance of the assigned levels.

The closest noise sensitive premises are located as follows:

- Farmhouse approximately 1.9km to the north-east of the plant site
- Buildings within the Wubin town site are approximately 1.5km south of the site

The main sources of potential noise arising from operations of this type include (NICS, 2017a):

- Noise associated with trucks accessing the site.
- Operation of onsite machinery e.g. forklift.
- Operation of plant infrastructure e.g. boiler, generator, auger, heat exchanger, pre-expander, mixing bag pump, cooling tower, pumps, air compressor main, air compressor EPS, raw material pump.

The Noise Assessment undertaken for a similar HMSA facility in NSW (NICS, 2017a) found the operation of the facility could easily comply with the required noise levels. The closest noise sensitive receptor to this facility was located 1180m away (residential dwelling).

On the basis of the distance to noise sensitive premises at this site and the likely noise emissions from the site, specific noise management measures are not proposed above the general site management practices which will include:

- Standard operating hours would be 6.00AM to 6.00PM Monday to Saturday.
- A Site Complaints Register will be established to record any complaints received in relation to construction or operation activities at the site. Any complaints received will be investigated and management/contingency actions implemented if required.

4.2.6 Air Emissions

The following potential sources of air emission have been identified for the plant:

Table 4-3 Air Emission Potential Sources and Substances

Source	Emission Substance
Boiler	Steam (water vapour)

Source	Emission Substance
Heat exchange cooling tower	Steam (water vapour)
Diesel Generator	Nitrogen oxides, Sulphur dioxide, Carbon monoxide, Hydrocarbons, Particulate matter
Diesel powered steam boiler	Nitrogen oxides, Sulphur dioxide, Carbon monoxide, Hydrocarbons, Particulate matter
Hydrocarbon storage tanks	Hydrocarbon vapour
ANSOL storage tanks	Ammonia vapour

An air assessment conducted for a similar HMSA Nitrate Emulsion plant in NSW identified the following in relation to potential air emissions (NICS, 2017b):

- Due to the nature of materials received and processed onsite being of a non-volatile nature, it was determined that odours are unlikely to be generated at levels that could be detected outside of the boundaries of the plant. The only potential odour is ammonium, however, all activities are undertaken in closed tanks inside buildings which meant that any insignificant odour emissions are unlikely to be detected outside the buildings, let alone outside the boundaries of the site. The exception to the above is the storage of Ammonium Nitrate Solution in 6 tanks that are located outside any building. Again, this material is not volatile and is unlikely to produce any detectable odours.
- The predicted values at all nearby sensitive receptors (the closest was 1180m from the site) for total suspended particulates (TSP), sulphur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), ammonia (NH₃) and hydrocarbons (HC) were all well below the required limits.

In addition to the above small quantities of dust may be generated during the operational phase of the project from vehicle movement over trafficable area. Given that low number of vehicle movements predicted per day and the large separation distance to nearby sensitive receptors this is not anticipated to cause an issue.

4.2.7 Light Emissions

Artificial lighting may be required seasonally at the plant during operations when sunrise occurs after 6.00AM and sunset occurs before 6.00PM, or if the plant should be required to operate overnight in a period of peak demand. All lights installed at the site will be low in height and will be directed to the plant area to minimise any potential light spill.

4.2.8 Separation Distances

HMSA has undertaken a Separation Distance Compliance Review in relation to the AN Emulsion Plant and the proposed Detonator Assembly Facility (Appendix 12). This review analysed all proposed storage of energetic materials in the form of Class 1 explosives as well as how far any explosion might propagate.

The proposed separation distances were compared to the requirements of the Australian Explosives Industry and Safety Group *Code of Practice for Storage and Handling of UN3375* (ammonium nitrate emulsion), AS2187.1 Explosives – Storage and the Western Australian DMIRS *Code of Practice for Safe Storage of Ammonium Nitrate*.

The identification and categorisation of all Potential Explosive Sites (PES) was conducted including:

1. Detonator Assembly Building PES1 (DAB) – potential “No Warning” explosion
2. Base Cap Store Building – PES 2 (DTB) potential “No Warning” explosion
3. High Explosive Magazines – PES 3 (HEM) potential “No Warning” explosion
4. Detonator Magazines – PES 4 (DAM) potential “No Warning” explosion
5. ANE Tanks – PES 5 (20-TK-03A/B) potential “With Warning” explosion
6. AN Domes – PES 6 (Dome 1/2/3) potential “With Warning” explosion.

Separation distances for the AN Emulsion Storage (PES 5) and PES 6 (AN Domes) “With Warning” explosion is already licensed. In the Separations distance compliance review it was determined that there were “no vulnerable facilities or critical infrastructure” in the nearest town, Wubin, the boundary of which is 1.4km away” and Dalwallinu is over 21 km away.

It was determined that there is sufficient separation distances to the nearest town.

For onsite personnel it is credible to evacuate the site within 20 minutes to 1.2km away, north of the AN Emulsion Plant.

The detailed review including the additional assessment conducted for the proposed detonator assembly facility is attached in Appendix 12.

5 Vegetation Clearing

In order to gain access to the site a crossover has been constructed within the road reserve to connect the property to the Mullewa-Wubin Road. This required clearing for the crossover of approximately 0.025ha of vegetation within the road reserve to accommodate truck movements into and out of the site.

Photographs of the vegetation within the road reserve are provided in the Plates below.

Correspondence with DWER on 22nd August 2018, confirmed that vegetation clearance for the purpose of constructing a crossover from a road to a property adjacent to the road and associated sight line areas that is not an environmental sensitive area is exempt under Regulation 5, item 21A.



Plate 5-1 **Wubin-Mullewa Road Access Location**



Plate 5-2 **Access Location Vegetation (now cleared)**



Plate 5-3 **Access location and site Boundary interface, looking north**



Plate 5-4 **Access location and site boundary interface, looking south**

The width of the vegetation within the road reserve was approximately 25m.

As noted in Section 2.4 and seen in the above plates, the vegetation within the road reserve is comprises Acacia as the dominant species which would form part of Beard Vegetation Association 435. This location is not mapped as an Environmentally Sensitive Area (Landgate, 2017).

Review of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* and the *Environmental Protection Act 1986* identified that the following exemption is applicable to this clearing.

Table 5-1 Clearing Exemptions Guide Extract

Item No.	Wording of Exemption	DER Comment / Explanation
Regulation 5, Item 21A Clearing for a crossover Clearing must be done by or with the authority of: The person with the authority to construct the crossover	Clearing that is the result of constructing a crossover from a road to a property adjacent to the road, and any associated sight line areas, if the construction is within the scope of the authority to construct the crossover.	This exemption allows for the creation of a crossover between a road and a property, to enable access to that property through the road reserve. “Property” means an area of land that is managed as a single property whether or not it is made up of a number of properties held under separate titles. This exemption does not apply in an environmentally sensitive area.

Source: DER, 2013

On this basis a clearing permit was not required for the clearing to construct the crossover.

6 Summary and Conclusions

HMSA has constructed and is commencing commissioning of an ANE Plant within Lots 115 and 117, located near the corner of the Mullewa-Wubin Road and Thomas Road, Wubin. It is proposed that a detonator assembly facility and high explosive magazines be constructed within the same site. The area of the facility including access roads extends over approximately 5.6ha.

The ANE plant produces an ammonium nitrate emulsion product which is used as a precursor ingredient in explosives used in the mining industry. The product is created by mixing dry calcium nitrate with ammonium nitrate solution, mineral oil and an emulsifier to create the end product. Initially the plant will produce 50,000 tonnes per annum of Ammonium Nitrate Emulsion product. It is estimated that this volume may rise to 90,000 tonnes per annum should additional contracts be obtained.

Work Approval Number W6148/2018/1 was issued by DWER on 11/7/2018 with a duration to 10/7/2021 for a prescribed premises Category 75 for the ANE Plant and construction of this plant is near completion. Commissioning and licencing of the facility is due to commence shortly.

The proposed detonator assembly facility will be the first in Australia and will include an Assembly building, Base Cap Store, Detonator Test Building, five High Explosive Magazines and a Detonator Assembly Magazine. A revised Separation Distance Compliance Review was conducted to incorporate the proposed Detonator Assembly Facility. The ANE storage facilities have already been assessed and licenced and it was determined that there is sufficient separation distance to the town of Wubin.

The facility (both ANE Plant and Detonator Assembly Facility) will employ up to 6 people and with the standard operating hours being from 6am to 6pm Monday to Saturday. It is estimated that the plant will receive 5 to 6 truck deliveries per day.

The use of the site for this purpose has been supported by the Shire of Dalwallinu as indicated by Gazettal of Town Planning Scheme No 2, Amendment No. 2 in December 2016.

The key environmental features of the site are summarised as follows:

- Average annual rainfall of 357.5mm, with the majority of rain falling between May and August.
- Dominant winds are south easterly in summer (strongest in the mornings) and north westerly in winter.
- Topography of plant site being approximately 335-347mAHD.
- Soils onsite comprise sands and gravels, which have a high infiltration ability.
- Groundwater is deeper than 2m below ground level.
- The site is predominantly cleared of native vegetation, with the only vegetation requiring removal being located in the road reserve (for the driveway crossover).
- The farmhouse is located 1.9km to the north-east. Buildings within the Wubin town site are located approximately 1.5km to the south.

The construction phase of the ANE plant is complete and the proposed new detonator assembly facility will involve limited earthworks to create foundations for the additional buildings and drainage.

The plant commissioning process will generally include commissioning of any specialist plant components by specialist installation companies, undertaking an inert plant test run using water, followed by alpha and beta test runs of the plant with test products.

The activities and potential impacts associated with site construction and the commissioning are:

- Dust generation from the limited earthworks to be undertaken as part of the site preparation.

- Noise generation from site preparation: including ground works, construction machinery/tools and construction vehicles.
- Spills from temporary storage of liquids on site.
- Stormwater drainage management.
- Light emissions

Potential impacts associated with these activities have been identified as manageable. Some of the key actions which will be undertaken during the construction and commissioning period include:

- Construction hours will be limited to between 7.00AM and 7.00PM Monday to Saturday (no construction work to be undertaken on public holidays).
- Artificial lighting will not be utilised during the construction period
- Speed of vehicles onsite will be restricted to a maximum of 10 km/hour to minimise dust generation.
- Visual monitoring of dust generation will be undertaken onsite throughout the construction period. A record of observations will be maintained and available for inspection if required.
- Any storage of hydrocarbons onsite to be undertaken in an appropriately bunded location(s). The integrity of the bunds is to be inspected regularly.
- Hydrocarbon spill clean-up kits to be available onsite during the construction and operation phases of the project. Any spills and associated clean-ups are to be documented
- Immediate neighbours of the site will be notified on the proposed commencement date and duration of construction works prior to works onsite commencing.
- A Site Complaints Register will be established to record any complaints received in relation to construction or operation activities at the site. Any complaints received will be investigated and management/contingency actions implemented if required.
- A notice will be erected on the site boundary advising of the contact details for the personnel responsible for the construction program.

The operational process for the plant will generally involve:

- Heating of the solution tank
- Purge the ANSOL and AN/CN lines and prepare the plant
- Transfer the heated ANSOL, ANSOL seed, CN and water into the solution tank
- Transfer the AN/CN solution into the batch tank
- Add mineral oil and emulsifier to the batch tank to create the AN emulsion (ANE)
- Transfer the ANE into the storage tank ready for dispatch offsite

The operational activities which have been identified to have a potential impact on the site or surrounding environment include:

- Loading and unloading of CN, AN, ANSOL and ANE
- Stormwater intersecting the work area
- Equipment and machinery repairs
- Waste generation within the office and detonator assembly facility
- Sewerage generation

- ANE infrastructure failure or breakdown
- ANE residues

Key management actions which have been proposed to address these impacts include:

- Standard operating hours would be 6.00AM to 6.00PM Monday to Saturday.
- Key actions in relation to chemical management include:
 - Installation on concrete for the floor material in key loading areas to contain any spills.
 - Undertake regulation inspections of the plant to detect damage, wear and tear, leaks and spills.
 - Fit alarms to ANE storage silos to prevent overflows.
 - Store ANSOL and diesel within bunded areas.
 - Keep chemical spill kits onsite.
- All plant operators will be appropriately trained in both operation of the plant and what to do in an emergency.
- Key action in relation to stormwater management will include:
 - Install an earth bund around the plant site to prevent surface water generated during rainfall events from flowing across the work site.
 - Drainage and stormwater will be directed towards a bio-infiltration basin to be located adjacent to the work site. The bio-infiltration basin will be vegetated to assist with the uptake of nutrients from the drainage water prior to infiltration through the sand profile.
- Non-contaminated waste will be collected in waste bins onsite and disposed to landfill via a local waste management contractor. Potentially contaminated waste will be disposed in accordance with the material's specific requirements.
- Discharge sewerage onsite through a septic tank and leach drain system.
- All lights installed at the site will be low in height and will directed to the plant area to minimise any potential light spill.
- A Site Complaints Register will be established to record any complaints received in relation to construction or operation activities at the site. Any complaints received will be investigated and management/contingency actions implemented if required

In order to gain access to the site a crossover has been constructed within the road reserve to connect the property to the Mullewa-Wubin Road. The clearing for the driveway is approximately 0.025ha to accommodate truck movements into and out of the site. Review of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* and the *Environmental Protection Act 1986* has identified an applicable clearing permit exemption for this work.

Based on the above, it is concluded that the Ammonium Nitrate Emulsion Plant and the proposed detonator assembly facility can be operated at the site in an environmentally sound manner. This will be monitored by DWER through the licencing and any associated monitoring or reporting requirements.

7 References

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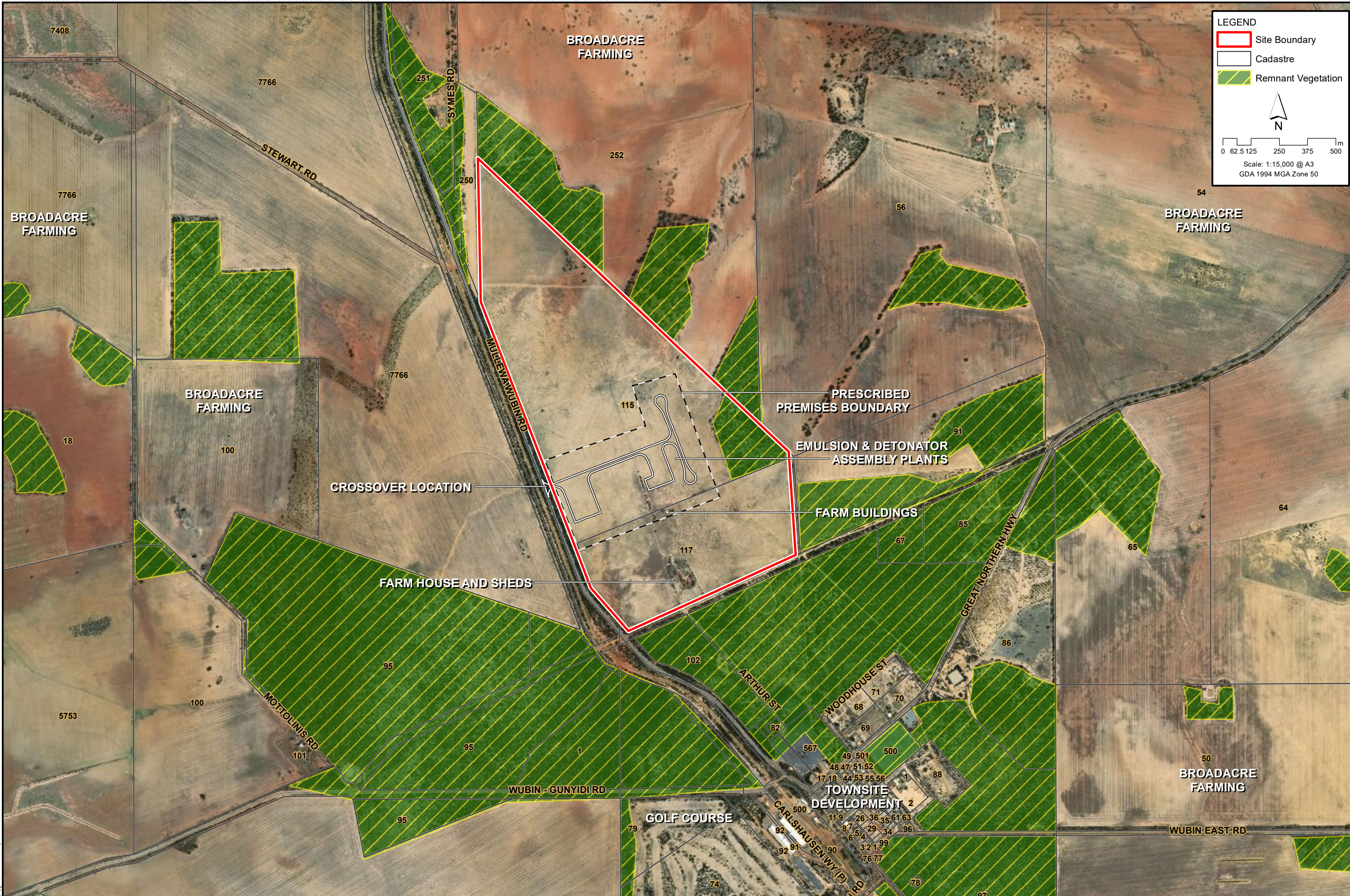
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Figures



LEGEND

- Site Boundary
- Cadastre
- Remnant Vegetation

N

0 62.5 125 250 375 500 m

Scale: 1:15,000 @ A3
GDA 1994 MGA Zone 50

Source: Cadastre - Landgate, 2017
Orthophoto - Landgate, 2010
Remnant Vegetation - DPaW, 2016



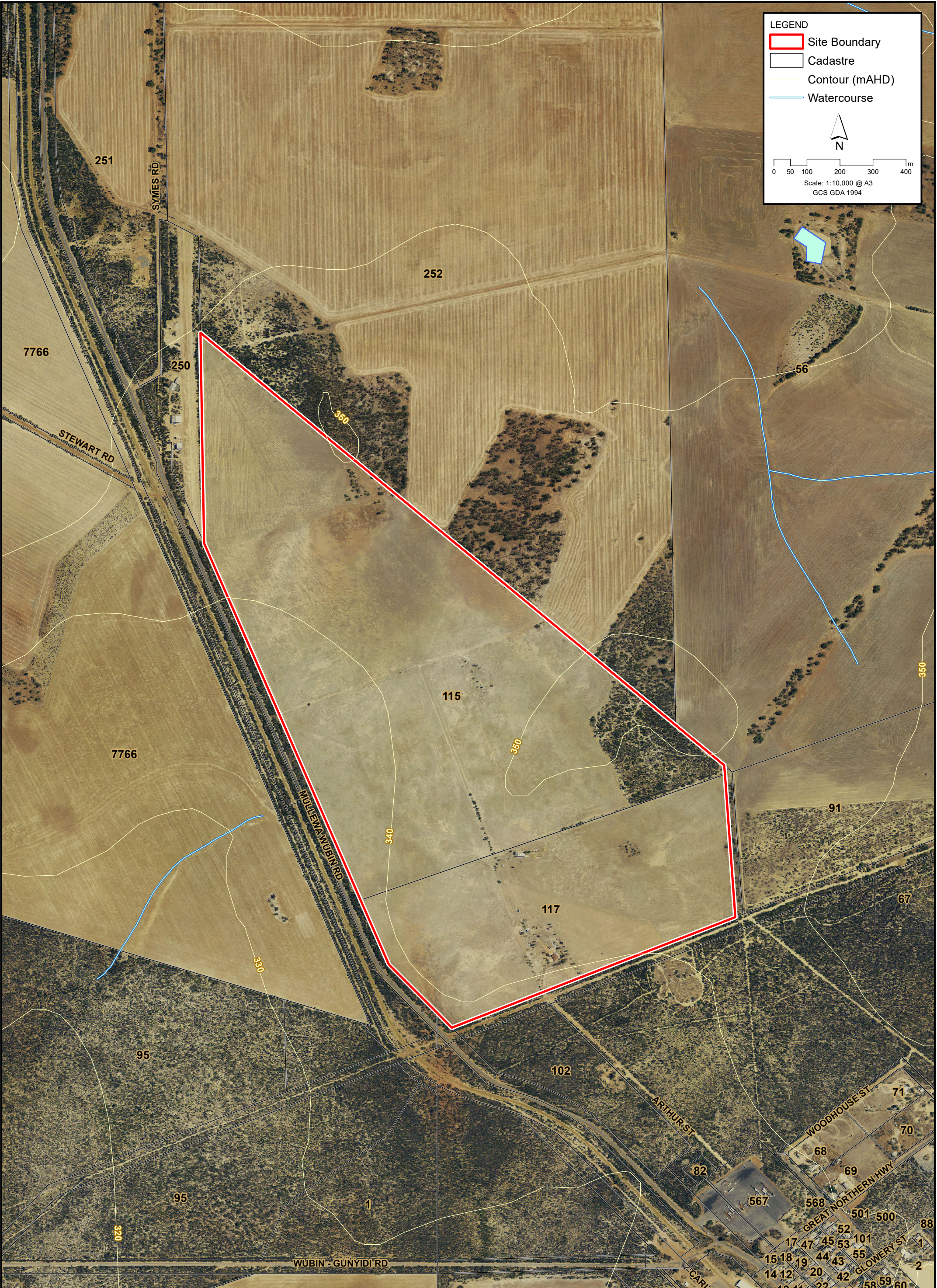
158

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Hanwha Mining Services
ENVIRONMENTAL MANAGEMENT PLAN
AMMONIUM NITRATE EMULSION PLANT, WUBIN

AERIAL PHOTOGRAPH AND LAND USES

Figure 2



Source: Cadastre - Landgate, 2017
Orthophoto - Landgate, 2010
Topography - Landgate, 2017

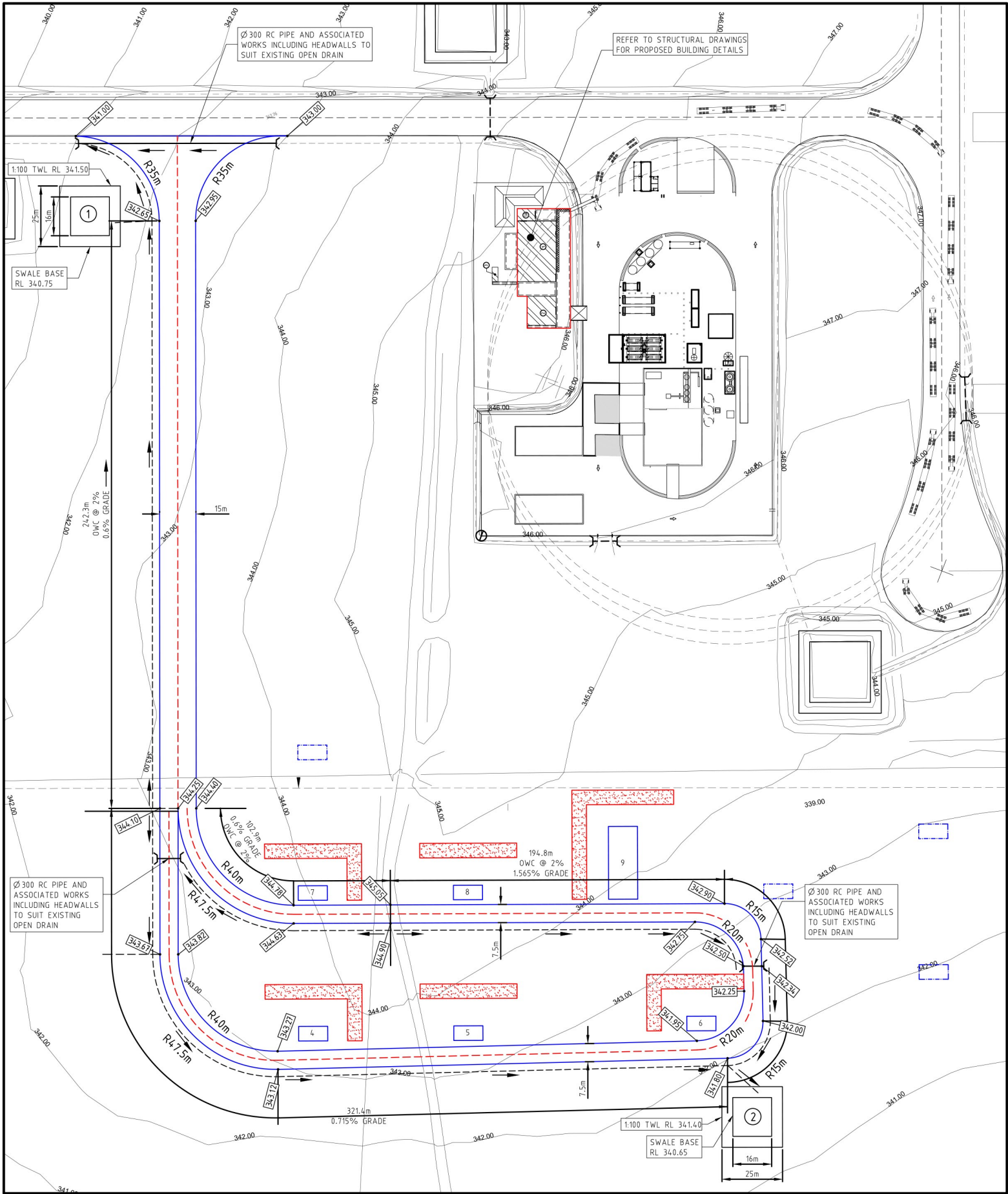
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Hanwha Mining Services
ENVIRONMENTAL MANAGEMENT PLAN
NITRATE EMULSION PLANT, WUBIN

TOPOGRAPHY

Figure 3



STORMWATER MANAGEMENT PLAN	
1. GEOTECHNICAL INVESTIGATION UNDERTAKEN BY STRUCTERRE: - REF J181453 DATED 10.08.2018	
2. OVERLAND FLOW PATH FROM DEVELOPMENT - YES	
3. DESIGN CRITERIA - SHIRE OF DALWALLINU 1 IN 100 YEAR STORM EVENT OF A 1 HOUR DURATION.	
DRAINAGE CALCULATIONS SWALE 1	
IMPERVIOUS AREA (m²)	5502
VOLUME TO STORE (m³)	225.61
SWALE STORAGE (m³)	330.00
DRAINAGE CALCULATIONS SWALE 2	
IMPERVIOUS AREA (m²)	4060
VOLUME TO STORE (m³)	188.62
SWALE STORAGE (m³)	330.00

APPROXIMATE DEVELOPMENT SITE
EARTHWORKS CALCULATIONS:

APPROXIMATE TOTAL UN-COMPACTED CUT:
= Xm³
(EXCLUDING BULKING & COMPACTION
FACTORS)

APPROXIMATE DEVELOPMENT SITE
PAVEMENT CALCULATIONS
(WITHIN SITE BOUNDARY):

PAVEMENT AREA: Xm²

200mm COMPACTED SANDY GRAVEL
SUB-BASE: Xm³

150mm COMPACTED CRUSHED ROCK
BASECOURSE Xm³
(EXCLUDING BULKING & COMPACTION
FACTORS)

GENERAL NOTES:

- CHECK ALL DIMENSIONS ON SITE. READ ALL ENGINEERING DRAWINGS IN CONJUNCTION WITH ARCHITECTURAL AND SURVEY DRAWINGS. ANY DISCREPANCIES BETWEEN ENGINEERING DRAWINGS AND ARCHITECTURAL DRAWINGS SHALL BE CONFIRMED PRIOR TO COMMENCING CONSTRUCTION. DO NOT SCALE FROM THESE DRAWINGS.
- ALL WORK TO BE IN ACCORDANCE WITH "AS3500-2003 PLUMBING & DRAINAGE", THE "BUILDING CODE OF AUSTRALIA" AND THE LOCAL AUTHORITY'S STANDARD SPECIFICATIONS.
- LOT CONNECTION PIT TO LOCAL AUTHORITY SPECIFICATIONS.
- ALL MANHOLES ARE TO BE SET BACK FROM ALL BUILDINGS ON THE SITE INCLUDING ANY STRUCTURE LOCATED ON THE BOUNDARY AS PER DETAIL, UNO.
- WHERE MANHOLES ARE LOCATED IN THE AREAS SUBJECT TO VEHICULAR LOADING, TRAFFICABLE LIDS TO SUIT THE VEHICLE LOADS ARE TO BE INSTALLED.
- ALL DRAINAGE PIPEWORK SHALL BE PVC CLASS HD STORMWATER, EXCEPT WHERE LOCATED UNDERNEATH ANY STRUCTURES PIPEWORK SHALL BE PVC SEWER CLASS S18.
- ALIGNMENT OF PIPES SHALL BE AS SHOWN ON THE PLAN AND SHALL BE TO THE PIPE OR MANHOLE CENTERLINE.
- BEFORE CONSTRUCTION COMMENCES, THE CONTRACTOR SHALL:
 - CHECK ON SITE THE LOCATION OF THE EXISTING SERVICES WITH THE APPROPRIATE AUTHORITY. ENSURE PROPOSED STORMWATER PIPE DOES NOT CLASH WITH ANY EXISTING SERVICES.
 - ARRANGE FOR THE LOCATION AND THE LEVEL OF THE CONNECTION POINT TO EXISTING STORMWATER MANHOLE TO BE VERIFIED BY A SURVEYOR.
 - CONFIRM THAT BOUNDARY PEGS OR OTHER SURVEY REFERENCE POINTS TO BE USED IN SETTING OUT OF THE PROJECT ARE LOCATED IN THE CORRECT POSITIONS.
 - ENSURE A PERMIT AND REINSTATEMENT SPECIFICATIONS ARE OBTAINED FROM THE LOCAL AUTHORITY IF EXCAVATION WILL BE IN A ROAD RESERVE OR RIGHT OF WAY.
 - ENSURE ALL DETAILS HAVE BEEN CHECKED AND THAT NO DISCREPANCIES EXIST. ALL QUERIES AND DISCREPANCIES ARE TO BE RESOLVED PRIOR TO COMMENCING WORKS.
- RESIDENTS SHALL BE KEPT INFORMED THROUGHOUT & SITE SECURITY SHALL BE MAINTAINED.
- ALL EXCAVATIONS SHALL BE SECURED & MADE SAFE IN ACCORDANCE WITH REQUIREMENTS OF THE OCCUPATIONAL SAFETY & HEALTH ACT 1984, THE OCCUPATIONAL SAFETY & HEALTH REGULATION 1996, AND OF ANY RELEVANT REGULATORY BODY.
- PROPERTIES WHICH HAVE BEEN EXCAVATED SHALL BE RETURNED TO AT LEAST A SIMILAR CONDITION TO THAT WHICH EXISTED PRIOR TO CONSTRUCTION.
- TRENCH BACKFILL SHALL BE CLEAN GRANULAR MATERIAL, COMPACTED TO A LEVEL NOT LESS THAN THAT OF THE SURROUNDING UNDISTURBED GROUND, FOR THE FULL DEPTH OF EXCAVATION. BACKFILL UNDER ROADS SHALL BE COMPACTED TO THE REQUIREMENTS OF THE LOCAL AUTHORITY.
- ALL CONNECTIONS INTO EXISTING LOCAL AUTHORITY STORMWATER ARE TO BE CARRIED OUT BY THE CONTRACTOR TO LOCAL AUTHORITY SPECIFICATIONS.
- THIS DRAINAGE SPECIFICATION IS TO BE READ IN CONJUNCTION WITH CLIENT'S ARCHITECTURAL DRAWINGS (PARTIALLY REPRODUCED HERE).
- CLIENT IS TO ENSURE LOCAL AUTHORITY HAVE APPROVED THESE DRAWINGS BEFORE BEING ISSUED FOR PRICING, TENDER & CONSTRUCTION.
- IF GROUND WATER IS ENCOUNTERED DURING THE WORKS THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY.

CLEARING / DEMOLITION NOTES:

- THE CLEARING AND DEMOLITION SHALL CONSIST OF THE REMOVAL OF ALL SHRUBS, TREES, VEGETATION, EXISTING PAVEMENTS, DRAINAGE INFRASTRUCTURE, ABANDONED SERVICES, RUBBISH, BOULDERS, PERISHABLE MATERIALS AND ANY OTHER ITEMS AS INDICATED ON THE ARCHITECTURAL DRAWINGS, AND SHALL BE LIMITED TO THE PROPERTY BOUNDARIES.
- NO CLEARING OR DEMOLITION SHALL TAKE PLACE OUTSIDE THE EARTHWORKS AREA UNLESS APPROVED BY THE LOCAL AUTHORITY.
- THE CLEARING SHALL INCLUDE THE GRUBBING OUT OF ALL STUMPS AND TREE ROOTS TO A DEPTH OF 600mm BELOW THE NATURAL SURFACE OR 400mm BELOW THE FINISHED CUT SURFACE, WHICHEVER IS THE LOWER, AND DISPOSING OF ALL SPOILS RESULTING FROM THE CLEARING AND GRUBBING.
- ANY HOLES LEFT AFTER CLEARING OR DEMOLITION SHALL BE FILLED AND COMPACTED TO THE SAME DENSITY AS THAT OF THE SURROUNDING UNDISTURBED SOIL.
- AS LITTLE AS POSSIBLE OF THE SURFACE SOIL SHALL BE REMOVED DURING CLEARING OPERATIONS.
- THE CONTRACTOR SHALL TAKE PRECAUTIONS TO MINIMISE DAMAGE TO GROWING TREES AND SHRUBS, FENCES AND OTHER IMPROVEMENTS OUTSIDE THE DESIGNATED AREAS, AND ANY DAMAGE SHALL BE MADE GOOD. THE SPOILS OF ALL DEMOLITION, CLEARING AND GRUBBING OPERATIONS SHALL BE STOCKPILED AWAY FROM THE BUILDING SITE.

TOPSOIL NOTES:

- THE CONTRACTOR SHALL CLEAR ALL VEGETATION FROM THE EARTHWORKS AREA AND STOCKPILE LOCALLY AWAY FROM THE BUILDING SITE.
- THE EXISTING TOPSOIL SHALL BE STRIPPED FROM ALL AREAS AND STOCKPILED LOCALLY AWAY FROM THE BUILDING SITE.

DRAINAGE LEGEND:

- EXISTING SPOT LEVEL (m)
- EXISTING DRAINAGE
- EXISTING WATER CORPORATION SEWER MAIN
- DIRECTION OF FLOW
- OVERLAND FLOW PATH FOR LARGER STORM EVENTS
- PROPOSED FLOOR LEVEL (m)
- FINISHED PAVING LEVEL (m)
- STONE PITCHING (SEE DETAIL ON SHEET C-110)
- UNSEALED HARDSTAND PAVEMENT (SEE DETAIL ON SHEET C-110)
- SPOON DRAIN/BUNDING
- OPEN SWALE



SITE LAYOUT

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Hanwha Mining Services
ENVIRONMENTAL MANAGEMENT PLAN
AMMONIUM NITRATE EMULSION PLANT, WUBIN

**PROPOSED SITE LAYOUT - ANE PLANT
AND DETONATOR ASSEMBLY FACILITY**

PLANNING AND DEVELOPMENT ACT 2005

RESOLUTION TO ADOPT AMENDMENT TO LOCAL PLANNING SCHEME

SHIRE OF DALWALLINU

LOCAL PLANNING SCHEME NO. 2

SCHEME AMENDMENT NO. 2

Resolved that the local government pursuant to Section 75 of the Planning and Development Act 2005, amend the above local planning scheme by:

1. Adding an Additional Use for "Storage of Dangerous Goods and Associated Manufacturing" to Lots 115 and 117 cnr of the Mullewa-Wubin Road and Thomas Road; and
2. Delete "Schedule 2 – Additional Uses" and replace with the following:

Schedule 2 – Additional Uses

No.	Description of Land	Additional Use	Conditions
A1	Lot 117 on Deposited Plan 150270 and Lot 115 on Deposited Plan 148784 on the corner of Mullewa-Wubin Road and Thomas Road, Wubin	Storage of dangerous goods and associated manufacturing Truck assembly	General 1. The use is not permitted unless the local government has exercised its discretion by granting development approval under Part 8 of the deemed provisions. 2. Development shall generally be in accordance with the development approval granted by the local government. 3. Minor variations may be permitted to the development approval by the local government after following the procedures in Clause 77 of the deemed provisions. 4. All buildings and activities to comply with relevant Commonwealth, State and Local Government by-laws and regulations. 5. Access and egress to the

No.	Description of Land	Additional Use	Conditions
			<p>Mullewa-Wubin Road are to be at a location and at a standard of construction to the satisfaction of Main Roads WA and the local government.</p> <p>6. All stormwater drainage shall be accommodated on site and no direct discharge onto surrounding properties or road reserves.</p> <p>7. The implementation of appropriate fire control and emergency evacuation and management measures as determined by the local government in consultation with relevant State authorities.</p> <p>Effluent Disposal</p> <p>8. Effluent disposal shall be undertaken to the satisfaction of the local government and the relevant State Government authority.</p> <p>Environmental Management</p> <p>9. The development, operation and management of the ammonium nitrate emulsion facility shall be undertaken in accordance with an Environmental Management Plan approved by the local government.</p> <p>Department of Mines and Petroleum – Licensing and Inspections</p> <p>10. The plant must comply with the requirements of the <i>Dangerous Goods Safety Act 2004</i>, the national code prepared by Australian Explosives Industry Safety Group (AEISG) for the storage and handling of UN3375 (ammonium nitrate</p>

No.	Description of Land	Additional Use	Conditions
			<p>emulsion) and the Department of Mines and Petroleum (DMP) code of practice on the safe storage of ammonium nitrate.</p> <p>11. A Dangerous Goods Storage License and a Security Restricted Substance License must be obtained from the DMP prior to the commissioning and operation of the plant.</p>

3. Amending the Scheme Maps accordingly – to show the subject land as having an “Additional Use” No. 1.
4. Add the symbol for Additional Use to the Legend.

The amendment is standard under the provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015* for the following reasons:

- (a) the amendment would have minimal impact on land in the scheme area that is not the subject of the amendment;
- (b) the amendment would not result in any significant environmental, social, economic or governance impacts on land in the scheme area; and
- (c) the amendment is not recognised as being a complex or basic amendment.

Dated this.....day of.....20.....

.....
CHIEF EXECUTIVE OFFICER



Government of Western Australia
Department of Water and Environmental Regulation

Your ref: W6148/2018/1
Our ref: DER2018/000808
Enquiries: Peter Johns
Phone: (08) 6364 7149
Email: info@dwer.wa.gov.au

Mr Graham Morgan
SHEC and Training Manager
Hanwha Mining Services Australia Pty Ltd
PO Box 7067
CLOISTER SQUARE WA 6850

Via email: graham.morgan@hanwha.com, kristen.watts@coterra.com.au

Dear Mr Morgan

APPLICATION FOR A WORKS APPROVAL UNDER THE ENVIRONMENTAL PROTECTION ACT 1986 – NOTICE OF DECISION TO GRANT

I refer to your works approval application received on 4 May 2018 relating to the construction of an ammonium nitrate emulsion plant at Lot 115, Mullewa-Wubin Road, Wubin

A draft works approval was provided to Hanwha Mining Services Australia Pty Ltd on 4 July 2018. After considering the comments you provided on 9 July 2018, I have granted the attached works approval subject to the conditions prescribed in the instrument. The attached Decision Report sets out the reasons for my decision.

In accordance with section 102(1)(c) of the EP Act, if you are aggrieved by my decision to specify conditions in the works approval you may lodge an appeal with the Minister for Environment in writing, setting out the grounds of that appeal, within 21 days of this notification. Should you wish to lodge an appeal, please contact the Office of the Appeals Convenor on 6567 5190 or by email at admin@appealsconvenor.wa.gov.au.

Under section 102(3)(a) of the EP Act, third parties aggrieved by this decision are also entitled to lodge an appeal against the conditions of a works approval. Under section 102(4), the conditions of the works approval remain in effect pending the determination of any third party appeals.

If you have any queries regarding the above information, please contact Peter Johns as listed above.

Yours sincerely

Paul Byrnes
MANAGER, PROCESS INDUSTRIES
REGULATORY SERVICES (ENVIRONMENT)

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

11 July 2018

Att: Decision Report and Works Approval



Works Approval

Works Approval Number W6148/2018/1

Works Approval Holder Hanwha Mining Services Australia Pty Ltd
ACN 169067252

Registered business address Pitcher Partners WA Pty Ltd
Level 1 914 Hay Street
PERTH WA 6000

File Number DER2018/000808

Duration 11/07/2018 to 10/07/2021

Date of issue 11/07/2018

Prescribed Premises Category 75

Premises

Hanwha Mining Services
Lot 115 Mullewa-Wubin Road
WUBIN WA 6612

Legal description -
Part of Lot 117 on Deposited Plan 150270 and Part
of Lot 115 on Deposited Plan 148784.

As defined by the coordinates in Schedule 1 of the
Works Approval

This Works Approval is granted to the Works Approval Holder, subject to the following conditions, on 11 July 2018, by:


Paul Byrnes

MANAGER, PROCESS INDUSTRIES
REGULATORY SERVICES (ENVIRONMENT)

an Officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Reporting of incidents

The Works Approval Holder has a duty to report to the Department all Discharges of Waste that have caused or are likely to cause Pollution or Environmental Harm in accordance with s.72 of the EP Act.

Offences and defences

The EP Act and its regulations set out a number of offences including:

- Offence of emitting an Unreasonable Emission from any Premises under s.49.
- Offence of causing Pollution under s.49.
- Offence of dumping Waste under s.49A.
- Offence of discharging Waste in circumstances likely to cause Pollution under s.50.
- Offence of causing Serious Environmental Harm (s.50A) or Material Environmental Harm (s.50B).
- Offence of causing Emissions which do not comply with prescribed standards (s.51).
- Offences relating to Emissions or Discharges under regulations prescribed under the EP Act, including materials discharged under the *Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)*.
- Offences relating to noise under the *Environmental Protection (Noise) Regulations 1997 (WA)*.

Section 53 of the EP Act provides that a Works Approval Holder commits an offence if Emissions are caused, or altered, from a Prescribed Premises unless done in accordance with a Works Approval, Licence or the requirements of a closure notice or an environmental protection notice.

Defences to certain offences may be available to a Works Approval Holder and these are set out in the EP Act. Section 74A(b)(iii) provides that it is a defence to an offence for causing Pollution, in respect of an Emission, or for causing Serious Environmental Harm or Material Environmental Harm, or for discharging or abandoning Waste in water to which the public has access, if the Works Approval Holder can prove that an Emission or Discharge occurred in accordance with a Works Approval.

This Works Approval specifies the Emissions and Discharges, and the limits and Conditions which must be satisfied in respect of specified Emissions and Discharges, in order for the defence to offence provision to be available.

Authorised Emissions and Discharges

The specified and general Emissions and Discharges from the Works authorised through this Works Approval are authorised to be conducted in accordance with the Conditions of this Works Approval.

Amendment of Works Approval

The Works Approval Holder can apply to amend the Conditions of this Works Approval under s.59 of the EP Act. An application form for this purpose is available from DWER.

The CEO may also amend the Conditions of this Works Approval at any time on the initiative of the CEO without an application being made.

Duration of Works Approval

The Works Approval will remain in force for the duration set out on the first page of this Works Approval or until it is surrendered, suspended or revoked in accordance with s.59A of the EP Act.

Suspension or revocation

The CEO may suspend or revoke this Works Approval in accordance with s.59A of the EP Act.

Definitions and interpretation

Definitions

In this Works Approval, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the <i>Environmental Protection Act 1986</i> Locked Bag 33 Cloisters Square PERTH WA 6850 info@dwer.wa.gov.au
Condition	means a condition to which this Works Approval is subject under s.62 of the EP Act.
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
Department Request	means a request for Books or other sources of information to be produced, made by an Inspector or the CEO to the Works Approval Holder in writing and sent to the Works Approval's address for notifications, as described at the front of this Works Approval, in relation to: (a) compliance with the EP Act or this Works Approval; (b) the Books or other sources of information maintained in accordance with this Works Approval; or (c) the Books or other sources of information relating to Emissions from the Premises.
DWER	Department of Water and Environmental Regulation
EP Act	means the <i>Environmental Protection Act 1986</i> (WA).
EP Regulations	means the <i>Environmental Protection Regulations 1987</i> (WA).
Premises	refers to the premises to which this Works Approval applies, as specified at the front of this Works Approval and as shown on the map in Schedule 1 to this Works Approval.
Works Approval	refers to this document, which evidences the grant of the works approval by the CEO under s.54 of the EP Act, subject to the Conditions.
Works Approval Holder	refers to the occupier of the Premises being the person to whom this Works Approval has been granted, as specified at the front of this Works Approval.

Interpretation

In this Works Approval:

- (a) the words 'including', 'includes' and 'include' will be read as if followed by the words 'without limitation';
- (b) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;
- (c) where tables are used in a Condition, each row in a table constitutes a separate Condition;
- (d) any reference to an Australian or other standard, guideline or code of practice in this Works Approval means the version of the standard, guideline or code of practice in force at the time of granting of this Works Approval and includes any amendments to the standard, guideline or code of practice which may occur from time to time during the course of the Works Approval; and
- (e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act.

Conditions

Infrastructure and equipment

1. The Works Approval Holder must install and undertake the Works for the infrastructure and equipment:
 - (a) specified in Column 1;
 - (b) to the requirements specified in Column 2;
 of Table 2 below.
2. The Works Approval Holder must not depart from the requirements specified in Column 2 of Table 2 except:
 - (a) where such departure does not increase risks to public health, public amenity or the environment; and
 - (b) all other Conditions in this Works Approval are still satisfied.
3. Subject to Condition 2, within 14 days of the completion of the Works specified in Column 1 of Table 2, the Works Approval Holder must provide to the CEO a report by an Engineer confirming each item of infrastructure or component of infrastructure specified in Column 1 of Table 2 below has been constructed with no material defects and to the requirements specified in Column 2.
4. Where a departure from the requirements specified in Column 2 of Table 2 occurs and is of a type allowed by Condition 2, the Works Approval Holder must provide to the CEO a description of, and explanation for, the departure along with the certification required by Condition 3.

Table 2: Infrastructure and equipment requirements table

Column 1	Column 2
Infrastructure/Equipment	Requirements (design and construction)
Ammonium nitrate storage dome	With concrete floor and intact external cladding to prevent wind blown dust emissions
Calcium Nitrate Storage Dome	With concrete floor and intact external cladding to prevent wind blown dust emissions
36 kL Diesel storage tank with a concrete bund	Bund has impervious walls and floor.
2 x 75 kL Mineral oil storage tanks and a concrete bund	Bund has impervious walls and floor.
Ammonium nitrate solution (ANSOL) storage area including 6 x 26 kL storage tanks with a concrete bund.	Bund has impervious walls and floor
Emulsifier storage area tank shed with concrete floor and wall bund	Bund has impervious walls and floor.
IBC storage area with concrete bund	Bund has impervious walls and floor.
Emulsion manufacturing plant comprising a boiler, diesel generator, fuel makeup area ANE blending plant.	Constructed inside a shed with concrete floor and intact external cladding to prevent wind blown dust. emissions
Bund and spoon drain surrounding the site to prevent stormwater ingress onto or off the site.	Earth bund and stone pitched spoon drain directing water to bio-infiltration basins.
Bio-infiltration basins	Constructed in sandy gravel base with a not less than 500 mm filter media layer
Hardstand	Covering areas marked on site plant in Schedule 1 and constructed of concrete for all sheds, domes and tank footings with compacted earth between. Unsealed hardstand to consist of not less than 150 mm compacted crushed rock over sub base of not less than 200 mm compacted sandy gravel.

Emissions

5. The Works Approval Holder must not cause any Emissions from the Works authorised through this Works Approval except for specified Emissions and general Emissions described in Column 1 of Table 3, subject to the exclusions, limitations or requirements specified in Column 2, of Table 3.

Table 3: Authorised Emissions table

Column 1	Column 2
General Emissions (excluding Specified Emissions)	
Emissions which arise from undertaking the Works set out in Schedule 2.	<p>Emissions excluded from General Emissions are:</p> <ul style="list-style-type: none"> • Unreasonable Emissions; or • Emissions that result in, or are likely to result in, Pollution, Material Environmental Harm or Serious Environmental Harm; or • Discharges of Waste in circumstances likely to cause Pollution; or • Emissions that result, or are likely to result in, the Discharge or abandonment of Waste in water to which the public has access; or • Emissions or Discharges which do not comply with an Approved Policy; or • Emissions or Discharges which do not comply with prescribed standard; or • Emissions or Discharges which do not comply with the conditions in an Implementation Agreement or Decision; or • Emissions or Discharges the subject of offences under regulations prescribed under the EP Act, including materials discharged under the Environmental Protection (<i>Unauthorised Discharges</i>) Regulations 2004.

Record-keeping

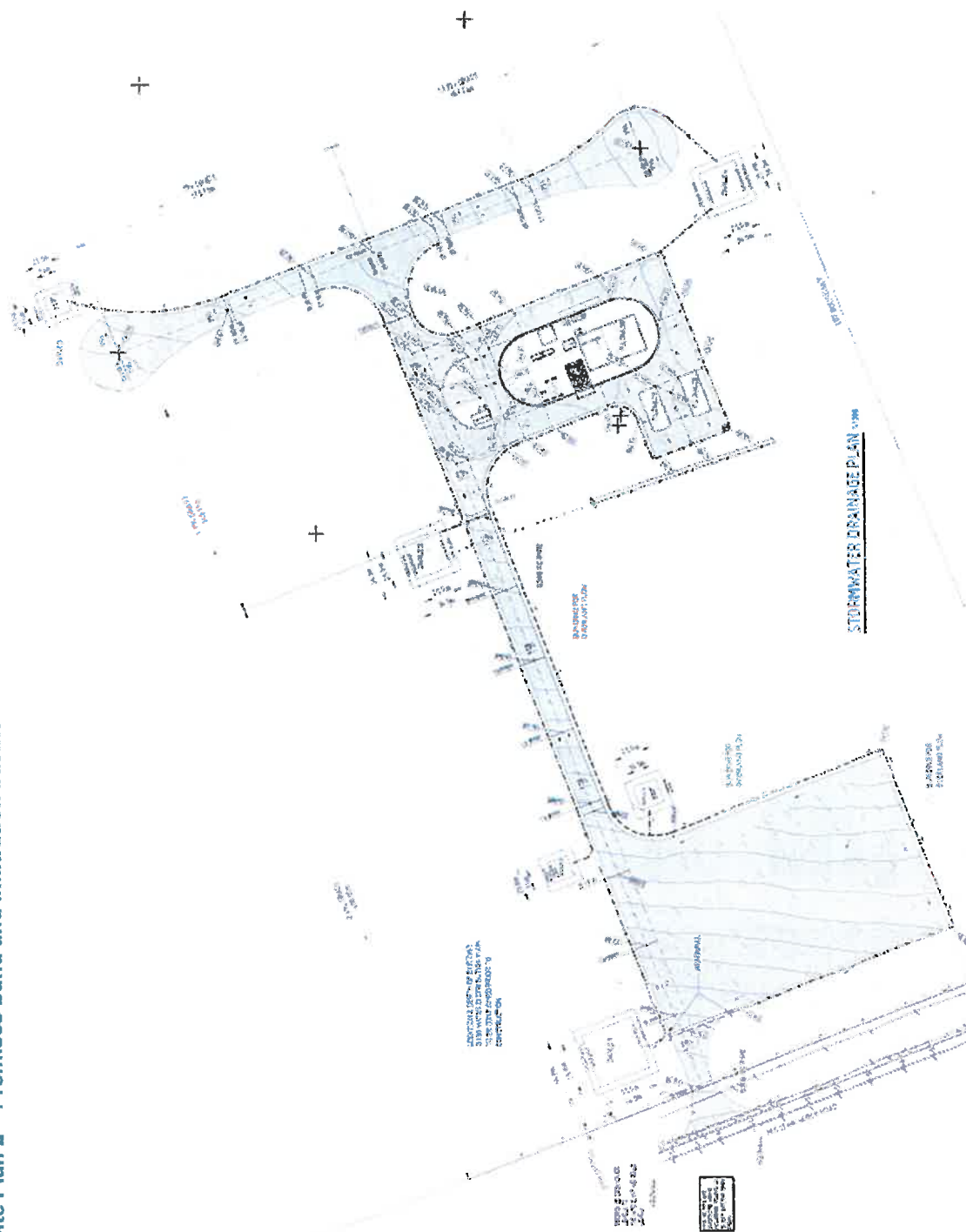
6. The Works Approval Holder must maintain accurate Books including information, reports and data in relation to the Works and the Books must:
- be legible;
 - if amended, be amended in such a ways that the original and subsequent amendments remain legible or are capable of retrieval;
 - be retained for at least 3 years from the date the Books were made; and
 - be available to be produced to an Inspector or the CEO.
7. The Works Approval Holder must comply with a Department Request within 14 days from the date of the Department Request or such other period as agreed to by the Inspector or the CEO.

PLANTATION INN

LEGEND

SYMBOL	DESCRIPTION
[Symbol]	ENTRANCE
[Symbol]	RECEPTION
[Symbol]	RESTAURANT
[Symbol]	BAR
[Symbol]	KITCHEN
[Symbol]	BULLOCKS
[Symbol]	STABLES
[Symbol]	CARTS
[Symbol]	HORSES
[Symbol]	PASTURE
[Symbol]	FENCE
[Symbol]	GATE
[Symbol]	ROAD
[Symbol]	TRAIL
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[Symbol]	TOWER
[Symbol]	LAMP
[Symbol]	BENCH
[Symbol]	FURNITURE
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[Symbol]	TREES
[Symbol]	SHRUBS
[Symbol]	GRASS
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[Symbol]	BRICK
[Symbol]	CONCRETE
[Symbol]	ASPHALT
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[Symbol]	ROOFING
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[Symbol]	HEATING
[Symbol]	COOLING
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[Symbol]	RESTRICTIONS
[Symbol]	LIMITATIONS
[Symbol]	EXEMPTIONS
[Symbol]	DISCREPANCIES
[Symbol]	CONTRADICTIONS
[Symbol]	INCONSISTENCIES

Site Plan 2 – Premises bund and infiltration basins



Premises map

The Premises are shown in the map below.



Premises boundary

The Premises boundary is defined by the coordinates in Table 4.

Table 4: Premises boundary coordinates

	Latitude	Longitude
A	-30.0922°	116.6182°
B	-30.0908°	116.6228°
C	-30.0892°	116.6223°
D	-30.0888°	116.6242°
E	-30.0937°	116.6263°
F	-30.0958°	116.6197°



Application for Works Approval

Division 3, Part V *Environmental Protection Act 1986*

Works Approval Number W6148/2018/1

Applicant Hanwha Mining Services Australia Pty Ltd

ACN 169067252

File Number DER2018/000808

Premises Hanwha Mining Services
Lot 115 Mullewa-Wubin Road
WUBIN WA 6612

Legal description -

Part of Lot 117 on Deposited Plan 150270 and Part of Lot 115
on Deposited Plan 148784.

As defined by the coordinates in Schedule 1 of the Works
Approval

Date of Report 11 July 2018

Status of Report Final

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1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
ACN	Australian Company Number
ANE	Ammonium nitrate emulsion
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CS Act	<i>Contaminated Sites Act 2003 (WA)</i>
Decision Report	refers to this document.
Delegated Officer	an Officer Delegated under section 20 of the EP Act.
Department	means the Department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DMIRS	The Department of Mines and Industry Regulation and Safety
DWER	The Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report
Risk Event	As described in <i>Guidance Statement: Risk Assessment</i>
UDR	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)</i>

2. Purpose and scope of assessment

Hanwha Mining Services Pty Ltd (the Applicant) lodged an application for a works approval on 4 May 2018 to construct a facility for the manufacture of ammonium nitrate emulsion (Category 75). The proposed site is on the Mullewa–Wubin Road, 1 km north of Wubin and it is currently used for agricultural activities. It is shown on Figure 1. Native vegetation on the site was cleared many years ago to enable agricultural activities.

Upon completion of construction the Applicant is likely to register the premises and as such operation of the site would not be subject specific regulatory controls by of conditions attached to a licence.

The report that follows assesses the application and recommends that approval is granted, subject conditions.

2.1 Application details

The applications was lodged on 4 May and it contained an application form and supporting information. On 30 May 2018 Hanwha provided additional info by email including process flow details and structural plans.

Those documents that form the application and the Departmental Guidance Statements that have informed assessment of Application are set out in Appendix 1.

3. Background

The Applicant proposes to construct an ammonium nitrate emulsion plant with a nominal production capacity of 90,000 tonnes per annum, as well as storing mining related chemicals for sales and distribution.

The site has previously been used for agricultural activities and the majority of the native vegetation was removed many years ago.

Table 2 lists the prescribed premises category that has been applied for.

Table 2: Prescribed Premises Categories in the Existing Licence

Classification of Premises	Description	Nominal production capacity
Category 75	Chemical blending or mixing not causing discharge: premises on which chemicals or chemical products are mixed, blended or packaged in a manner that does not cause or is not likely to cause a discharge of waste into the environment.	90,000 tonnes per annum

4. Overview of Premises

4.1 Operational aspects

The proposed facility is to include a plant to manufacture ANE and also to warehouse mining related chemicals for sales and distribution.

Ammonium nitrate emulsion is manufactured by dissolving ammonium nitrate in water, heating it and then mixing it at high pressure with a range of oils and emulsifiers. This creates AN dissolved within a high viscosity water in oil emulsion with the consistency of a petroleum grease.

A range of mining chemicals will also be stored on site for sales and distribution to mine sites.

Finished products and mining chemicals will be transported directly to mine sites from the premises.

4.2 Infrastructure

The proposed site infrastructure, as it relates to Category 75, is detailed in Table 3 and with reference to the Site Plan (attached in the Issued Works Approval).

Table 3 lists infrastructure associated with each prescribed premises category.

Table 3: Proposed Ammonium Nitrate Emulsion Plant Infrastructure

	Infrastructure	Site Plan Reference
	Prescribed Activity Category 75	
1.	Ammonium Nitrate Storage Dome with concrete floor	Site Plan 1 on Schedule 1 of the issued Works Approval
2.	Calcium Nitrate Storage Dome with concrete floor	
3.	36 kL Diesel Storage tank with a concrete bund	
4.	2 x 75 kL Mineral Oil Storage tanks and a concrete bund	
5.	Ammonium Nitrate Solution (ANSOL) storage area including 6 x 26 kL storage tanks with a concrete bund.	
6.	Emulsifier Storage Area tank shed with concrete floor and wall bund	
7.	IBC storage area with concrete bund	
8.	Emulsion Manufacturing Plant comprising a boiler, diesel generator, fuel makeup area ANE blending plant.	
9.	Emulsion Manufacturing Plant comprising a boiler, diesel generator, fuel makeup area ANE blending plant.	
10.	Earth bund surrounding the site to prevent stormwater ingress onto or off the site.	Site Plan 2 on Schedule 1 of the issued Works Approval
11.	Bio-infiltration basins	
12.	Hardstand constructed of concrete for all sheds, domes and tank footings with compacted earth between.	
	Other activities*	
1.	Weighbridge	Site Plan 1 on Schedule 1 of the issued Works Approval
2.	Office facility	
3.	Water Tanks	

*Note: Infrastructure not within the scope of the Works Approval

5. Legislative context

Table 4 summarises approvals relevant to the assessment other than approvals required under the EP Act, the CS Act and their subordinate legislation.

Table 4: Relevant approvals and tenure

Legislation	Number	Subsidiary Approval
<i>Dangerous Goods Safety Act 2004</i>	Dangerous Goods	Letter from Manager Dangerous Goods, Dangerous Goods and Petroleum Safety dated 30 December 2015 giving in principal support for the location of the facility and noting that compliance with Act will be required for storage of Ammonium nitrate emulsion (UN3375) and other products on site.

5.1 Contaminated sites

Neither of the two lots that form the site for the facility have not been reported as contaminated under the provisions of the CS Act.

Acid sulfate soils are not likely to be encountered during construction of the ANE plant.

5.2 Other relevant approvals

5.2.1 Planning approvals

The Shire of Dalwallinu granted planning approval to construct and operate an ammonium nitrate emulsion plant (including ancillary storage facility) on 26 June 2018 (DA151718)

6. Part V of the EP Act

6.1.1 Applicable regulations, standards and guidelines

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

The Departmental Guidance Statements that inform assessment of the Application are set out in Appendix 1.

6.1.2 Clearing

The Applicant has not sought to clear native vegetation under the provisions of the works approval and no permit to clear native vegetation has been granted. Clearing of native vegetation is required for a crossover or entry way to the site from the Mullewa–Wubin Road however, this is exempted from the requirement to hold a clearing permit.

7. Consultation

The application was advertised on the Departmental internet website and in the West Australian newspaper on 28 May 2018. Comment were also sought from the Shire of Dandaragan.

No submissions were received by the due date.

8. Location and siting

8.1 Siting context

The proposed site for the ANE plant is 1 km north of Wubin, approximately 275 km north-northeast of Perth, Western Australia. The ANE plant is to be constructed on previously

cleared agricultural land and it is surrounded by farm land and large nature reserves. The nearest residential dwellings are about 1 km away and nearest commercial or industrial land use is 800 metres to the south. The Application included an aerial image of the proposed site and surrounds which is reproduced in Figure 1 below.

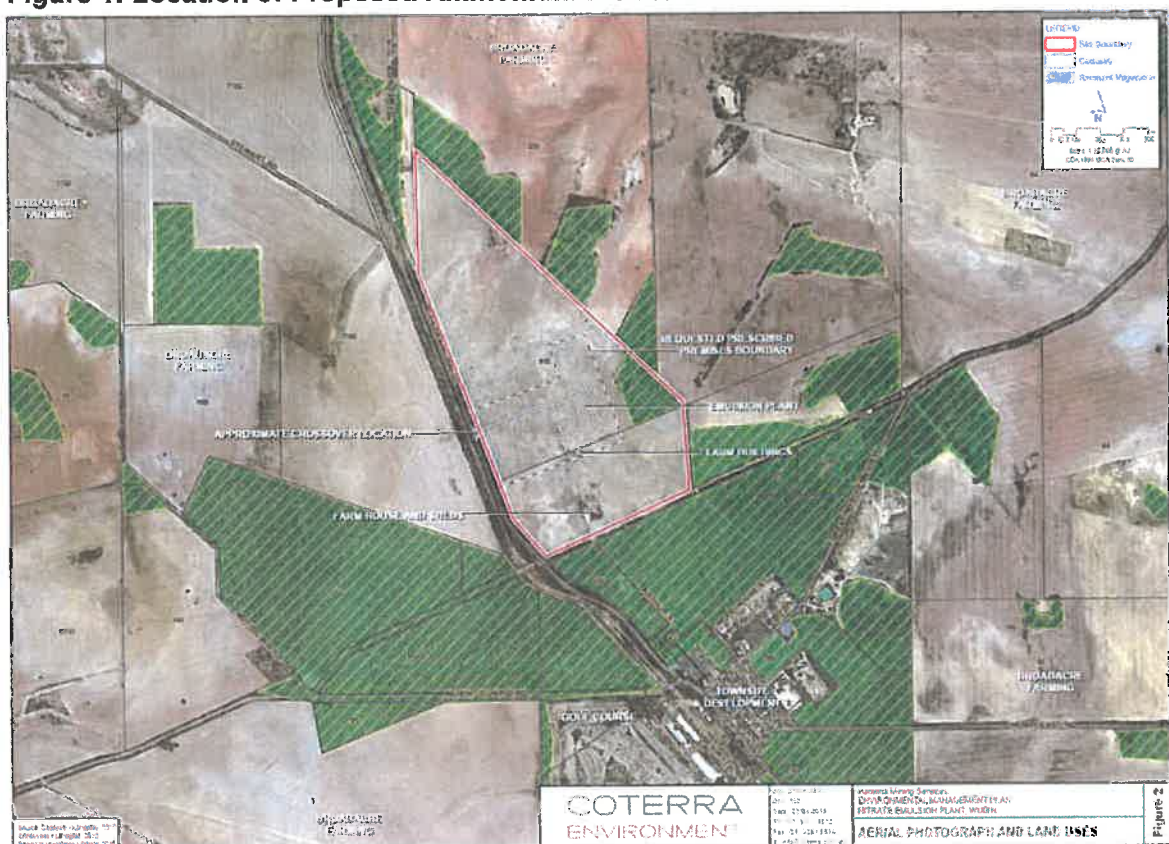
8.2 Residential and sensitive Premises

The distances to residential and sensitive receptors are detailed in Table 5.

Table 5: Receptors and distance from activity boundary

Sensitive Land Uses	Distance from Prescribed Activity
Residential dwellings: <ul style="list-style-type: none"> A rural dwelling to the north west on the Mullewa-Wubin Road Nearest dwelling in the residential area of the Wubin town site to the south. 	<p>Approximately 1 km from the boundary</p> <p>Approximately 1 km from the boundary</p> <p>The applicants Separation Distance Report (Appendix K of the Application) that these dwellings are 1.3 km from the ammonium nitrate stores.</p>
Nearest commercial or industrial land use is a road train assembly yard operated by the Shire.	800m from the boundary to the south

Figure 1: Location of Proposed Ammonium Nitrate Emulsion Plant



8.3 Specified ecosystems

Specified ecosystems are areas of high conservation value and special significance that may be impacted as a result of activities at or emissions and discharges from the premises. The distances to specified ecosystems are shown in Table 6. Table 6 also identifies the distances to other sites which do not fit the specific definition of a specified ecosystem.

The table has also been modified to align with the Guidance Statement: Environmental Siting.

Table 6: Environmental values

Specified ecosystems	Distance from the Premises
Geomorphic Wetlands	The nearest geomorphic wetlands is 3.8 km south of the site
Biological component	Distance from the Premises
Threatened/Priority Fauna	Confirmed Carnaby's Cockatoo Breeding area 750 meters west.

8.4 Groundwater and water sources

The distances to groundwater and water sources are shown in 7.

Table 7: Groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental value
Groundwater	The nearest recorded bore site with is 600 m south of the site. The depth to groundwater is 22metre.	The shallow aquifer is mildly saline suitable for garden bore or stock watering.

8.5 Soil type

DWER GIS information indicates that the soil is classified Ms4 which is described as sandy silt – light cream to yellow brown, mottled low lying alluvium , clayey in parts.

9. Risk assessment

9.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER has identified all potential emissions pathways and potential receptors to establish whether there are credible Risk Events that require detailed risk assessment.

The identification of the sources, pathways and receptors to determine Risk Events which required detailed risk assessment are set out in Table 8 and Table 9 below.

Table 8: Identification of emissions, pathway and receptors during construction

Sources/Activities	Risk Events				Continue to detailed risk assessment	Reasoning
	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Construction, mobilisation and positioning of infrastructure	Vehicle movements on unsealed access roads	Noise	Air / wind dispersion	Amenity impacts	No	The separation distances between the proposed plant and residential areas is sufficiently large for there to be minimal to no impacts. (> 1 Km)
		Dust		Amenity impacts	No	
	Construction of new buildings, plant and infrastructure	Noise	Air / wind dispersion	Amenity impacts	No	Note: construction will occur over a short period of time and construction works are limited. The Noise Regulations apply
		Dust		Amenity impacts	No	

Table 9: Identification of emissions, pathway and receptors during operation

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Transport of products on and off the site.	Vehicle movements	Fugitive dust from roads and sources	Surrounding land or residential premises	Air / wind dispersion	Amenity	No	The handstand and separation distance between the proposed plant and residential areas is sufficiently large for there to be minimal to no impacts
	Unloading and loading of calcium nitrate, ammonium nitrate, ANSOL, diesel, mineral Oil emulsifier and ANE	Fugitive chemical dusts	Surrounding land or residential premises	Air / wind dispersion	Amenity Contamination of land	No	Handling materials in packages rather than bulk and loading and unloading indoors as well as the separation distance to sensitive receptors is sufficiently large for there to be minimal or no impacts
Mixing and blending of chemicals	Products to and from mixing chamber	Fugitive chemical dusts	Surrounding land or residential premises	Air / wind dispersion	Amenity Contamination of land	No	The separation distance between the proposed plant and residential areas is sufficiently large for there to be minimal to no impacts. (> 1 Km)
	Mixing and blending	Fumes odours and gases	Surrounding land or residential premises	Air / wind dispersion	Amenity	No	These are small emission sources with a large separation distance between them and residential areas so that there is likely to be minimal to no impacts (> 1 km)
		Discharges to air from diesel generator and oil heater.	Surrounding land or residential premises	Air / wind dispersion	Amenity	No	

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
	Noise	Residential or commercial premises	Air / wind dispersion	Amenity	No	The separation distance between the proposed plant and residential areas is sufficiently large for there to be minimal to no impacts. (> 1 km). The Noise Regulation apply
Storage of Raw Materials and Product	Leaks and spills	Contamination of Land and groundwater	Surface water or groundwater movement	Contamination of land and groundwater	No	Bunding of liquid chemicals and concrete floors to material handling areas with ammonium nitrate solid and solutions are to be stored in accordance with Australian Standard A
Overall Premises	Contaminated Stormwater run-off	Contamination of Land and groundwater	Direct Discharge	Contamination of land and groundwater	No	The bunding of the premises to prevent stormwater running in the separate containment bunds, the low risk of potential contaminants and the use of bio-infiltration sumps to reduce nutrients is sufficient for there to be minimal to low impact.

In seeking to establish credible Risk Events above, the Delegated Officer has identified likely emissions and receptors that may be exposed to emission through an identified actual or likely pathway. No potential adverse effects to the receptor from exposure to likely emissions were identified in the Risk Assessment. As such, there is no Risk Event that warrants detailed assessment associated with this application. In making this determination, the Delegated Officer notes:

- that the proposed site is on vacant farm land, well separated from rural and residential dwellings and it is surrounded by other farms and nature reserves;
- the proposed site is about 275 km north east of Perth and 1 km north of the Town of Wubin where about 50 people reside.
- there are no surface water bodies, groundwater (22m below) or other environmental receptor in close proximity to the proposed site; and
- the site is also regulated by DMIRS for the storage of dangerous goods and manufacturing explosive related products.

10. Regulatory controls

The proposed plant is located in an isolated rural area with the nearest residences located 1 kilometre or more away. The proposed location is separated by 4 kilometres to surface water bodies.

The site consists of compacted hardstand not less than 350 mm thick, surrounded by a bund and drained to fully contain potential liquid spills and prevent contaminated stormwater leaving. Infiltration sumps will be planted with sedges to reduce possible nutrient contamination of stormwater prior to infiltration.

Liquid chemicals stored whether in tanks or packages will be stored in areas with concrete bunds to contain spills.

The operator will control windblown chemical dust be unloading and loading in enclosed area and storing solid materials in packages so there will be no handling of bulk solid materials.

The site is also subject to regulation by DMIRS.

On completion of construction the facility will become a registered premises under Regulation 5A of the EP Regulations. No further regulatory controls will be applied.

11. Determination of Works Approval conditions

The conditions in the issued Works Approval in Attachment 1 have been determined in accordance with the *Guidance Statement: Setting Conditions*.

The *Guidance Statement: Licence Duration* has been applied and the works approval has been granted for a 3 years duration.

Table 10 provides a summary of the conditions to be applied to the works approval. These conditions generally relate to securing the works, as detailed in the Application to the works approval. No Risk Events were identified in the detailed risk assessment and as such there are no further regulatory controls other than those mentioned in Table 10.

Table 10: Summary of conditions to be applied

Condition Ref	Grounds
Infrastructure and Equipment Condition 1 and 2	This condition is valid, risk-based and contains appropriate controls.
Compliance report Conditions 3 and 4	These conditions are valid and are necessary requirements to ensure compliance
Information and Reports Conditions 4, 5, 6 and 7	These conditions are valid and are necessary for administration and reporting requirements to ensure compliance.

DWER notes that it may review the appropriateness and adequacy of controls at any time and that, following a review, DWER may initiate amendments to the works approvals under the EP Act.

12. Applicant's comments

The Applicant was provided with the draft Decision Report and Works Approval on 5 July 2018. The Applicant replied on 9 July 2018 accepting the conditions of the works approval and requesting a minor administrative change.

13. Conclusion

This assessment of the risks of activities on the premises has been undertaken with due consideration of a number of factors, including the location of the premises, proposed activities, infrastructure, application documentation and policies set out in this report.

Based on this assessment, I have accepted the Application and granted a work approval subject to conditions commensurate with the determined controls and as necessary for administration and reporting requirements.

Paul Byrnes
MANAGER, PROCESS INDUSTRIES
Regulatory Services (Environment)

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

Appendix 1: Key documents

	Document title	In text ref	Availability
1.	Application, document 1: Application form. Attachment A – Signed Works Approval Application Form	Application	DWER record A1668549
2.	Application, document 2: Supporting Application information. Attachment B – Ammonium Nitrate Emulsion Plant Environmental Management Plan Lots 115 & 117 Mullewa-Wubin road, Wubin Revision 2 April 2018 Coterra Environment	Application	DWER record A1668550
3.	Application, document 3: Additional Supporting information.	Application	DWER record A1674843
4.	Application, document 4: Applicant's submission on drafts	Application	DWER record A1700495
5.	DER, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth.	DER 2015a	accessed at www.dwer.wa.gov.au
6.	DER, October 2015. <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth.	DER 2015b	
7.	DER, August 2016. <i>Guidance Statement: Licence duration</i> . Department of Environment Regulation, Perth.	DER 2016a	
8.	DER, November 2016. <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth.	DER 2016b	
9.	DER, November 2016. <i>Guidance Statement: Decision Making</i> . Department of Environment Regulation, Perth.	DER 2016c	

Attachment 1: Issued Works Approval W6148/2018/1

**ASIC**

Australian Securities & Investments Commission

Forms Manager

Registered Agents

Company: HANWHA MINING SERVICES AUSTRALIA PTY LTD ACN 169 067 252**Company details**

Date company registered	11-04-2014
Company next review date	11-04-2016
Company type	Australian Proprietary Company
Company status	Registered
Home unit company	No
Superannuation trustee company	No
Non profit company	No

Registered office

PITCHER PARTNERS WA PTY LTD, LEVEL 1 , 914 HAY STREET , PERTH WA 6000

Principal place of business

LEVEL 2 , 179 ST GEORGES TERRACE , PERTH WA 6000

Ultimate holding company

HANWHA CORPORATION (110111-0002959)
169069096
Incorporated in KOREA

Officeholders

KENNEDY, PATRICK STEPHEN GERALD

Born 21-05-1967 at MACCLESFIELD UNITED KINGDOM

15-16 SEONGBUK-DONG , SEONGBUK-GU , SEOUL , KOREA, REPUBLIC OF

Office(s) held: Director, appointed 08-09-2015

PATCHING, GREGORY GEORGE

Born 10-02-1970 at PERTH WA

37 KINGSALL ROAD , ATTADALE WA 6156

Office(s) held: Director, appointed 09-06-2014

KELLY, DAVID PATRICK

Born 22-06-1978 at DUBLIN IRELAND

14 ELMWOOD AVENUE , WOODLANDS WA 6018

Office(s) held: Director, appointed 15-05-2014

HEON, KIM JAE

Born 06-03-1963 at ULSAN KOREA, REPUBLIC OF

HAGYE-1CHACHUNGGU APT 106 1403 , HANGUEL-BISEOK-RO 91 , NOWON-GU , KOREA, REPUBLIC OF

Office(s) held: Director, appointed 08-09-2015

Company share structure

Share class	Share description	Number issued	Total amount paid	Total amount unpaid
ORD	ORDINARY SHARES	37050000	37050000.00	0.00

Members

HANWHA CORPORATION (110111- 86 CHEONGGYECHEOU-RO (JANGGYO-DONG) 0002959) JUNG , -GU , SEOUL 100-797 , KOREA, REPUBLIC OF

Share class	Total number held	Fully paid	Beneficially held
ORD	37050000	Yes	No

Document history

These are the documents most recently received by ASIC from this organisation.

Received	Number	FormDescription	Status
29-09-2015	7E7341053484	CHANGE TO COMPANY DETAILS	Processed and imaged
14-09-2015	7E7301056484	CHANGE TO COMPANY DETAILS	Processed and imaged
03-08-2015	7E7184985484	CHANGE TO COMPANY DETAILS	Processed and imaged

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SHEC Policy



SAFETY, HEALTH, ENVIRONMENT AND COMMUNITY POLICY

HANWHA MINING SERVICES

Hanwha Mining Services commits to the following Safety, Health Environment and Community (SHEC) Policy in order to achieve a workplace that protects people, respects the environment, is valued by the community and sets the basis for a long term successful & sustainable organization.

1. Commitment

All employees & contractors will embrace a harm reduction culture through their SHEC commitment to each other, our customers and the communities we operate in. Hanwha Mining Services will comply with all applicable laws, regulations, and policies.

2. Decision Making

We realize that how we actually perform as a business depends on the decisions we take each day. We are committed to take the right decision every time, to deliver our commitment and make it a reality.

3. Planning

Hanwha Mining Services will set annual SHEC objectives & targets, based on performance and impacts, to drive and continuously improve its performance.

4. Execution

All employees will be fully trained in their SHEC obligations as it befit their roles. SHEC accountabilities will be transparent and performance will be effectively monitored.

5. Continuous Improvement

We will strive to continuously improve our performance through proactive training, risk identification, learning through investigations and implementation of improvement activities to ensure we operate to the highest standards expected of a leading global company.

6. Social Responsibility

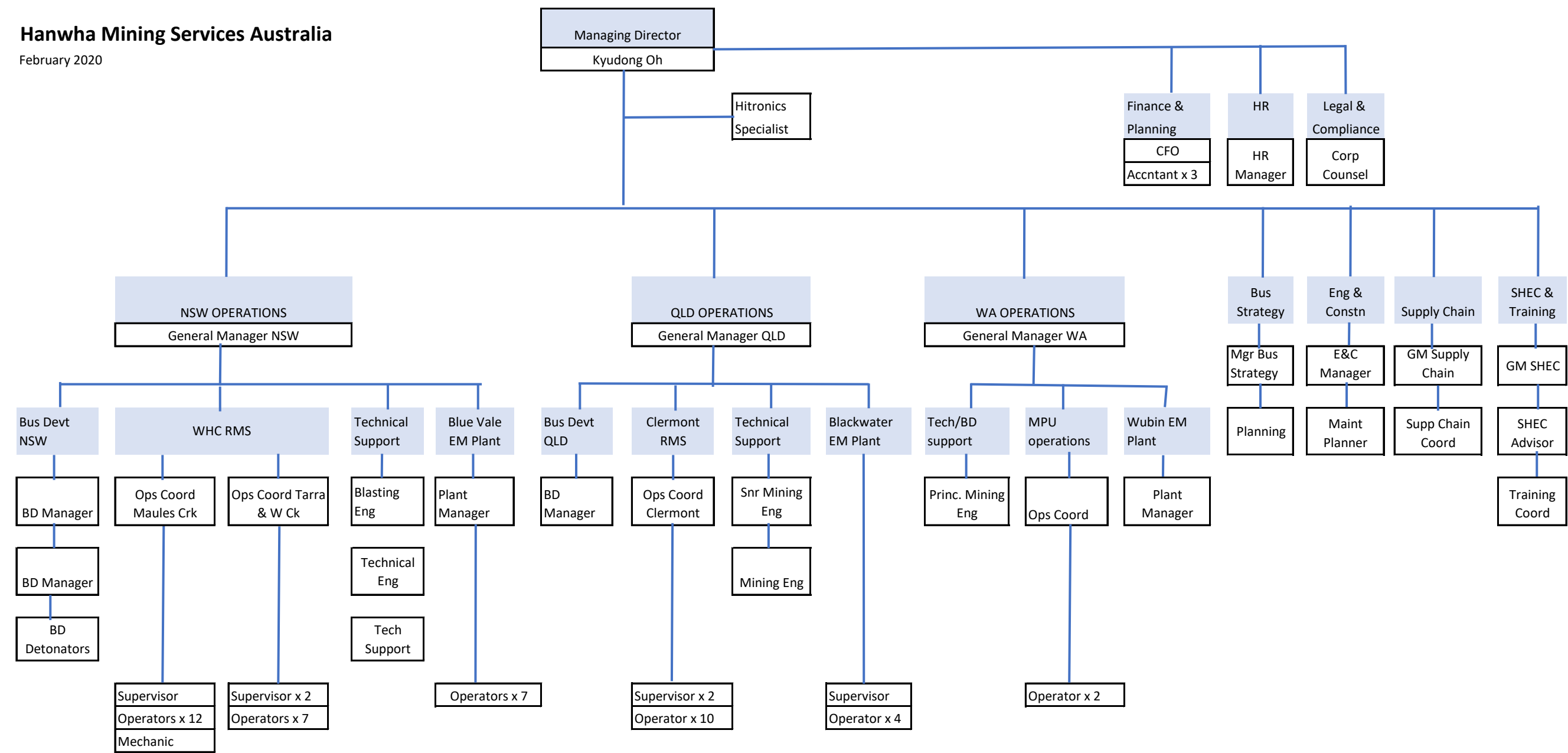
Hanwha Mining Services is committed to achieving the highest standards of community engagement. Hanwha Mining Services recognizes the need to engage with and support the communities where we operate, and to be a trusted partner.

Through our commitment to this policy and our uncompromising approach to Safety, Health, Environment & Community we will ensure the well-being of all our stakeholders now and into the future.

Kyu-dong Oh

Managing Director

November 2018



355J
Perth Batch
N428071



WESTERN



AUSTRALIA

REGISTER NUMBER	
115/DP148784	
Duplicate Edition	DATE Duplicate ISSUED
2	7/9/2016

DUPLICATE CERTIFICATE OF TITLE
UNDER THE TRANSFER OF LAND ACT 1893

VOLUME
17

FOLIO
220A

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 115 ON DEPOSITED PLAN 148784

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

HMS AUSTRALIA PROPERTY HOLDINGS PTY LTD OF LEVEL 2 179 ST GEORGES TERRACE PERTH
(T N428071) REGISTERED 6 SEPTEMBER 2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. THE LAND THE SUBJECT OF THIS CERTIFICATE OF TITLE EXCLUDES ALL PORTIONS OF THE LOT DESCRIBED ABOVE EXCEPT THAT PORTION SHOWN IN THE SKETCH OF THE SUPERSEDED PAPER VERSION OF THIS TITLE.

Warning: A current search of the certificate of title held in electronic form should be obtained before dealing on this land.
Lot as described in the land description may be a lot or location.

-----END OF DUPLICATE CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 17-220A (115/DP148784).
PREVIOUS TITLE: 1229-437.
PROPERTY STREET ADDRESS: NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AREA: SHIRE OF DALWALLINU.



355J
Perth Batch
N428071



WESTERN



AUSTRALIA

REGISTER NUMBER	
117/DP150270	
Duplicate Edition	DATE Duplicate ISSUED
2	7/9/2016

DUPLICATE CERTIFICATE OF TITLE
UNDER THE TRANSFER OF LAND ACT 1893

VOLUME
19

FOLIO
75A

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 117 ON DEPOSITED PLAN 150270

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

HMS AUSTRALIA PROPERTY HOLDINGS PTY LTD OF LEVEL 2 179 ST GEORGES TERRACE PERTH
(T N428071) REGISTERED 6 SEPTEMBER 2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

Warning: A current search of the certificate of title held in electronic form should be obtained before dealing on this land.
Lot as described in the land description may be a lot or location.

-----END OF DUPLICATE CERTIFICATE OF TITLE-----

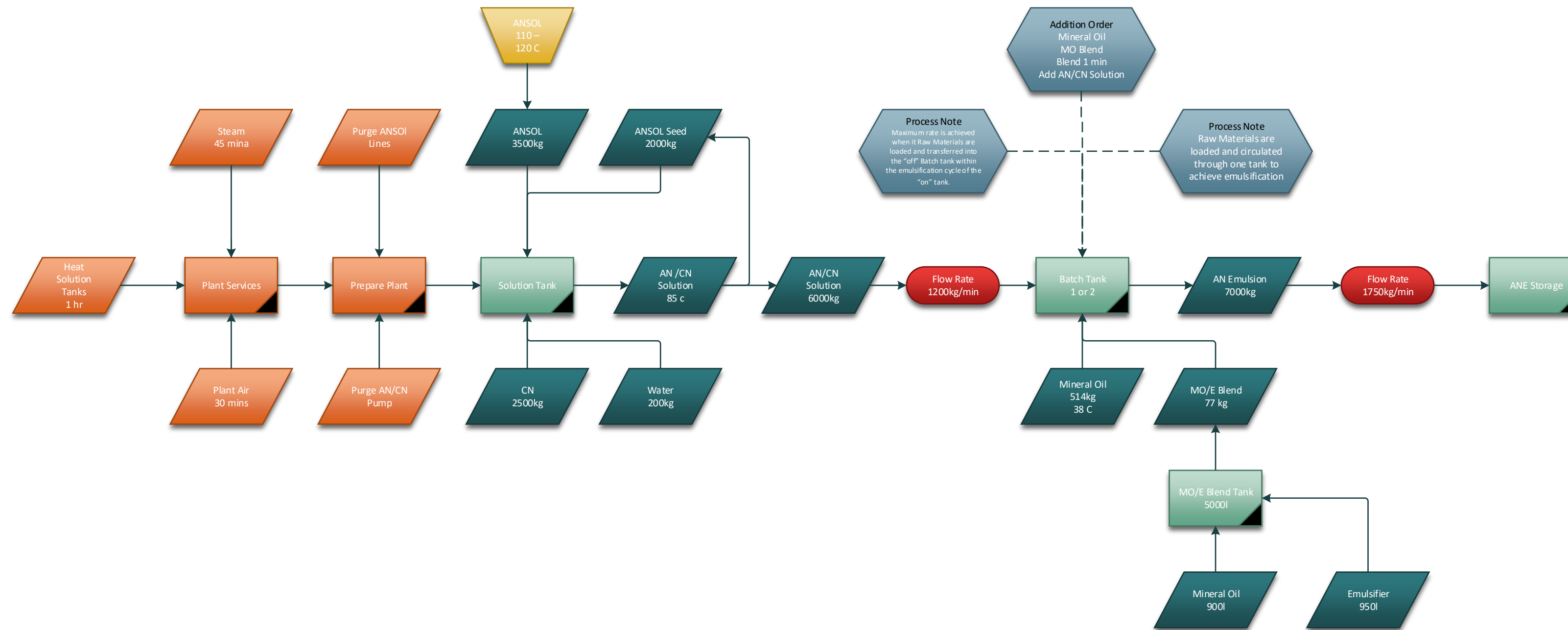
STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 19-75A (117/DP150270).
PREVIOUS TITLE: 1170-858.
PROPERTY STREET ADDRESS: 29 THOMAS RD, WUBIN.
LOCAL GOVERNMENT AREA: SHIRE OF DALWALLINU.



ANE Plant Process Flow



SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name HIMEX EMULSION
Synonym(s) BULK EMULSION, EMULSION MATRIX, AMMONIUM NITRATE EMULSION

1.2 Uses and uses advised against

Use(s) EXPLOSIVES • INTERMEDIATE
Intermediate product used to manufacture explosives.

1.3 Details of the supplier of the product

Supplier name HANWHA MINING SERVICES AUSTRALIA PTY LIMITED
Address Level 2, 179 St Georges Terrace, Perth, WESTERN AUSTRALIA, 6000
Telephone (08) 6181 0300
Email perth.office@hanwha.com
Website <http://www.hanwhaminingservices.com>

1.4 Emergency telephone number(s)

Emergency 1800 054 055

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO AUSTRALIAN WHS REGULATIONS

GHS classification(s) Oxidizing Liquids: Category 2
Acute Toxicity: Oral: Category 4
Acute Toxicity: Skin: Category 4
Skin Corrosion/Irritation: Category 2
Serious Eye Damage / Eye Irritation: Category 2A

2.2 Label elements

Signal word DANGER

Pictogram(s)



Hazard statement(s)

H272 May intensify fire; oxidizer.
H302 Harmful if swallowed.
H312 Harmful in contact with skin.
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Prevention statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P220 Keep/Store away from clothing/incompatible materials/combustible materials.
P221 Take any precaution to avoid mixing with combustibles/incompatible materials.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

PRODUCT NAME HiMEX EMULSION**Response statement(s)**

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTER or doctor/physician if you feel unwell.
P321 Specific treatment is advised - see first aid instructions.
P330 Rinse mouth.
P332 + P337 + P313 If skin or eye irritation occurs: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before re-use.
P370 + P378 In case of fire: Use appropriate media for extinction.

Storage statement(s)

None allocated.

Disposal statement(s)

P501 Dispose of contents/container in accordance with relevant regulations.

2.3 Other hazards

No information provided.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content
AMMONIUM NITRATE	6484-52-2	229-347-8	35 to 85%
UREA	57-13-6	200-315-5	<20%
WATER	7732-18-5	231-791-2	<20%
HYDROCARBON SOLVENT(S)	-	-	<10%
INORGANIC OXIDISER(S)	-	-	<50%
EMULSIFIER(S)	-	-	<10%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.

Inhalation If inhaled, remove from contaminated area. Apply artificial respiration if not breathing.

Skin If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. Continue flushing with water until advised to stop by a Poisons Information Centre or a doctor.

Ingestion For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting.

First aid facilities Eye wash facilities and safety shower are recommended.

4.2 Most important symptoms and effects, both acute and delayed

Over exposure can cause nausea, vomiting, flushing of face and neck, headache, weakness, faintness and collapse. Severe over exposure may interfere with the ability of the blood to carry oxygen (methaemoglobinemia). This can cause headache, weakness, fatigue, dizziness and a blue colour to skin and lips. Higher levels may cause trouble breathing, collapse and even death.

4.3 Immediate medical attention and special treatment needed

Support respiratory and cardiovascular function. Treat symptomatically and as for exposure to nitrates. Over exposure may lead to methaemoglobinemia. Nitrates have a smooth muscle relaxant effect potentially resulting in hypotension.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Use an extinguishing agent suitable for the surrounding fire.

5.2 Special hazards arising from the substance or mixture

Non flammable. In fire situation, water will evaporate & there is some potential for explosion (at high temperature and pressure). May evolve toxic gases (ammonium nitrate, nitrogen oxides) when heated to decomposition.

5.3 Advice for firefighters

Do not attempt to fight fires involving explosives or explosive raw materials. Evacuate to the safe distance recommended in EPG and contact emergency services. Toxic gases may be evolved in a fire situation, remain upwind and notify those downwind of the hazard. Use waterfog to cool intact containers and nearby storage areas.

5.4 Hazchem code

1Y
1 Coarse Water Spray.
Y Risk of violent reaction or explosion. Wear full fire kit and breathing apparatus. Contain spill and run-off.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear Personal Protective Equipment (PPE) as detailed in section 8 of the SDS.

6.2 Environmental precautions

Prevent product from entering drains and waterways.

6.3 Methods of cleaning up

Contain spillage, then cover / absorb spill with non-combustible absorbent material (vermiculite, sand, or similar), collect and place in suitable containers for disposal.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

7.2 Conditions for safe storage, including any incompatibilities

Store in a cool, dry, well ventilated area, preferably outdoor or detached, removed from direct sunlight, incompatible substances, heat or ignition sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use.

7.3 Specific end use(s)

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

No exposure standards have been entered for this product.

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

Engineering controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended. Maintain vapour levels below the recommended exposure standard.

PPE

Eye / Face	Wear splash-proof goggles.
Hands	Wear PVC or rubber gloves.
Body	Wear safety boots and coveralls.
Respiratory	Wear appropriate respirator when ventilation is inadequate.



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	VISCOUS LIGHT BROWN/GREY EMULSION
Odour	FUEL OIL ODOUR
Flammability	MAY BE COMBUSTIBLE
Flash point	NOT RELEVANT
Boiling point	NOT AVAILABLE
Melting point	NOT AVAILABLE
Evaporation rate	NOT AVAILABLE
pH	1.5 to 6.5 (1 % solution)
Vapour density	NOT AVAILABLE
Specific gravity	1.30 - 1.42
Solubility (water)	INSOLUBLE
Vapour pressure	NOT AVAILABLE
Upper explosion limit	NOT RELEVANT
Lower explosion limit	NOT RELEVANT
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	20000cP – 70000cP
Explosive properties	NOT AVAILABLE
Oxidising properties	OXIDISING LIQUID
Odour threshold	NOT AVAILABLE

10. STABILITY AND REACTIVITY

10.1 Reactivity

Powerful oxidising agent.

10.2 Chemical stability

Powerful oxidising agent. Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Oxidising agent. Incompatible with combustible materials, reducing agents (e.g. sulphites), acids (e.g. nitric acid), alkalis (e.g. sodium hydroxide), metals, heat and ignition sources.

10.6 Hazardous decomposition products

May evolve carbon and nitrogen oxides when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

PRODUCT NAME HiMEX EMULSION**11.1 Information on toxicological effects****Acute toxicity****Information available for the product:**

Harmful if swallowed or in contact with skin.

Information available for the ingredient(s):

Ingredient	Oral Toxicity (LD50)	Dermal Toxicity (LD50)	Inhalation Toxicity (LC50)
AMMONIUM NITRATE	2217 mg/kg (rat)	--	--
UREA	8471 mg/kg (rat)	8200 mg/kg (rat)	--

Skin

Irritating to the skin. Contact may result in irritation, redness, rash and dermatitis.

Eye

Irritating to the eyes. Contact may result in irritation, lacrimation and redness.

Sensitisation

Not classified as causing skin or respiratory sensitisation.

Mutagenicity

Not classified as a mutagen.

Carcinogenicity

Not classified as a carcinogen.

Reproductive

Not classified as a reproductive toxin.

STOT – single exposure

Over exposure can cause nausea, vomiting, flushing of face and neck, headache, weakness, faintness and collapse. Severe over exposure may interfere with the ability of the blood to carry oxygen (methaemoglobinemia). This can cause headache, weakness, fatigue, dizziness and a blue colour to skin and lips. Higher levels may cause trouble breathing, collapse and even death. WARNING: May explode with shock, heat, friction or static charge.

STOT – repeated exposure

Repeated exposure to decomposition products may result in blood or respiratory disease.

Aspiration

Not classified as causing aspiration.

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

AQUATIC: Nitrates are nutrient in water. Spills may cause massive algae blooms in static water and affect local species population balance in the aquatic environment. Avoid contaminating waterways.

12.2 Persistence and degradability

No information provided.

12.3 Bioaccumulative potential

No information provided.

12.4 Mobility in soil

No information provided.

12.5 Other adverse effects

No information provided.

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Waste disposal**

For small amounts, absorb with sand, vermiculite or similar and dispose of to an approved landfill site. For large quantities, contact the manufacturer/supplier for additional information. Prevent contamination of drains and waterways as aquatic life may be threatened and environmental damage may result.

Legislation

Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION**CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE**

PRODUCT NAME HiMEX EMULSION

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	3375	3375	3375
14.2 Proper Shipping Name	AMMONIUM NITRATE EMULSION	AMMONIUM NITRATE EMULSION	AMMONIUM NITRATE EMULSION
14.3 Transport Hazard Class	5.1	5.1	5.1
14.4 Packing Group	II	II	II

14.5 Environmental hazards Not a Marine Pollutant

14.6 Special precautions for user

Hazchem code 1Y

EMS F-H, S-Q

Other information Security Sensitive Ammonium Nitrate (SSAN) must be transported and handled as per the relevant State Act and Regulation.

15. REGULATORY INFORMATION**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

Poison schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

The classifications and phrases listed below are based on the Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)].

Hazard codes

O	Oxidising
Xi	Irritant
Xn	Harmful

Risk phrases

R8	Contact with combustible material may cause fire.
R21/22	Harmful in contact with skin and if swallowed.
R36/38	Irritating to eyes and skin.

Safety phrases

S2	Keep out of reach of children.
S15	Keep away from heat.
S16	Keep away from sources of ignition - No smoking.
S17	Keep away from combustible material.
S20/21	When using, do not eat, drink or smoke.
S24/25	Avoid contact with skin and eyes.
S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S29	Do not empty into drains.
S35	This material and its container must be disposed of in a safe way.
S36/37/39	Wear suitable protective clothing, gloves and eye/face protection.
S41	In case of fire and/or explosion, do not breathe fumes.

Inventory listing(s) **AUSTRALIA: AICS (Australian Inventory of Chemical Substances)**
All components are listed on AICS, or are exempt.

16. OTHER INFORMATION

Additional information EXPLOSIVES & BLASTING AGENTS: Refer to Local State and Federal legislation that specifically relates to the use of Explosives. Users of products described in this ChemAlert Report are advised to ensure familiarity and compliance with the appropriate legal requirements (e.g. Regulations) prior to the use of this product. Where any further information is required, users may contact their local authority in Explosives and Dangerous Goods.

EXPLOSIONS: Fires involving explosives or explosive mixtures may undergo further explosions and rapid propagation. Police and emergency personnel should be notified immediately. Evacuate individuals to a safe sheltered area at least 800 metres away. If possible remove vehicles and further heat and ignition sources from the area. Do not return to areas until at least one hour after fire and explosions have ceased.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:

The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:

It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m ³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (highly acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report status

This document has been compiled by RMT on behalf of the manufacturer, importer or supplier of the product and serves as their Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

Prepared by

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[End of SDS]

Safety Data Sheet



1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: **AMMONIUM NITRATE**

Other name(s): Nitropril, Anopril, Marbyl, Ammonium nitrate prills, LDAN, Low density ammonium nitrate, PPAN, Porous prilled ammonium nitrate

Recommended Use of the Chemical and Restrictions on Use Explosives manufacture.
This material is classified as a Security Sensitive Ammonium Nitrate (SSAN). Various government controls may apply to this material.

Supplier: Orica Australia Pty Ltd
ABN: 99 004 117 828
Street Address: 1 Nicholson Street
Melbourne 3000
Australia

Telephone Number: +61 3 9665 7111
Facsimile: +61 3 9665 7937
Emergency Telephone: **AUSTRALIA: 1 800 033 111 (ALL HOURS)**
INTERNATIONAL AUSTRALIA: +61 3 9663 2130 (ALL HOURS)

Please ensure you refer to the limitations of this Safety Data Sheet as set out in the "Other Information" section at the end of this Data Sheet.

2. HAZARDS IDENTIFICATION

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

This material is hazardous according to Safe Work Australia; HAZARDOUS CHEMICAL.

Classification of the chemical:

Oxidising solids - Category 3

Eye Irritation - Category 2A

SIGNAL WORD: WARNING



Hazard Statement(s):

H272 May intensify fire; oxidizer.

H319 Causes serious eye irritation.

AUH031 Contact with acids liberates toxic gas.

AUH044 Risk of explosion if heated under confinement.

Precautionary Statement(s):

Prevention:

P210 Keep away from heat.

P220 Store away from clothing, incompatible materials and combustible materials.

P221 Take any precaution to avoid mixing with combustibles and incompatible materials.

P264 Wash thoroughly after handling.

P280 Wear eye protection.

Product Name: AMMONIUM NITRATE

Substance No: 000022017701

Issued: 09/11/2016

Version: 9

Safety Data Sheet

**Response:**

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337+P313 If eye irritation persists: Get medical attention.

P370+P378 In case of fire: Use flooding quantities of water for extinction.

Storage:

No storage statements.

Disposal:

P501 Dispose of contents and container in accordance with local regulations.

Poisons Schedule (SUSMP): None allocated.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Components	CAS Number	Proportion	Hazard Codes
Ammonium nitrate	6484-52-2	>98% w/w	H272 H319
Other minor ingredients	-	<2% w/w	-

4. FIRST AID MEASURES

For advice, contact a Poisons Information Centre (e.g. phone Australia 131 126; New Zealand 0800 764 766) or a doctor.

Inhalation:

Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Skin Contact:

If skin contact occurs, remove contaminated clothing and wash skin with running water. If irritation occurs seek medical advice. Nitrates can be absorbed through cut, burnt or broken skin. Launder contaminated clothing before reuse.

Eye Contact:

If in eyes, hold eyelids apart and flush the eye continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre or a doctor, or for at least 15 minutes. Seek medical attention.

Ingestion:

Rinse mouth with water. If swallowed, do NOT induce vomiting. Give a glass of water. Seek medical advice.

Safety Data Sheet



Indication of immediate medical attention and special treatment needed:

Treat symptomatically. Treat as for exposure to nitrates. May cause methemoglobinemia. Clinical findings: The smooth muscle relaxant effect of nitrate salts may lead to headache, dizziness and marked hypotension. Cyanosis is clinically detectable when approximately 15% of the haemoglobin has been converted to methaemoglobin (ie. ferric iron).

Symptoms such as headache, dizziness, weakness and dyspnoea occur when methaemoglobin concentrations are 30% to 40%; at levels of about 60%, stupor, convulsions, coma and respiratory paralysis occur and the blood is a chocolate brown colour. At higher levels death may result. Spectrophotometric analysis can determine the presence and concentration of methaemoglobin in blood.

Treatment:

1. Give 100% oxygen.
2. In cases of (a) ingestion: use gastric lavage, (b) contamination of skin (unburnt or burnt): continue washing to remove salts.
3. Observe blood pressure and treat hypotension if necessary.
4. When methaemoglobin concentrations exceed 40% or when symptoms are present, give methylene blue 1 to 2 mg/kg body weight in a 1% solution by slow intravenous injection. If cyanosis has not resolved within one hour a second dose of 2 mg/kg body weight may be given. The total dose should not exceed 7 mg/kg body weight as unwanted effects such as dyspnoea, chest pain, vomiting, diarrhoea, mental confusion and cyanosis may occur. Without treatment methaemoglobin levels of 20-30% revert to normal within 3 days.
5. Bed rest is required for methaemoglobin levels in excess of 40%.
6. Continue to monitor and give oxygen for at least two hours after treatment with methylene blue.
7. Consider transfer to centre where haemoperfusion can be performed to remove the nitrates from the blood if the condition of the patient is unstable.

Effects from exposure to decomposition products including nitrogen dioxide (possible decomposition component of blasting fumes) can include chest discomfort, shortness of breath and possible pulmonary oedema, the onset of which may be delayed. The exposed person should be kept under medical surveillance for 24 hours for delayed onset of pulmonary oedema.

Further observation for 2-3 weeks may be required to detect the onset of the inflammatory changes of bronchiolitis fibrosa obliterans.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media:

Coarse water spray. Water spray (large quantities).

Unsuitable Extinguishing Media:

Extinguishing methods based on smothering are ineffective in the case of oxidizing agents. DO NOT USE the following as extinguishing media: Carbon dioxide, dry chemical powder.

Hazchem or Emergency Action Code: 1Y

Specific hazards arising from the chemical:

WARNING:

Explosion risk in case of fire, especially if contaminated or confined. Molten product may explode from friction, shock or containment. In the case of an intense fire evacuate all personnel to at least 1000 m.

Oxidizing substance. Increases intensity of a fire, even in the absence of oxygen. Ammonium nitrate on its own is not combustible, however it supports the combustion of other materials. Contact with combustible material may cause fire. Decomposes on heating emitting irritating white fumes and/or brown fumes. Brown fumes indicate the presence of toxic oxides of nitrogen.

Safety Data Sheet



Special protective equipment and precautions for fire-fighters:

WARNING:

A major fire may involve a risk of explosion. Evacuate area immediately. Allow fire to burn out. An adjacent detonation may also involve the risk of explosion. Heating can cause decomposition of the material, which can lead to the containers exploding. Confinement of material may result in detonation.

In the case of an intense fire evacuate all personnel to a least 1000 metres. Police and emergency personnel should be notified immediately. If possible remove vehicles and further heat and ignition sources from area. Do not return to areas until the site has completely cooled down.

Decomposes on heating emitting irritating white fumes and/or brown fumes. Brown fumes indicate the presence of toxic oxides of nitrogen. On detection of fire the compartment(s) should be opened up to provide maximum ventilation. Fire-fighters to wear self-contained breathing apparatus and suitable protective clothing if there is a risk of exposure to products of combustion/decomposition. If safe to do so, remove containers from path of fire. If safe to do so, prevent molten material from being confined in drains, pipes etc.

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures/Environmental precautions:

Shut off all possible sources of ignition. Clear area of all unprotected personnel. Do not allow the product to mix with combustible/organic materials.

Do not allow container or product to get into drains, sewers, streams or ponds. If contamination of sewers or waterways has occurred advise local emergency services.

Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:

Clean up spillages immediately. Contain - prevent run off into drains and waterways. Wear protective equipment to prevent skin and eye contact and breathing in dust. Sweep or vacuum up, but avoid generating dust. Collect and seal in properly labelled containers or drums for disposal. (Loose fitting lids). Do not return spilled material to original container. Ensure that contaminated material (clothing, pallets) is thoroughly washed.

This material is classified as a Security Sensitive Ammonium Nitrate (SSAN). Spillage recovery needs to be appropriately documented and material accurately accounted for.

In the case of a transport accident notify the Police, Regulatory Authorities and Orica Australia Pty Ltd (Telephone: 1800 033 111 -- 24 hour service) and/or Orica New Zealand Limited (Telephone: 0800 734 607 -- 24 hour service) or Orica International Australia: (Telephone: +61 3 9663 2130 -- 24 hour service).

7. HANDLING AND STORAGE

Precautions for safe handling:

Avoid skin and eye contact and breathing in dust. Avoid handling which leads to dust formation. Handle with care. Keep out of reach of children.

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Conditions for safe storage, including any incompatibilities:

Store in a cool, dry, well ventilated place and out of direct sunlight. Store away from sources of heat or ignition. Store away from combustible materials including organic materials, reducing agents, metal powders, strong acids, nitrites, chlorates, chlorides and permanganates. Store away from incompatible materials described in Section 10. Keep containers closed when not in use - check regularly for spills.

Concrete floors are recommended for storage. If ammonium nitrate is to be stored in bulk, the surface must be treated so that it is resistant to attack. Bulk ammonium nitrate should not be stored on a bituminous floor. Floors drains, recesses or other areas of possible confinement should be eliminated to prevent entrapment/confinement of molten (flowing) ammonium nitrate during a fire.

This product when stored in a confined, unventilated space/hold can give off ammonia or other odour and lead to the depletion of oxygen within this space and other confined spaces. It is therefore essential that ventilation is carried out prior to entry.

Ensure ammonium nitrate is stored securely and in accordance with regulations/controls issued by relevant authority. The secure storage of ammonium nitrate within Australia includes but is not limited to the use of site security plans, locking the facility/container with physical restraining items, validation and record keeping of all stock, and where deemed necessary through a risk management approach constant surveillance.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters: No value assigned for this specific material by Safe Work Australia. However, Workplace Exposure Standard(s) for decomposition product(s):

Nitrogen dioxide: 8hr TWA = 5.6 mg/m³ (3 ppm), 15 min STEL = 9.4 mg/m³ (5 ppm)

As published by Safe Work Australia Workplace Exposure Standards for Airborne Contaminants.

TWA - The time-weighted average airborne concentration of a particular substance when calculated over an eight-hour working day, for a five-day working week.

STEL (Short Term Exposure Limit) - the airborne concentration of a particular substance calculated as a time-weighted average over 15 minutes, which should not be exceeded at any time during a normal eight hour work day. According to current knowledge this concentration should neither impair the health of, nor cause undue discomfort to, nearly all workers.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Appropriate engineering controls:

Use in well ventilated areas. Avoid generating and breathing in dusts. Keep containers closed when not in use.

If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented risk assessment using the relevant Personal Protective Equipment (PPE) (refer to PPE section below) as a basis must be carried out to determine the minimum PPE requirements.

Safety Data Sheet



Individual protection measures, such as Personal Protective Equipment (PPE):

The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

OVERALLS, SAFETY SHOES, CHEMICAL GOGGLES, GLOVES, DUST MASK.



Wear overalls, chemical goggles and impervious gloves. Avoid generating and inhaling dusts. If determined by a risk assessment an inhalation risk exists, wear a dust mask/respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Granular Solid / Prills
Colour:	White to Off-white
Odour:	Negligible
Solubility:	Soluble in water.
Specific Gravity:	0.72 - 0.78 g/cm ³ (bulk density)
Relative Vapour Density (air=1):	Not available
Vapour Pressure (20 °C):	Negligible
Flash Point (°C):	Not applicable
Flammability Limits (%):	Not applicable
Autoignition Temperature (°C):	Not available
Solubility in water (g/L):	190g/100g at 20°C
Melting Point/Range (°C):	160 - 169
Boiling Point/Range (°C):	Decomposes (approx 210 °C)
Decomposition Point (°C):	210°C (approx)
pH:	4.5 - 5.2 (10% solution @ 20°C)
Viscosity:	Not available
Evaporation Rate:	Not available

10. STABILITY AND REACTIVITY

Reactivity:	Powerful oxidizing agent. Oxidizing agents may cause vigorous reactions.
Chemical stability:	Stable under normal ambient and anticipated storage and handling conditions when free of contaminants including inorganic and organic materials. Hygroscopic: absorbs moisture or water from surrounding air. May explode under confinement and high temperature, but not readily detonated. May explode due to nearby detonations.

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**Possibility of hazardous reactions:**

Oxidizing agent. Supports combustion of other materials and increases intensity of a fire. Will react with organic materials, and reducing agents. Reacts with nitrites, chlorides, chlorates, permanganates and metal powders. When mixed with strong acids, and occasionally during blasting, it produces an irritating toxic brown gas, mostly of nitrogen dioxide. When molten (such as in a fire situation) may decompose violently due to shock or pressure.

Contamination with chlorine bleaches, pool chlorine and hypochlorites may result in the formation of explosive nitrogen trichloride. Heating can cause expansion or decomposition of the material, which can lead to the containers exploding.

Conditions to avoid:

Avoid exposure to heat, sources of ignition, and open flame. Will react with organic materials and reducing agents. Avoid contact with combustible chemicals. Avoid contact with other chemicals. Avoid dust generation. Avoid exposure to moisture.

Incompatible materials:

Ammonium nitrate is a powerful oxidizing agent; it is incompatible with tetranitromethane, dichloroisocyanuric acid, trichloroisocyanuric acid, bromates, chlorates, chlorites, hypochlorites, perchlorates, permanganates, chloroisocyanurate, nitrites, powdered metals. Incompatible with combustible materials. Incompatible with reducing agents. Incompatible with copper, zinc, brass and bronze.

Hazardous decomposition products:

Oxides of nitrogen. Nitrous oxide. Ammonium nitrate fumes. Ammonia. Nitric acid.

11. TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion:

Swallowing can result in nausea, vomiting, diarrhoea, and abdominal pain. Swallowing large amounts may result in headaches, dizziness and a reduction in blood pressure (hypotension).

Eye contact:

An eye irritant. Exposure to the dust may cause discomfort due to particulate nature. May cause physical irritation to the eyes.

Skin contact:

Repeated or prolonged skin contact may lead to irritation. Can be absorbed through cut, broken, or burnt skin with resultant adverse effects. See effects as noted under 'Inhalation'.

Inhalation:

Breathing in dust may result in respiratory irritation. Blasting may produce a toxic brown gas of nitrogen dioxide. Inhalation of the gas may result in chest discomfort, shortness of breath and possible pulmonary oedema, the onset of which may be delayed.

Absorption of ammonium nitrate by inhalation, ingestion or through burnt or broken skin may cause dilation of blood vessels by direct smooth muscle relaxation and may also cause methaemoglobinaemia. May cause dizziness, drowsiness, nausea and headache due to central nervous system effects.

Acute toxicity:

Oral LD50 (rat): 2217 mg/kg for ammonium nitrate

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Serious eye damage/irritation: Causes serious eye irritation.

Respiratory or skin sensitisation: Not known or reported to be a skin or respiratory sensitiser.

Chronic effects: No information available for the product.

Aspiration hazard: Not classified.

In humans and animals methaemoglobinaemia has occurred under untreated circumstances following overexposure to nitrates. Absorption of nitrates by any route may cause dilation of blood vessels by direct smooth muscle relaxation.

12. ECOLOGICAL INFORMATION

Ecotoxicity Avoid contaminating waterways. Ammonium nitrate is a plant nutrient. Large scale contamination may kill vegetation and cause poisoning in livestock and poultry.

Low toxicity to aquatic life. TLm 96: 10-100 ppm

Ammonia: 48hr LC50 (Cyprinus carpio): 1.15-1.72mg un-ionised NH₃/L; 95-102 mg total NH₃/L

Nitrates: 96hr LC50 (Chinook salmon, rainbow trout, bluegill): 420-1360 mg NO₃⁻/L

Persistence/degradability: The material is biodegradable. Not expected to bioconcentrate or accumulate.

Mobility in soil: The material is water soluble and may disperse in soil.

Aquatic toxicity: Ammonium nitrate was evaluated at 5, 10, 25 and 50 mg (NH₄⁺)/L. The fertility of *Daphnia magna* was decreased at 50 mg/L. Post embryonic growth of crustacea was impaired at 10, 25 and 50 mg/L.

Can stimulate weed and algal growth in static surface waters.

13. DISPOSAL CONSIDERATIONS

Disposal methods:

Refer to Waste Management Authority. Dispose of contents and container in accordance with local regulations. Empty containers must be either rendered totally unusable, or if to be recycled for use, decontaminated by rinsing thoroughly with water. Rinsing water needs to be disposed of carefully.

Waste ammonium nitrate may be disposed of as a fertiliser, but this method of disposal must be agreed with the authorities.

As this material is classified as a Security Sensitive Ammonium Nitrate (SSAN) disposal of material needs to be appropriately documented and material accurately accounted for.

14. TRANSPORT INFORMATION

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Road and Rail Transport

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.



UN No: 1942
Transport Hazard Class: 5.1 Oxidizing Agent
Packing Group: III
Proper Shipping Name or Technical Name: AMMONIUM NITRATE
Hazchem or Emergency Action Code: 1Y

Marine Transport

Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; DANGEROUS GOODS.

UN No: 1942
Transport Hazard Class: 5.1 Oxidizing Agent
Packing Group: III
Proper Shipping Name or Technical Name: AMMONIUM NITRATE

IMDG EMS Fire: F-H
IMDG EMS Spill: S-Q

Air Transport

Classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air; DANGEROUS GOODS.

UN No: 1942
Transport Hazard Class: 5.1 Oxidizing Agent
Packing Group: III
Proper Shipping Name or Technical Name: AMMONIUM NITRATE

15. REGULATORY INFORMATION

Classification:

This material is hazardous according to Safe Work Australia; HAZARDOUS CHEMICAL.

Classification of the chemical:

Oxidising solids - Category 3
Eye Irritation - Category 2A

Hazard Statement(s):

H272 May intensify fire; oxidizer.
H319 Causes serious eye irritation.
AUH031 Contact with acids liberates toxic gas.
AUH044 Risk of explosion if heated under confinement.

Poisons Schedule (SUSMP): None allocated.

Product Name: AMMONIUM NITRATE
Substance No: 000022017701

Issued: 09/11/2016
Version: 9

Safety Data Sheet



All the constituents of this material are listed on the Australian Inventory of Chemical Substances (AICS).

Various regulations/controls/authorisations/licences may apply governing the manufacture, importation, exportation, use, handling, storage, sale/supply, transport and disposal of ammonium nitrate. Ammonium nitrate in Australia is considered a security sensitive material and loss, theft, attempted theft and unexplained discrepancies shall be reported to authorities. Record keeping and licensing of individuals shall be required and maintained.

16. OTHER INFORMATION

'Registry of Toxic Effects of Chemical Substances'. Ed. D. Sweet, US Dept. of Health & Human Services: Cincinnati, 2016.

In: 'The Dictionary of Substances and their Effects'. Ed. Gangolli S. Royal Society of Chemistry, 1999.

PACIA Code of Practice for Secure Distribution of High Analysis Ammonium Nitrate. 03/ 2004.

'Principles for the Regulation of Ammonium Nitrate COAG (Council of Australian Government)'.

This safety data sheet has been prepared by Ixom Operations Pty Ltd Toxicology & SDS Services.

Reason(s) for Issue:

Revised Primary SDS

Alignment to Safe Work Australia requirements

Alignment to NOHSC requirements

Alignment to GHS requirements

Minor Text Changes

This SDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since The Supplier cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Supplier representative or The Supplier at the contact details on page 1.

The Supplier's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is available upon request.

1. IDENTIFICATION

Product Name	Calcium Nitrate/Ammonium Nitrate Double Salt
Other Names	Mixture - All components listed on AICS
Uses	Professional use of fertilisers containing nitric acid ammonium calcium salt. Consumer use of seeds coated in fertiliser substance.
Chemical Family	No Data Available
Chemical Formula	5Ca(NO ₃) ₂ .NH ₄ NO ₃ .10H ₂ O
Chemical Name	Calcium Nitrate
Product Description	No Data Available

Contact Details of the Supplier of this Safety Data Sheet

Organisation	Location	Telephone
Redox Pty Ltd	2 Swettenham Road Minto NSW 2566 Australia	+61-2-97333000
Redox Pty Ltd	11 Mayo Road Wiri Auckland 2104 New Zealand	+64-9-2506222
Redox Inc.	2132A E. Dominguez Street Carson CA 90810 USA	+1-424-675-3200
Redox Chemicals Sdn Bhd	No. 8, Block G, Ground Floor, Taipan 2 Jalan PJU 1A/3 Ara Damansara 47301, Petaling Jaya, Selangor, Malaysia	+60-3-7843-6833

Emergency Contact Details

For emergencies only; DO NOT contact these companies for general product advice.

Organisation	Location	Telephone
Poisons Information Centre	Westmead NSW	1800-251525 131126
Chemcall	Australia	1800-127406 +64-4-9179888

2. HAZARD IDENTIFICATION

Poisons Schedule (Aust) Not scheduled

Globally Harmonised System

Hazard Classification Hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)



Hazard Categories

Acute Toxicity (Oral) - Category 4
 Serious Eye Damage/Irritation - Category 1

Pictograms



Signal Word

Danger

Hazard Statements

H302 Harmful if swallowed.
H318 Causes serious eye damage.

Precautionary Statements

Prevention	P280	Wear protective gloves/protective clothing/eye protection/face protection.
	P270	Do not eat, drink or smoke when using this product.
	P264	Wash face, hands and any exposed skin thoroughly after handling.
Response	P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
	P310	Immediately call a POISON CENTER or doctor/physician.
	P301 + P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
	P330	Rinse mouth.
Disposal	P501	Dispose of contents/container in accordance with local / regional / national / international regulations.

National Transport Commission (Australia)

Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification

NOT Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Entity	Formula	CAS Number	Proportion
Calcium Ammonium Nitrate	No Data Available	15245-12-2	80.00 - 85.00 %
Nitric acid, ammonium salt	No Data Available	6484-52-2	68.00 - 72.00 %
Nitric acid, calcium salt	No Data Available	10124-37-5	12.00 - 13.00 %
Water	No Data Available	7732-18-5	>12.00 %

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure

Swallowed Rinse mouth Get medical attention Never give anything by mouth to an unconscious person. Toxic if swallowed.

Eye Rinse cautiously with water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Skin Wash off immediately with soap and plenty of water for 15 minutes while removing all contaminated clothes and shoes. Wash contaminated clothing before reuse. If skin irritation persists, call a physician.

Inhaled Remove victim from exposure to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth to mouth method. Induce artificial respiration with the aid of a pocket mask equipped with a one way valve or other proper respiratory medical device. Seek medical attention immediately.

Advice to Doctor Treat symptomatically based on judgement of doctor and individual reactions of patient.



Medical Conditions Aggravated by Exposure

Persons with other blood dyscrasias, especially anemia might have increased sensitivity. Persons exposed to other oxidizing agents or other agents known to induce methemoglobinemia, such as aniline, nitrobenzene, or other nitrates, or those exposed to agents known to deprive the body of oxygen, such as carbon monoxide, hydrogen sulfide or asphyxiates, might be hypersusceptible. Pre-existing heart disease might be aggravated from exposure to this product.

5. FIRE FIGHTING MEASURES

General Measures	Clear fire area of all non-emergency personnel. Stay upwind. Keep out of low areas. Eliminate ignition sources. Move fire exposed containers from fire area if it can be done without risk.
Flammability Conditions	Non-combustible solid. But substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition.
Extinguishing Media	In case of fire, use flooding quantities of water for extinction. Do NOT use chemical extinguisher or foam or attempt to smother the fire with steam or sand.
Fire and Explosion Hazard	Can cause explosions in contact with combustible dust or vapours, occasionally explosive by shock or friction. Sensitive to mechanical impact.
Hazardous Products of Combustion	When involved in a fire, this product may generate oxides of nitrogen and metal oxides.
Special Fire Fighting Instructions	Do NOT allow fire fighting water to reach waterways, drains or sewers. Store fire fighting water for treatment.
Personal Protective Equipment	Fire fighters should wear a positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots and gloves).
Flash Point	No Data Available
Lower Explosion Limit	No Data Available
Upper Explosion Limit	No Data Available
Auto Ignition Temperature	No Data Available
Hazchem Code	No Data Available

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	Avoid accidents, clean up immediately. Slippery when spilt. Ensure adequate ventilation, especially in confined areas. Remove all sources of ignition. Avoid contact with skin, eyes and inhalation of vapours.
Clean Up Procedures	Small spill: Move containers from spill area. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor. Large spill: Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor.
Containment	Stop leak if safe to do so. Isolate the danger area.
Decontamination	Residual traces can be wiped away.
Environmental Precautionary Measures	Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
Evacuation Criteria	Evacuate all unnecessary personnel.
Personal Precautionary Measures	Personnel involved in the clean up should wear full protective clothing as listed in section 8.

7. HANDLING AND STORAGE

Handling	Ensure an eye bath and safety shower are available and ready for use. Observe good personal hygiene practices and recommended procedures. Wash thoroughly after handling. Take precautionary measures against static discharges by bonding and grounding equipment. Avoid contact with eyes, skin and clothing. Do not inhale product dust/fumes. Avoid contamination by any source including metals, dust and organic materials. Prevent moisture pick up. Do not eat, drink or smoke when using this product. Wash thoroughly after handling.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat Keep locked up and out of reach of children. Keep away from food, drink and animal feeding stuffs Store in accordance with local regulations This product is not classified dangerous for transport according to The



Australian Code for the Transport of Dangerous Goods By Road and Rail.

Store in original packaging as approved by manufacturer.

Container

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General

Exposure Pattern	DNEL (Workers)	DNEL (General Population)
Oral	Not applicable	8.3 mg/kg bw/d
Dermal	13.9 mg/kg bw/day	8.3 mg/kg bw/day
Inhalation	24.5 mg/m ³	6.3 mg/m ³

As an acute toxicity hazard leading to Classification and Labeling of the substance has not been identified, the long term DNEL is considered sufficient to ensure that effects from acute exposure to the substance do not occur (in accordance with ECHA guidance on information requirements and chemical safety assessment: Chapter R.8: Characterization of dose [concentration]-response for human health, May 2008 and Part B: Hazard Assessment, Draft new chapter B.8 Scope of Exposure Assessment, March 2010).

PNEC (freshwater): 0.0011 mg/L for free Ammonia.

Exposure Limits

No Data Available

Biological Limits

No information available on biological limit values for this product.

Engineering Measures

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Adequate ventilation should be provided so that exposure limits are not exceeded.

Personal Protection Equipment

RESPIRATOR: Wear an approved respirator where dusts/vapours are generated and engineering controls are inadequate (AS1715/1716).
EYES: Safety glasses with side shields or full face shield where splashing or dust is possible (AS1336/1337).
HANDS: Chemical resistant impervious gloves (AS2161).
CLOTHING: Long-sleeved protective clothing and safety footwear (AS3765/2210).

Work Hygienic Practices

Ensure eyewash and safety shower facilities are available. Do not eat, drink or smoke in work areas. Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory, and at the end of the work period. Remove contaminated clothing and protective equipment before entering eating areas. Wash contaminated clothing before re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State

Solid

Appearance

Solid, pellets, granules

Odour

Odourless

Colour

White

pH

5 - 7 (10% solution in water)

Vapour Pressure

The vapour pressure study is not required since CN (@ No Data Available)

Relative Vapour Density

No Data Available

Boiling Point

No Data Available

Melting Point

<400°C °C

Freezing Point

No Data Available

Solubility

very soluble (> 10000 mg/L) 25°C

Specific Gravity

No Data Available

Flash Point

No Data Available

Auto Ignition Temp

No Data Available

Evaporation Rate

No Data Available

Bulk Density

1100 kg/m³

Corrosion Rate

No Data Available

Decomposition Temperature

No Data Available

Density

2.05 g/cm³ (20°C)



Specific Heat	No Data Available
Molecular Weight	No Data Available
Net Propellant Weight	No Data Available
Octanol Water Coefficient	No Data Available
Particle Size	No Data Available
Partition Coefficient	No Data Available
Saturated Vapour Concentration	No Data Available
Vapour Temperature	No Data Available
Viscosity	No Data Available
Volatile Percent	No Data Available
VOC Volume	No Data Available
Additional Characteristics	Auto ignition temperature: Will not auto ignite between room temperature and melting temperature (based on molecular structure).
Potential for Dust Explosion	Can cause explosions in contact with combustible dust or vapours.
Fast or Intensely Burning Characteristics	No Data Available
Flame Propagation or Burning Rate of Solid Materials	No Data Available
Non-Flammables That Could Contribute Unusual Hazards to a Fire	No Data Available
Properties That May Initiate or Contribute to Fire Intensity	Sensitive to mechanical impact. Occasionally explosive by shock or friction.
Reactions That Release Gases or Vapours	No Data Available
Release of Invisible Flammable Vapours and Gases	No Data Available

10. STABILITY AND REACTIVITY

Chemical Stability	The product is stable. Stable under recommended storage and handling conditions.
Conditions to Avoid	Avoid contamination by any source including metals, dust and organic materials. Keep away from heat, sparks and flame. Store away from direct sunlight.
Materials to Avoid	Incompatible with oxidizing agents, organic materials, powdered metals, ammonia, hydrazine, reducing agents, combustible materials, acids, alkalis and sources of ignition. Other calcium nitrate compounds are strong oxidizers and react violently upon contact with many organic substances, particularly textile and paper.
Hazardous Decomposition Products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous Polymerisation	Hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

General Information	<p>Oral LD50 > 300 < 2000 mg/kg bw OECD Guideline 423 (Acute Oral toxicity -Acute Toxic Class Method)</p> <p>Dermal LD50 > 2000 mg/kg bw OECD Guideline 402 (Acute Dermal Toxicity)</p> <p>Calcium Nitrate; Oral LD50 Rat: >2000mg/Kg</p> <p>Ammonium Nitrate; Oral LD50 Rat: 2217mg/Kg</p> <p>Calcium Nitrate Tetrahydrate; Oral LD50 Rat: 3900mg/Kg</p> <p>Eye Irritation: 500mg/24hr Mild (rabbit)</p> <p>Acute inhalation toxicity: No data, vapour pressure considered to be low, particle size is high.</p> <p>Sub-acute toxicity: Oral 28 day NOAEL >=1000 mg/kg bw (OECD 407, with potassium pentacalcium nitrate decahydrate)</p> <p>Reproductive toxicity: Oral 28 day NOAEL >=1500 mg/kg bw/day (OECD422 with potassium nitrate)</p>
Eyelrritant	Risk of serious eye damage. Causes irritation, redness, pain.



Ingestion	Harmful if swallowed. Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. Small amounts are unlikely to cause toxic effects. Large amounts may give rise to gastro-intestinal disorders and in extreme cases, formation of methaemoglobin (blue baby syndrome) and cyanosis (indicated by blueness around the mouth) may occur.
Inhalation	Inhalation of product dust/vapours may cause respiratory tract irritation, coughing and shortness of breath. Inhalation of nitrous gases (decomposition product) may cause edema of the lungs. Symptoms may be delayed up to 48 hours.
Skin/Irritant	Can cause itching, redness and pain.
Carcinogen Category	No Data Available

12. ECOLOGICAL INFORMATION

Ecotoxicity	<p>Toxicity:</p> <p>Fish: 48h LC50 447 mg/L</p> <p>Daphnia Magna 48h EC50 >100 mg/L</p> <p>Algae: 72h EC50 >100 mg/L NOEC 100 mg/L (OECD202)</p> <p>Inhibition of microbial activity: 3h EC50 >1000 mg/L NOEC 180 mg/L (OECD209, with sodium nitrate)</p>
Persistence/Degradability	<p>Ammonium ion is toxic to plants in large concentrations. Ammonium ion will convert to the nitrate form with accompanying acidification of the soil. Nitrate ion will leach more easily than ammonium ion, and may pollute water courses and are toxic to people (especially children) at high concentrations (methemoglobinemia). Nitrate ion will become part of the natural Nitrogen cycle by converting to nitrogen gas (N₂) or by becoming part of organisms.</p> <p>Biodegradation: Standard test is not applicable as the substance is inorganic. In addition, in the anaerobic transformation of ammonium one group of bacteria oxidizes ammonium to nitrite while another group oxidizes nitrite into nitrate. The average biodegradation rate in wastewater plant is 20 deg C is 52g N/kg dissolved solid/day. Nitrate degradation is fastest in anaerobic conditions. In the anaerobic transformation of nitrate into N₂, N₂O and NH₃, the biodegradation rate in wastewater plant at 20 deg C is 70g N/kg dissolved solid/day.</p> <p>Hydrolysis: No hydrolysable group is present, will completely dissociate into ions.</p>
Mobility	Ammonium and nitrate ions are mobile (the nitrate ion more so than ammonium ion) and will leach from soils and into water courses. Calcium ion is less mobile and will remain attached to soil constituents.
Environmental Fate	Avoid contaminating waterways, drains and sewers.
Bioaccumulation Potential	According to Annex XIII of Regulation (EC) No 1907/2006, no PBT and vPvB assessment has been conducted since nitric acid, ammonium calcium salt is inorganic.
Environmental Impact	No Data Available

13. DISPOSAL CONSIDERATIONS

General Information	Dispose of in accordance with all local, state and federal regulations. All empty packaging should be disposed of in accordance with Local, State, and Federal Regulations or recycled/reconditioned at an approved facility.
Special Precautions for Land Fill	Contact a specialist disposal company or the local waste regulator for advice. Incinerate at an approved site following all local regulations. This material may be suitable for approved landfill.

14. TRANSPORT INFORMATION

Land Transport (Australia)

ADG

Proper Shipping Name	CALCIUM NITRATE (NON-DG GRADE)
Class	No Data Available
Subsidiary Risk(s)	No Data Available



	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	208

Sea Transport

IMDG

Proper Shipping Name	CALCIUM NITRATE (NON-DG GRADE)
Class	No Data Available
Subsidiary Risk(s)	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	208
EMS	No Data Available
Marine Pollutant	No

Air Transport

IATA

Proper Shipping Name	CALCIUM NITRATE (NON-DG GRADE)
Class	No Data Available
Subsidiary Risk(s)	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available

National Transport Commission (Australia)

Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification	NOT Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)
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15. REGULATORY INFORMATION

General Information	No Data Available
Poisons Schedule (Aust)	Not scheduled

National/Regional Inventories

Australia (AICS)	Listed
Canada (DSL)	Listed
Canada (NDSL)	Not Determined
China (IECSC)	Listed
Europe (EINECS)	239-289-5



Europe (REACH)	01-2119493947-16-0016
Japan (ENCS/METI)	Listed
Korea (KECI)	Listed
Malaysia (EHS Register)	Not Determined
New Zealand (NZIoC)	Listed
Philippines (PICCS)	Listed
Switzerland (Giftliste 1)	Not Determined
Switzerland (Inventory of Notified Substances)	Not Determined
Taiwan (NCSR)	Not Determined
USA (TSCA)	Listed

16. OTHER INFORMATION

Related Product Codes	CANITR0600, CANITR1700, CANITR1701, CANITR2000, CANITR2001, CANITR2100, CANITR2101, CANITR2300, CANITR2400, CANITR2700, CANITR2800, CANITR3600, CANITR4400, CANITR4401, CANITR4500, CANITR4501, CANITR4502, CANITR4503, CANITR4504, CANITR4505, CANITR4506, CANITR5000, CANITR5001, CANITR5002, CANITR5003, CANITR5004, CANITR5005, CANITR5006, CANITR5007, CANITR5008, CANITR5009, CANITR5010, CANITR5011, CANITR5012, CANITR5600, CANITR5700, CANITR6000, CANITR6001, CANITR6002, CANITR6003, CANITR6004, CANITR6100, CANITR6200, CANITR6400, CANITR6600, CANITR6700, CANITR6800, CANITR7100, CANITR7200, CANITR7300, CANITR7400, CANITR7600, CANITR8600, CANITR9100, CANITR9500, CANITR9501, CANITR9502, CANITR9503, CANITR9504, CANITR9505, CANITR9506, CANITR9507, CANITR9508, CANITR9509, CANITR9510, CANITR9511, CANITR9512, CANITR9600, CANITR9700, CANITR9800, CANITR9900, CANITR9901, CANITR9902, CANITR9903, CANITR9904, CANITR9905, CANITR9906, CANITR9907, CANITR9908, CANITR9909, CANITR9910, CANITR9911, CANITR9912, CANITR9913, CANITR9914, CANITR9915, CANITR9916, CANITR9917, CANITR9918, CANITR9919, CANITR9920, CANITR9921, CANITR9922, CANITR9923, CANITR9924, CANITR9925, CANITR9926, CANITR9927, CANITR9928, CANITR9929, CANITR9930, CANITR9931, CANITR9932, CANITR9933, CANITR9934, CANITR9935, CANITR9936, CANITR9937, CANITR9938, CANITR9939, CANITR9940, CANITR9941, CANITR9942, CANITR9943, CANITR9944, CANITR9945, CANITR9946, CANITR9947, CANITR9948, CANITR9949, CANITR9950, CANITR9951, CANITR9952, CANITR9953, CANITR9954, CANITR9955, CANITR9956, CANITR9957, CANITR9958, CANITR9959, CANITR9960, CANITR9961, CANITR9962, CANITR9963, CANITR9964, CANITR9965, CANITR9966, CANITR9967, CANITR9968, CANITR9969, CANITR9970, CANITR9971, CANITR9972, CANITR9973, CANITR9974, CANITR9975, CANITR9976, CANITR9977, CANITR9978, CANITR9979, CANITR9980, CANITR9981, CANITR9982, CANITR9983, CANITR9984, CANITR9985, CANITR9986, CANITR9987, CANITR9988, CANITR9989, CANITR9990, CANITR9991, CANITR9992, CANITR9993, CANITR9994, CANITR9995, CANITR9996, CANITR9997, CANITR9998, CANITR9999
Revision	3
Revision Date	20 Apr 2015
Reason for Issue	Updated SDS
Key/Legend	<p>< Less Than</p> <p>> Greater Than</p> <p>AICS Australian Inventory of Chemical Substances</p> <p>atm Atmosphere</p> <p>CAS Chemical Abstracts Service (Registry Number)</p> <p>cm² Square Centimetres</p> <p>CO2 Carbon Dioxide</p> <p>COD Chemical Oxygen Demand</p> <p>deg C (°C) Degrees Celcius</p> <p>EPA (New Zealand) Environmental Protection Authority of New Zealand</p> <p>deg F (°F) Degrees Farenheit</p> <p>g Grams</p> <p>g/cm³ Grams per Cubic Centimetre</p> <p>g/l Grams per Litre</p> <p>HSNO Hazardous Substance and New Organism</p> <p>IDLH Immediately Dangerous to Life and Health</p> <p>immiscible Liquids are insoluable in each other.</p> <p>inHg Inch of Mercury</p> <p>inH2O Inch of Water</p> <p>K Kelvin</p> <p>kg Kilogram</p> <p>kg/m³ Kilograms per Cubic Metre</p> <p>lb Pound</p> <p>LC50 LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours.</p> <p>LD50 LD stands for Lethal Dose. LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals.</p> <p>ltr or L Litre</p> <p>m³ Cubic Metre</p> <p>mbar Millibar</p>



mg Milligram
mg/24H Milligrams per 24 Hours
mg/kg Milligrams per Kilogram
mg/m³ Milligrams per Cubic Metre
Misc or **Miscible** Liquids form one homogeneous liquid phase regardless of the amount of either component present.
mm Millimetre
mmH₂O Millimetres of Water
mPa.s Millipascals per Second
N/A Not Applicable
NIOSH National Institute for Occupational Safety and Health
NOHSC National Occupational Health and Safety Commission
OECD Organisation for Economic Co-operation and Development
Oz Ounce
PEL Permissible Exposure Limit
Pa Pascal
ppb Parts per Billion
ppm Parts per Million
ppm/2h Parts per Million per 2 Hours
ppm/6h Parts per Million per 6 Hours
psi Pounds per Square Inch
R Rankine
RCP Reciprocal Calculation Procedure
STEL Short Term Exposure Limit
TLV Threshold Limit Value
tne Tonne
TWA Time Weighted Average
ug/24H Micrograms per 24 Hours
UN United Nations
wt Weight



Safety Data Sheet



1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: **AMMONIUM NITRATE LIQUID**

Recommended use of the chemical and restrictions on use: Manufacture of emulsion explosives.

Supplier: Orica Australia Pty Ltd
ABN: 99 004 117 828
Street Address: 1 Nicholson Street
Melbourne 3000
Australia

Telephone Number: +61 3 9665 7111
Facsimile: +61 3 9665 7937
Emergency Telephone: **1 800 033 111 (ALL HOURS)**

Please ensure you refer to the limitations of this Safety Data Sheet as set out in the "Other Information" section at the end of this Data Sheet.

2. HAZARDS IDENTIFICATION

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

This material is hazardous according to Safe Work Australia; HAZARDOUS SUBSTANCE.

Classification of the substance or mixture:

Oxidising liquids - Category 3
Eye Irritation - Category 2A

SIGNAL WORD: WARNING



Hazard Statement(s):

H272 May intensify fire; oxidizer.
H319 Causes serious eye irritation.

Precautionary Statement(s):

Prevention:

P210 Keep away from heat / sparks / open flames / hot surfaces. No smoking.
P220 Keep / Store away from clothing / incompatible materials / combustible materials.
P221 Take any precaution to avoid mixing with combustibles / incompatible materials.
P264 Wash hands thoroughly after handling.
P280 Wear eye protection.

Response:

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 If eye irritation persists: Get medical advice/attention.
P370+P378 In case of fire: Use extinguishing media as outlined in Section 5 of this Safety Data Sheet to extinguish.

Storage:

No storage statements.

Product Name: AMMONIUM NITRATE LIQUID
Substance No: 000022035801

Issued: 24/06/2015
Version: 4

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**Disposal:**

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Poisons Schedule (SUSMP): None allocated.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Proportion	Hazard Codes
Ammonium nitrate	6484-52-2	>80%	H272 H319
Water	7732-18-5	7-15%	-
Buffering agents	-	<10%	-
Organics	-	<0.2%	-
Chlorine compounds	-	<0.02%	-

4. FIRST AID MEASURES

For advice, contact a Poisons Information Centre (e.g. phone Australia 131 126; New Zealand 0800 764 766) or a doctor.

Inhalation:

Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Skin Contact:

Caution - material can be very hot. For skin burns, immediately flood burnt area with plenty of water. For skin burns, cover with a clean, dry dressing until medical help is available.

If spilt on large areas of skin or hair, immediately drench with running water and remove clothing. Continue to wash skin and hair with plenty of water (and soap if material is insoluble) until advised to stop by the Poisons Information Centre or a doctor. Nitrates can be absorbed through cut, burnt or broken skin. Launder contaminated clothing before reuse.

Eye Contact:

Immediately wash in and around the eye area with large amounts of water for at least 15 minutes. Eyelids to be held apart. Remove clothing if contaminated and wash skin. Urgently seek medical assistance. Transport promptly to hospital or medical centre.

Ingestion:

Immediately rinse mouth with water. If swallowed, do NOT induce vomiting. Give a glass of water. Seek immediate medical assistance.

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Indication of immediate medical attention and special treatment needed:

Hot material can cause severe thermal and chemical burns due to temperature and oxidising properties. Treat initially as for scalds. Delayed shock is a possibility. This material contains up to 93% ammonium nitrate which can be absorbed through burnt skin. If exposure is suspected treat as outlined below. Clinical findings: The smooth muscle relaxant effect of nitrate salts may lead to headache, dizziness and marked hypotension.

Cyanosis is clinically detectable when approximately 15% of the haemoglobin has been converted to methaemoglobin (ie. ferric iron).

Symptoms such as headache, dizziness, weakness and dyspnoea occur when methaemoglobin concentrations are 30% to 40%; at levels of about 60%, stupor, convulsions, coma and respiratory paralysis occur and the blood is a chocolate brown colour. At higher levels death may result. Spectrophotometric analysis can determine the presence and concentration of methaemoglobin in blood.

Treatment:

1. Give 100% oxygen.
 2. In cases of (a) ingestion: use gastric lavage, (b) contamination of skin (unburnt or burnt): continue washing to remove salts.
 3. Observe blood pressure and treat hypotension if necessary.
 4. When methaemoglobin concentrations exceed 40% or when symptoms are present, give methylene blue 1 to 2 mg/kg body weight in a 1% solution by slow intravenous injection. If cyanosis has not resolved within one hour a second dose of 2 mg/kg body weight may be given. The total dose should not exceed 7 mg/kg body weight as unwanted effects such as dyspnoea, chest pain, vomiting, diarrhoea, mental confusion and cyanosis may occur. Without treatment methaemoglobin levels of 20-30% revert to normal within 3 days.
 5. Bed rest is required for methaemoglobin levels in excess of 40%.
 6. Continue to monitor and give oxygen for at least two hours after treatment with methylene blue.
 7. Consider transfer to centre where haemoperfusion can be performed to remove the nitrates from the blood if the condition of the patient is unstable.
 8. Following inhalation of oxides of nitrogen the patient should be observed in hospital for 24 hours for delayed onset of pulmonary oedema.
- Further observation for 2-3 weeks may be required to detect the onset of the inflammatory changes of bronchiolitis fibrosa obliterans.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media:

Not combustible, however, if material is involved in a fire use: Water spray (large quantities).

Unsuitable Extinguishing Media:

DO NOT USE the following as extinguishing media: Dry agent (carbon dioxide, dry chemical powder). Extinguishing methods based on smothering are ineffective in the case of oxidising agents.

Hazchem or Emergency Action Code: 1Y

Specific hazards arising from the substance or mixture:

Oxidizing substance. Non combustible, but will support combustion of other materials. Increases intensity of a fire, even in the absence of oxygen.

Special protective equipment and precautions for fire-fighters:

Caution - material can be very hot. Oxidising agent. Increases intensity of a fire. Decomposes on heating emitting toxic fumes, including those of oxides of nitrogen, ammonia and nitric acid. Heating can cause expansion or decomposition of the material, which can lead to the containers exploding. If safe to do so, remove containers from the path of fire. Keep containers cool with water spray. Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure to products of decomposition.

6. ACCIDENTAL RELEASE MEASURES

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Emergency procedures/Environmental precautions:

Clear area of all unprotected personnel. Slippery when spilt. Avoid accidents, clean up immediately. Shut off all possible sources of ignition. Do not allow the product to mix with combustible/organic materials. Caution: material can be very hot and contact may result in thermal burns. Wear protective equipment to prevent skin and eye contact and inhalation of vapours/dusts. If contamination of sewers or waterways has occurred advise local emergency services.

Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:

Contain - prevent run off into drains and waterways. Use absorbent (soil, sand or other inert material). DO NOT use combustible material. Collect and seal in properly labelled containers or drums for disposal. DO NOT return spilled material to original container. Wash area down with excess water. Ensure that contaminated material (clothing, pallets) is thoroughly washed.

7. HANDLING AND STORAGE

Precautions for safe handling:

Hot ammonium nitrate liquid can cause severe burns due to its temperature and the oxidising properties of ammonium nitrate.

Avoid skin and eye contact and breathing in vapour, mists and aerosols.

A significant risk of exposure exists when clearing blocked lines or valves. Extreme care should be taken in this situation to avoid contact with the material.

Conditions for safe storage, including any incompatibilities:

Store in a compatible, insulated, heated, bunded tank away from combustible materials. Australian Standard AS 4326 (1995) provides further guidance on storage. Avoid contamination with other chemicals. Store away from incompatible materials described in Section 10. Check regularly for leaks.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters: No value assigned for this specific material by Safe Work Australia. However, Workplace Exposure Standard(s) for possible constituents of vapour:

Ammonia: 8hr TWA = 17 mg/m³ (25 ppm), 15 min STEL = 24 mg/m³ (35 ppm)

Nitric acid: 8hr TWA = 5.2 mg/m³ (2 ppm), 15 min STEL = 10 mg/m³ (4 ppm)

Nitrogen dioxide: 8hr TWA = 5.6 mg/m³ (3 ppm), 15 min STEL = 9.4 mg/m³ (5 ppm)

Nitrous oxide (Dinitrogen monoxide): 8hr TWA = 45 mg/m³ (25 ppm)

As published by Safe Work Australia Workplace Exposure Standards for Airborne Contaminants.

TWA - The time-weighted average airborne concentration of a particular substance when calculated over an eight-hour working day, for a five-day working week.

STEL (Short Term Exposure Limit) - the airborne concentration of a particular substance calculated as a time-weighted average over 15 minutes, which should not be exceeded at any time during a normal eight hour work day. According to current knowledge this concentration should neither impair the health of, nor cause undue discomfort to, nearly all workers.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

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Appropriate engineering controls:

Ensure ventilation is adequate and that air concentrations of components are controlled below quoted Workplace Exposure Standards. If inhalation risk exists: Use with local exhaust ventilation or while wearing air supplied mask.

If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented risk assessment using the relevant Orica Personal Protection Guide information (refer to PPE section below) as a basis must be carried out to determine the minimum PPE requirements.

Individual protection measures, such as Personal Protective Equipment (PPE):

The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

Orica Personal Protection Guide No. 1, 1998: D - OVERALLS, CHEMICAL GOGGLES, FACE SHIELD, GLOVES (Long), APRON, RUBBER BOOTS.



Wear overalls and boots or chemically resistant suit, face shield, elbow-length impervious gloves. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

If determined by a risk assessment an inhalation risk exists, wear an air supplied respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Hot (130°C max.) Liquid
Colour:	Clear , Colourless
Odour:	Depending on pH, material can have irritating odour of ammonia (high pH) or nitric acid (low pH).
Solubility:	Miscible with water.
Specific Gravity:	1.35
Relative Vapour Density (air=1):	Not available
Vapour Pressure (20 °C):	Not available
Flash Point (°C):	Not applicable.
Flammability Limits (%):	Not applicable
Autoignition Temperature (°C):	Not available
% Volatile by Volume:	Not available
Solubility in water (g/L):	Miscible
Boiling Point/Range (°C):	Not available
Decomposition Point (°C):	Not available
pH:	5-7
Viscosity:	Not available

10. STABILITY AND REACTIVITY

Reactivity: Oxidising agents may cause exothermic reactions.

Product Name: AMMONIUM NITRATE LIQUID
Substance No: 000022035801

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Chemical stability:	Ammonium nitrate is a powerful oxidising agent. When heated to decomposition (unconfined) it produces nitrous oxide, white ammonium nitrate fumes and water. When mixed with strong acids, and occasionally during blasting, it produces an irritating toxic brown gas, mostly of nitrogen dioxide. When molten may decompose violently due to shock or pressure.
Possibility of hazardous reactions:	Oxidising agent. Supports combustion of other materials and increases intensity of a fire. Will react with organic materials, and reducing agents. Hazardous polymerisation will not occur.
Conditions to avoid:	Avoid contact with combustible substances. Avoid contact with other chemicals. Will react with organic materials and reducing agents.
Incompatible materials:	Incompatible with reducing agents. Incompatible with combustible materials. Incompatible with acids. Incompatible with alkalis. Incompatible with copper, zinc, brass and bronze.
Hazardous decomposition products:	Oxides of nitrogen. Ammonia. Nitric acid.

11. TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion:	Swallowing can result in nausea, vomiting, diarrhoea, abdominal pain and chemical burns to the gastrointestinal tract. Swallowing large amounts may result in headaches, dizziness and a reduction in blood pressure (hypotension). Material can be very hot and exposure can result in severe thermal burns.
Eye contact:	Contact with the hot material can result in pain, thermal burns, and permanent injury. An eye irritant.
Skin contact:	Contact with hot material may cause skin burns. Can be absorbed through cut, broken, or burnt skin with resultant adverse effects. See effects as noted under 'Toxicological Data'.
Inhalation:	Vapour and processing fumes may cause irritation to mucous membranes of the respiratory tract, headache and nausea. May cause shortness of breath, severe headaches and lung effects.

Acute toxicity: No LD50 data available for the product. For the constituent AMMONIUM NITRATE: (1): Oral LD50 (rat): 2217 mg/kg.

Chronic effects: No information available for the product.

Following the ingestion of nitrates in humans and animals methaemoglobinaemia has occurred. NITRATES: Absorption of nitrates by ingestion, inhalation or through burnt or broken skin may cause dilation of the blood vessels by direct smooth muscle relaxation with a subsequent lowering of blood pressure and may also cause breathing difficulties, blueness of the skin (cyanosis) and methaemoglobinaemia.

12. ECOLOGICAL INFORMATION

Ecotoxicity	Avoid contaminating waterways.
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Substance No: 000022035801

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**Aquatic toxicity:**

For AMMONIUM NITRATE: Ammonium nitrate was evaluated at 5, 10, 25 and 50 mg (NH₄⁺)/L.
The fertility of *Daphnia magna* was decreased at 50 mg/L. Post embryonic growth of crustacea was impaired at 10, 25 and 50 mg/L.

13. DISPOSAL CONSIDERATIONS

Disposal methods:

Refer to Waste Management Authority. Dispose of contents/container in accordance with local/regional/national/international regulations. Allow material to cool and solidify. Empty containers must be decontaminated by rinsing thoroughly with water. Rinsing water needs to be disposed of carefully.

14. TRANSPORT INFORMATION

Road and Rail Transport

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.



UN No: 2426
Transport Hazard Class: 5.1 Oxidizing Agent
Proper Shipping Name or Technical Name: AMMONIUM NITRATE, LIQUID
Hazchem or Emergency Action Code: 1Y

Marine Transport

Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; DANGEROUS GOODS.

UN No: 2426
Transport Hazard Class: 5.1 Oxidizing Agent
Proper Shipping Name or Technical Name: AMMONIUM NITRATE, LIQUID

IMDG EMS Fire: F-H
IMDG EMS Spill: S-Q

Air Transport

TRANSPORT PROHIBITED under the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air in Passenger and Cargo Aircraft, and Cargo Aircraft Only.

15. REGULATORY INFORMATION

Classification:

This material is hazardous according to Safe Work Australia; HAZARDOUS SUBSTANCE.

Classification of the substance or mixture:

Oxidising liquids - Category 3
Eye Irritation - Category 2A

Product Name: AMMONIUM NITRATE LIQUID
Substance No: 000022035801

Issued: 24/06/2015
Version: 4

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**Hazard Statement(s):**

H272 May intensify fire; oxidizer.

H319 Causes serious eye irritation.

Poisons Schedule (SUSMP): None allocated.

All the constituents of this material are listed on the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION

(1) 'Registry of Toxic Effects of Chemical Substances'. Ed. D. Sweet, US Dept. of Health & Human Services: Cincinnati, 2015.

This safety data sheet has been prepared by Ixom Operations Pty Ltd Toxicology & SDS Services.

Reason(s) for Issue:

5 Yearly Revised Primary SDS

Alignment to Safe Work Australia requirements

Alignment to GHS requirements

Alignment to HSNO requirements

Change in Hazardous Substance Classification

This SDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Orica Limited cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Orica representative or Orica Limited at the contact details on page 1.

Orica Limited's responsibility for the material as shipped is subject to the terms and conditions of sale, a copy of which is available upon request.



Material Safety Data Sheet

Date of Preparation September 3, 2013

Section 1 - Chemical Product and Company Identification

Product Name: EMRO 60 HT
 Chemical Name: Severely Hydrotreated Light Naphthenic Distillate
 Chemical family: Petroleum Distillate
 Chemical Formula: Not Applicable
 CAS Number: 64742-53-6

EMERGENCY TELEPHONE NUMBERS:

Environmental Management of KC, Inc. (913) 287-1575
 HAZ- MAT Response 1-800-229-5252 After Business

Section 2 - Product Ingredient

A complex combination of hydrocarbons obtained by treating a petroleum fraction with hydrogen in the presence of a catalyst. It consists of hydrocarbons having carbon numbers predominantly in the range of C15 through C30 with a finished oil viscosity near 60 SUS @ 100 F.

Ingredient Name				CAS Number		%	
Severely Hydrotreated Light Naphthenic Petroleum Oil				64742-53-6		100%	
	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH
Severely Hydrotreated Light Naphthenic Petroleum Oil	5 mg/m ³ (oil mist)	none estab.	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	none estab.	none estab.	none estab.

Section 3 - Hazards Identification

Emergency Overview: Not expected to cause a severe emergency hazard.

Potential Health Effects: Primary Entry Routes: Skin

Inhalation: Inhalation of vapors or mist may be irritating to respiratory passages.

Prolonged exposure may result in dizziness and nausea.

Eye: Eye contact may result in irritation and redness.

Skin: Prolonged and repeated contact can de-fat the skin which may result in dryness, dermatitis, and cracking of the skin. Ingestion: May result in nausea or stomach discomfort.

Meets EU requirement of less than 3% (w/w) DMSO extract for total polycyclic aromatic compound (PAC) using IP 346.

Medical Conditions Aggravated by Long-Term Exposure: Personnel with pre-existing skin disorders should avoid contact with this product.

HMIS	
H	1
F	1
R	0
PPE	B

Section 4 - First Aid Measures

Inhalation: Remove to fresh air. Assist breathing if necessary. Seek medical help.

Eye Contact: Wash with water. If irritation or redness persists seek medical help.

Skin Contact: Wash thoroughly with soap and water. Remove contaminated clothing.

Ingestion: If swallowed, observe for signs of stomach discomfort or nausea. If symptoms persist, seek medical

Section 5 - Fire-Fighting Measures

Flash Point: 295 F (145 C)

Flash Point Method: COC

Burning Rate: Not Available

Lower Explosive Level (LEL)%: 0.6

Upper Explosive Level (UEL%): 7.0

Auto-ignition Temperature: 770 F

Flammability Classification: OSHA Class IIIB, Combustible Liquid

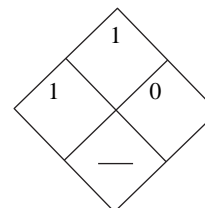
Extinguishing Media: Halon, dry chemical, foam, CO2 and water mist or fog.

Unusual Fire or Explosion Hazards: Do not use forced stream as this could cause fire to spread.

Combustion Products: fumes, smoke and carbon monoxide.

Fire-Fighting Instructions and Equipment: Use water to cool containers exposed to flames. Do not enter enclosed or a confined work space without proper protective equipment. Firefighting personnel should wear respiratory protection (positive pressure if available).

NFPA



Section 6 - Accidental Release Measures

Spill/Leak Procedures: Stop spill at source if possible without risk. Contain spill. Eliminate sources of ignition.

Use non-flammable absorbent material.

Section 7 - Handling and Storage

Handling and Storage Precautions: Keep away from flames, sparks or hot surfaces. Never use a torch to cut or weld on or near container. Empty oil containers can contain explosive vapors. NFPA Class IIIB storage. Wash thoroughly after handling.

Work/Hygienic Practices: Wash hands with soap and water before eating, drinking, smoking or use of toilet facilities. Do not use gasoline, kerosene, solvents or harsh abrasive skin cleaners for washing exposed skin areas. Take a shower after work if general contact occurs. Remove oil-soaked clothing and laundry before reuse. Discard contaminated shoes and leather gloves.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Adequate ventilation is required where excessive heating or agitation may occur to maintain concentration below exposure limits.

Eye / Face Protection: Safety glasses or face shield where splashing is possible.

Skin Protection: As needed to prevent repeated skin contact. Solvent resistant gloves should be used.

Respiratory Protection: Not normally needed. Respirator should be used in areas where vapor concentrations are excessive due to high temperatures or where oil misting occurs.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: Clear/bright straw liquid

Odor: Mild Petroleum Odor

Odor Threshold: Not Determined

Vapor Pressure, PSIA: <0.2

Vapor Density: (Air=1); >1

Specific Gravity (H2O=1): 0.88

Water Solubility: Negligible

Boiling Point: 500-700 F (260-370 C)

Melting Point: -40 F (-55 C)

Decomposition Temperature: >900 F

Evaporation Rate: Not Available

pH: 7.29

Section 10 - Stability and Reactivity

Stability: Stable

Polymerization: Polymerization will not occur.

Chemical Incompatibilities: Strong Oxidizers

Conditions to Avoid (Stability): Sources of Ignition.

Hazardous Decomposition Products: Combustion products include carbon dioxide and carbon monoxide.

Section 11 - Toxicological Information

Acute Studies: Tests on similar materials show a low order of acute oral and dermal toxicity.

Eye Effects: Minimal irritation on contact.

Skin Effects: Practically non-toxic if absorbed. May cause mild irritation with prolonged and repeated exposure.

Acute Oral Effects: Tests on similar materials indicate low order of acute oral toxicity.

Acute Inhalation Effects: Low acute toxicity expected on inhalation.

This product is severely Hydrotreated. Severely Hydrotreated naphthenic petroleum oils have not been found to be carcinogenic or potential carcinogens.

Section 12 - Ecological Information

Aquatic Release: Advise authorities if product has entered or may enter watercourses or sewer drain.

Section 13 - Disposal Considerations

Follow Federal, State and Local Regulations. Not a RCRA hazardous waste if uncontaminated. If "used", RCRA criteria be determined. Do not flush to drain/storm sewer. Contract to authorized disposal service. If permitted incineration may be practical. Consider recycling.

Section 14 - Transport Information

Proper Shipping Name: Not regulated by DOT (Contains Oil)

Hazard Class: Not Applicable

DOT ID No.: Not Applicable

Dot Shipping Label: Not regulated by DOT

Section 15 - Regulatory Information

U.S. Federal Regulatory Information:

SARA 311 Categories:	Immediate (Acute) Health Effects	No
	Delayed (Chronic) Health Effects	No
	Fire Hazard	No
	Sudden Release of Pressure Hazard	No
	Reactivity Hazard	No

EPA/TSCA Inventory: The components of this product are listed on the EPA/TSCA inventory of chemicals.

Section 16 - Other Information

NFPA Hazard Rating:	Health	1 Slight
	Fire	1 Slight
	Reactivity	0 Least

Disclaimer: Environmental Management of K.C., Inc. believes this information is accurate but not all inclusive in all circumstances. It is the responsibility of the user to determine suitability of the material for their purposes. No warranty, expressed or implied, is given.

SAFETY DATA SHEET

1. Identification of the substance or mixture and of the supplier

Product identifier

Product name: **MX 12**

Additional identification

Chemical name: Mixture
CAS-No.: Not applicable.

Recommended use and restriction on use

Recommended use: Not determined.
Restrictions on use: Not determined.

Details of the supplier of the safety data sheet

Supplier

Company Name: LUBRIZOL INTERNATIONAL, INC.
Address: 28 RIVER STREET
SILVERWATER NSW, 2128
AU
Telephone: TEL: (02) 9741-5200

Emergency telephone number:

FOR TRANSPORT EMERGENCY CALL CHEMTREC (+1) 703 527 3887 OR WITHIN AUSTRALIA (02) 9037 2994 (LUBRIZOL)

2. Hazards Identification

Classification of the substance or mixture

Prepared according to Global Harmonized System (GHS) standards.

Not classified

Label Elements not applicable
Other hazards which do not result in GHS classification: None identified.

3. Composition/Information on Ingredients

Mixtures

Chemical name	CAS number	Percent by Weight
Mineral oil	74869-22-0	40 - 50%

4. First aid measures

Description of first aid measures

Inhalation: Remove exposed person to fresh air if adverse effects are observed.

Eye contact: Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses.

Skin Contact: Wash with soap and water. Get medical attention if symptoms occur. Launder contaminated clothing before reuse.

Ingestion: Treat symptomatically. Get medical attention.

Most important symptoms and effects, both acute and delayed: See section 11.

Indication of any immediate medical attention and special treatment needed

Treatment: Treat symptomatically.

5. Fire-fighting measures

General Fire Hazards: No unusual fire or explosion hazards noted.

Extinguishing media

Suitable extinguishing media: CO₂, Dry chemical or Foam. Water can be used to cool and protect exposed material.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazard arising from the chemical: A solid stream of water will spread the burning material. Material creates a special hazard because it floats on water. See section 10 for additional information. Water may cause splattering.

Advice for firefighters

Special fire fighting procedures: No data available.

Special protective equipment for fire-fighters: Wear full protective firegear including self-containing breathing apparatus operated in the positive pressure mode with full facepiece, coat, pants, gloves and boots.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Personal Protective Equipment must be worn, see Personal Protection Section for PPE recommendations.

Environmental Precautions: Avoid release to the environment. Do not contaminate water sources or sewer. Environmental manager must be informed of all major spillages. Prevent further leakage or spillage if safe to do so.

Methods and material for containment and cleaning up: Dike far ahead of larger spill for later recovery and disposal. Pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material.

Reference to other sections: See sections 8 and 13 for additional information.

7. Handling and Storage:

Precautions for safe handling: Do not mix with inorganic nitrites or organic nitro compounds, nitrites or nitrates. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or grounding procedures. Use grounding and bonding connection when transferring material. In case of spills, beware of slippery floors and surfaces. Observe good industrial hygiene practices. Provide adequate ventilation. Wear appropriate personal protective equipment.

Maximum Handling Temperature: 71 °C 160 °F

Conditions for safe storage, including any incompatibilities: Store away from incompatible materials. See section 10 for incompatible materials.

Maximum Storage Temperature: 45 °C 113 °F

8. Exposure Controls/Personal Protection

Control Parameters:

Occupational Exposure Limits

Chemical name	type	Exposure Limit Values	Source
Mineral oil - Inhalable fraction.	TWA	5 mg/m3	US. ACGIH Threshold Limit Values (03 2014)

Appropriate engineering controls: No special requirements under ordinary conditions of use and with adequate ventilation. Adequate ventilation should be provided so that exposure limits are not exceeded.

Individual protection measures, such as personal protective equipment

General information: Use personal protective equipment as required.

Eye/face protection: If contact is likely, safety glasses with side shields are recommended.

Skin protection

Hand Protection: Use nitrile or neoprene gloves. Use good industrial hygiene practices. In case of skin contact, wash hands and arms with soap and water.

Other: Long sleeve shirt is recommended. Do not wear rings, watches or similar apparel that could entrap the material.

Respiratory Protection: Use disposable dust/mist mask if the recommended exposure limit is exceeded. Consult with an industrial hygienist to determine the appropriate respiratory protection for your specific use of this material. A respiratory protection program compliant with all applicable regulations must be followed whenever workplace conditions require the use of a respirator. Use self-contained breathing apparatus for entry into confined space, for other poorly ventilated areas and for large spill clean-up sites.

Hygiene measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Appearance

Physical state: liquid
Form: liquid
Color: Amber

Odor: Mild

Odor Threshold: No data available.

pH:	No data available.
Freezing point:	No data available.
Boiling Point:	No data available.
Flash Point:	168 °C (Pensky-Martens Closed Cup)
Evaporation Rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability Limit - Upper (%):	No data available.
Flammability Limit - Lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density (air=1):	No data available.
Relative density:	0,903 - 0,943 (15,6 °C)
Solubility(ies)	
Solubility in Water:	Insoluble in water
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Autoignition Temperature:	No data available.
Decomposition Temperature:	No data available.
Viscosity:	142 mm ² /s (100 °C); 3 100 - 6 100 mm ² /s (40 °C)
Explosive properties:	No data available.
Oxidizing properties:	No data available.
Pour Point Temperature	-10 °C
Other information	
Bulk density:	7,69 lb/gal (25 °C)

10. Stability and Reactivity

Reactivity:	No data available.
Chemical Stability:	Material is stable under normal conditions.
Possibility of Hazardous Reactions:	Will not occur.
Conditions to Avoid:	Do not expose to excessive heat, ignition sources, or oxidizing materials.
Incompatible Materials:	Strong oxidizing agents.
Hazardous Decomposition Products:	Thermal decomposition or combustion may generate smoke, carbon monoxide, carbon dioxide , nitrogen oxides, and other products of incomplete combustion.

11. Toxicological Information

Information on likely routes of exposure

Inhalation:	No data available.
Ingestion:	No data available.
Skin Contact:	No data available.
Eye contact:	No data available.

Information on toxicological effects

Acute toxicity

Oral

Product: Not classified for acute toxicity based on available data.

Dermal

Product: Not classified for acute toxicity based on available data.

Inhalation

Product: Not classified for acute toxicity based on available data.

Skin Corrosion/Irritation:

Product: Not classified as a primary skin irritant.

Serious Eye Damage/Eye Irritation:

Product: Remarks: Not classified as a primary eye irritant.

Respiratory sensitization:

Mineral oil Classification: Not a skin sensitizer. (Literature) Not a skin sensitizer.

Skin sensitization:

No data available

Specific Target Organ Toxicity - Single Exposure:

Mineral oil May cause irritation to the mucous membranes and upper respiratory tract.

Aspiration Hazard:

Product: May be fatal if swallowed and enters airways.

Chronic Effects

Carcinogenicity:

No data available

Germ Cell Mutagenicity:

No data available

Reproductive toxicity:

No data available

Specific Target Organ Toxicity - Repeated Exposure:

No data available

12. Ecological Information

Ecotoxicity

Fish

Mineral oil LC 50 (Fathead Minnow, 4 d): > 100 mg/l

Aquatic Invertebrates

Mineral oil EC 50 (Water flea (Daphnia magna), 2 d): > 10 000 mg/l
NOEC (Water flea (Daphnia magna), 21 d): > 10 mg/l

Toxicity to Aquatic Plants

Mineral oil EC 50 (Alga, 3 d): > 100 mg/l

Toxicity to soil dwelling organisms

No data available

Sediment Toxicity

No data available

Toxicity to Terrestrial Plants

No data available

Toxicity to Above-Ground Organisms

No data available

Toxicity to microorganisms

No data available

Persistence and Degradability**Biodegradation**

Mineral oil

2 %, 28 d, Not readily degradable.

Bioaccumulative Potential**Bioconcentration Factor (BCF)**

No data available

Partition Coefficient n-octanol / water (log K_{ow})

No data available

Mobility:

No data available

Other Adverse Effects:

No data available.

13. Disposal Considerations**Disposal methods:**

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations. Since emptied containers retain product residue, follow label warnings even after container is emptied.

Contaminated Packaging:

Container packaging may exhibit hazards.

14. Transport Information**IATA**

Not regulated.

ADR

Not regulated.

International standards**IMDG**

Not regulated.

Code of Emergency Measure:**Domestic Standard:** In compliance with domestic law.**Environmental hazards:**

Not regulated.

Special precautions for user:

No special precautions.

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

None known.

Shipping descriptions may vary based on mode of transport, quantities, temperature of the material, package size, and/or origin and destination. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material. For transportation, steps must be taken to prevent load shifting or materials falling, and all relating legal statutes should be obeyed. Review classification requirements before shipping materials at elevated temperatures.

15. Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.:

Inventory Status

Australia (AICS)

All components are in compliance with chemical notification requirements in Australia.

Canada (DSL/NDSL)

All components are in compliance with the Canadian Environmental Protection Act and are present on the Domestic Substances List.

China (IECSC)

All components of this product are listed on the Inventory of Existing Chemical Substances in China.

European Union (REACH)

To obtain information on the REACH compliance status of this product, please visit Lubrizol.com/REACH, or e-mail us at REACH_MSDS_INQUIRIES@Lubrizol.com

Japan (ENCS)

This product requires notification in Japan.

Korea (ECL)

All components are in compliance in Korea.

New Zealand (NZIoC)

All components are in compliance with chemical notification requirements in New Zealand.

Philippines (PICCS)

All components are in compliance with the Philippines Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (R.A. 6969).

Switzerland (SWISS)

All components are in compliance with the Environmentally Hazardous Substances Ordinance in Switzerland.

Taiwan (TCSCA)

All components of this product are listed on the Taiwan inventory.

United States (TSCA)

All components of this material are on the US TSCA Inventory.

The information that was used to confirm the compliance status of this product may deviate from the chemical information shown in Section 3.

16. Other Information

Key literature references and sources for data: Internal company data and other publically available resources.

HMIS Hazard ID

Health	1
Flammability	1
Physical Hazards	0

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible; *Chronic health effect

NFPA Hazard ID



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date: 21.05.2015

Disclaimer: As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local regulations remains the responsibility of the user.

SAFETY DATA SHEET

Automotive Diesel Fuel



Section 1. Identification

GHS product identifier	Automotive Diesel Fuel
Other means of identification	G10, BP 10 ppm diesel fuel, Ultra Low Sulphur diesel Fuel, Automotive Diesel Fuel AD 20 , AD40, ALPINE DIESEL, Biodiesel B5
Product code	0000002718
SDS no.	0000002718
Historic SDS no.	AD0K1
<u>Relevant identified uses of the substance or mixture and uses advised against</u>	
Use of the substance/ mixture	Fuel for compression ignition diesel engines.
Manufacturer	
Supplier	BP Australia Pty Ltd Level 17, 717 Bourke Street Docklands, Victoria 3008 ABN 53 004 085 616 www.bp.com.au Technical Helpline Number: 1300 139 700
EMERGENCY TELEPHONE NUMBER	1800 638 556

Section 2. Hazard(s) identification

Classification of the substance or mixture	FLAMMABLE LIQUIDS - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SKIN CORROSION/IRRITATION - Category 2 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (bone marrow, liver and thymus) - Category 2 ASPIRATION HAZARD - Category 1
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GHS label elements

Hazard pictograms



Signal word

DANGER

Hazard statements

H227 - Combustible liquid.
H332 - Harmful if inhaled.
H315 - Causes skin irritation.
H351 - Suspected of causing cancer.
H304 - May be fatal if swallowed and enters airways.
H373 - May cause damage to organs through prolonged or repeated exposure. (bone marrow, liver, thymus)

Precautionary statements

General

P103 - Read label before use.
P102 - Keep out of reach of children.
P101 - If medical advice is needed, have product container or label at hand.

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Section 2. Hazard(s) identification

Prevention	P201 - Obtain special instructions before use. P260 - Do not breathe vapour. P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing. P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P241 - Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. P273 - Avoid release to the environment.
Response	P314 - Get medical attention if you feel unwell. P308 + P313 - IF exposed or concerned: Get medical attention. P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. P301 + P310 + P331 - IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. P302 + P352 + P362-2 + P363 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse. P332 + P313 - If skin irritation occurs: Get medical attention.
Storage	P405 - Store locked up. P403 - Store in a well-ventilated place. P235 - Keep cool.
Disposal	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
Supplemental label elements	Not applicable.
Other hazards which do not result in classification	This material may contain significant quantities of polycyclic aromatic hydrocarbons, some of which have been shown by experimental studies to induce skin cancer. Note: High Pressure Applications Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency. See 'Notes to physician' under First-Aid Measures, Section 4 of this Safety Data Sheet.

Section 3. Composition and ingredient information

Substance/mixture	Mixture	
May contain Fatty Acid Methyl Esters (FAME). May also contain small quantities of proprietary performance additives. Contains small quantities of polycyclic aromatic hydrocarbons (PAHs).		
Ingredient name	% (w/w)	CAS number
Fuels, diesel	> 95	68334-30-5
Alkanes, C10-20-branched and linear	0 - 20	928771-01-1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Check for and remove any contact lenses. Get medical attention.
Inhalation	If inhaled, remove to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Get medical attention.

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Section 4. First aid measures

Skin contact

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Clean shoes thoroughly before reuse. Drench contaminated clothing with water before removing. This is necessary to avoid the risk of sparks from static electricity that could ignite contaminated clothing. Contaminated clothing is a fire hazard. Contaminated leather, particularly footwear, must be discarded. Get medical attention.

Ingestion

Do not induce vomiting. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Aspiration hazard if swallowed. Can enter lungs and cause damage. Get medical attention immediately.

Most important symptoms/effects, acute and delayed

See Section 11 for more detailed information on health effects and symptoms.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician

Treatment should in general be symptomatic and directed to relieving any effects. Product can be aspirated on swallowing or following regurgitation of stomach contents, and can cause severe and potentially fatal chemical pneumonitis, which will require urgent treatment. Because of the risk of aspiration, induction of vomiting and gastric lavage should be avoided. Gastric lavage should be undertaken only after endotracheal intubation. Monitor for cardiac dysrhythmias.

Note: High Pressure Applications

Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency. Injuries may not appear serious at first but within a few hours tissue becomes swollen, discoloured and extremely painful with extensive subcutaneous necrosis.

Surgical exploration should be undertaken without delay. Thorough and extensive debridement of the wound and underlying tissue is necessary to minimise tissue loss and prevent or limit permanent damage. Note that high pressure may force the product considerable distances along tissue planes.

Specific treatments

No specific treatment.

Protection of first-aiders

No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Section 5. Firefighting measures

Extinguishing media

Suitable extinguishing media

In case of fire, use water fog, foam, dry chemical or carbon dioxide extinguisher or spray.

Unsuitable extinguishing media

Do not use water jet.

Specific hazards arising from the chemical

Combustible liquid. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

Hazardous thermal decomposition products

Combustion products may include the following:
carbon dioxide
carbon monoxide
other hazardous substances.

Section 5. Firefighting measures

Special protective actions for fire-fighters

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters

Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Hazchem code

3z

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Immediately contact emergency personnel. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Put on appropriate personal protective equipment. Floors may be slippery; use care to avoid falling. Eliminate all ignition sources.

For emergency responders

Entry into a confined space or poorly ventilated area contaminated with vapour, mist or fume is extremely hazardous without the correct respiratory protective equipment and a safe system of work. Wear self-contained breathing apparatus. Wear a suitable chemical protective suit. Chemical resistant boots. See also the information in "For non-emergency personnel".

Environmental precautions

Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Methods and material for containment and cleaning up

Small spill

Eliminate all ignition sources. Stop leak if without risk. Move containers from spill area. Absorb with an inert material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. The method and equipment used must be in conformance with appropriate regulations and industry practice on explosive atmospheres.

Large spill

Eliminate all ignition sources. Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Dike spill area and do not allow product to reach sewage system and surface or ground water. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Use spark-proof tools and explosion-proof equipment. Contaminated absorbent material may pose the same hazard as the spilt product. The method and equipment used must be in conformance with appropriate regulations and industry practice on explosive atmospheres. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and storage

Precautions for safe handling

Protective measures

Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Avoid contact of spilt material and runoff with soil and surface waterways. Empty containers retain product residue and can be hazardous. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Do not reuse container. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Do not breathe vapour or mist. Avoid exposure -

Section 7. Handling and storage

Advice on general occupational hygiene

obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not swallow. Aspiration hazard if swallowed. Can enter lungs and cause damage. Never siphon by mouth.

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Wash thoroughly after handling. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidising materials. Keep container tightly closed and sealed until ready for use. Store and use only in equipment/containers designed for use with this product. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

As a precaution, tank headspaces should always be regarded as potentially flammable and care should be taken to avoid static electrical discharge and all ignition sources during filling, ullaging and sampling from storage tanks. Do not enter storage tanks. If entry to vessels is necessary, follow permit to work procedures. When the product is pumped (e.g. during filling, discharge or ullaging) and when sampling, there is a risk of static discharge. Ensure equipment used is properly earthed or bonded to the tank structure. Electrical equipment should not be used unless it is intrinsically safe (i.e. will not produce sparks). Explosive air/vapour mixtures may form at ambient temperature. If product comes into contact with hot surfaces, or leaks occur from pressurised fuel pipes, the vapour or mists generated will create a flammability or explosion hazard. Product contaminated rags, paper or material used to absorb spillages, represent a fire hazard, and should not be allowed to accumulate. Dispose of safely immediately after use. Entry into a confined space or poorly ventilated area contaminated with vapour, mist or fume is extremely hazardous without the correct respiratory protective equipment and a safe system of work.

Section 8. Exposure controls and personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Fuels, diesel	ACGIH TLV (United States). Absorbed through skin. TWA: 100 mg/m ³ , (measured as total hydrocarbons) 8 hours. Issued/Revised: 1/2007 Form: Inhalable fraction and vapor

Appropriate engineering controls

All activities involving chemicals should be assessed for their risks to health, to ensure exposures are adequately controlled. Personal protective equipment should only be considered after other forms of control measures (e.g. engineering controls) have been suitably evaluated. Personal protective equipment should conform to appropriate standards, be suitable for use, be kept in good condition and properly maintained.

Your supplier of personal protective equipment should be consulted for advice on selection and appropriate standards. For further information contact your national organisation for standards.

Provide exhaust ventilation or other engineering controls to keep the relevant airborne concentrations below their respective occupational exposure limits.

The final choice of protective equipment will depend upon a risk assessment. It is

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Section 8. Exposure controls and personal protection

Environmental exposure controls

important to ensure that all items of personal protective equipment are compatible.

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

Chemical splash goggles.

Skin protection

Hand protection

Wear chemical resistant gloves.

Protective gloves must give suitable protection against mechanical risks (i.e. abrasion, blade cut and puncture). Protective gloves will deteriorate over time due to physical and chemical damage. Inspect and replace gloves on a regular basis. The frequency of replacement will depend upon the circumstances of use.

Recommended: Nitrile gloves.

Skin protection

Use of protective clothing is good industrial practice.

Cotton or polyester/cotton overalls will only provide protection against light superficial contamination that will not soak through to the skin. Overalls should be laundered on a regular basis. When the risk of skin exposure is high (e.g. when cleaning up spillages or if there is a risk of splashing) then chemical resistant aprons and/or impervious chemical suits and boots will be required.

Wear suitable protective clothing.

Footwear highly resistant to chemicals.

When there is a risk of ignition from static electricity, wear anti-static protective clothing. For greatest effectiveness against static electricity, overalls, boots and gloves should all be anti-static.

When there is a risk of ignition wear inherently fire resistant protective clothes and gloves.

Work clothing / overalls should be laundered on a regular basis. Laundering of contaminated work clothing should only be done by professional cleaners who have been told about the hazards of the contamination. Always keep contaminated work clothing away from uncontaminated work clothing and uncontaminated personal clothes.

When the risk of skin exposure is high (from experience this could apply to the following tasks: cleaning work, maintenance and service, filling and transfer, taking samples and cleaning up spillages) then a chemical protective suit and boots will be required.

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Recommended: overall

Other skin protection

Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection

Use with adequate ventilation.

In case of insufficient ventilation, wear suitable respiratory equipment.

If there is a requirement for the use of a respiratory protective device, but the use of breathing apparatus (independent of ambient atmosphere) is not required, then a suitable filtering device must be worn.

The filter class must be suitable for the maximum contaminant concentration (gas/vapour/aerosol/particulates) that may arise when handling the product.

The correct choice of respiratory protection depends upon the chemicals being handled, the conditions of work and use, and the condition of the respiratory

Section 8. Exposure controls and personal protection

equipment. Safety procedures should be developed for each intended application. Respiratory protection equipment should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

Recommended: If ventilation is inadequate, use respirator that will protect against organic vapour and dust/mist.

[Refer to standards:](#)

Respiratory protection: AS/NZS 1715 and AS/NZS 1716

Gloves: AS/NZS 2161.1

Eye protection: AS/NZS 1336 and AS/NZS 1337

Section 9. Physical and chemical properties

[Appearance](#)

Physical state	Liquid.
Colour	Water white to straw including fluorescent green, blue or yellow.
Odour	Mild
Odour threshold	Not available.
pH	Not available.
Melting point	Not available.
Boiling point	180 to 380°C (356 to 716°F)
Flash point	Closed cup: >61.5°C (>142.7°F) [Pensky-Martens.]
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable. Based on - Physical state
Lower and upper explosive (flammable) limits	Lower: 0.5% Upper: 7.5%
Vapour pressure	0.1 kPa (0.755 mm Hg)
Vapour density	Not available.
Relative density	0.83
Density	820 to 850 kg/m ³ (0.82 to 0.85 g/cm ³) at 15°C
Solubility	Not available.
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature	240°C (464°F)
Decomposition temperature	Not available.
Viscosity	Kinematic: 2 to 4.5 mm ² /s (2 to 4.5 cSt) at 40°C

Section 10. Stability and reactivity

Reactivity	No specific test data available for this product. Refer to Conditions to avoid and Incompatible materials for additional information.
Chemical stability	The product is stable.
Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous polymerisation will not occur.
Conditions to avoid	Avoid all possible sources of ignition (spark or flame). Avoid excessive heat.
Incompatible materials	Reactive or incompatible with the following materials: oxidising materials.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Fuels, diesel	LC50 Inhalation Dusts and mists	Rat	4.1 mg/l	4 hours
	LD50 Dermal	Rabbit	>4300 mg/kg	-
	LD50 Dermal	Rabbit	>4300 mg/kg	-
	LD50 Oral	Rat	17900 mg/kg	-
	LD50 Oral	Rat	7600 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Fuels, diesel	Skin - Irritation	Rabbit	-	-	-
	Skin - Irritation	Rabbit	-	-	-
	Eyes - Non-irritating to the eyes.	Rabbit	-	-	-
	Eyes - Non-irritating to the eyes.	Rabbit	-	-	-

Skin

Causes skin irritation.

Sensitisation

Product/ingredient name	Route of exposure	Species	Result
Fuels, diesel	skin	Guinea pig	Not sensitising
	skin	Guinea pig	Not sensitising

Mutagenicity

Product/ingredient name	Test	Experiment	Result
Fuels, diesel	OECD 471	Experiment: In vitro Subject: Non-mammalian species	Positive
	Equivalent to OECD 476	Experiment: In vitro Subject: Mammalian-Animal Cell: Germ	Negative
	not guideline	Experiment: In vivo Subject: Unspecified Cell: Somatic	Negative

Conclusion/Summary

Not classified. Based on available data, the classification criteria are not met.

Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
Fuels, diesel	Positive - Dermal - Unspecified	Mouse	-	2 years

Conclusion/Summary

Suspected of causing cancer.

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Developmental toxin	Species	Dose	Exposure
Fuels, diesel	-	-	Negative	Rat	Dermal	20 days
	-	-	Negative	Rat	Dermal	10 days
	-	-	Negative	Rat	Dermal	10 days

Conclusion/Summary

Development: Not classified. Based on available data, the classification criteria are not met.

Fertility: Not classified. Based on available data, the classification criteria are not met.

Effects on or via lactation: Not classified. Based on available data, the classification criteria are not met.

Section 11. Toxicological information

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Fuels, diesel	Category 2	Not determined	bone marrow, liver and thymus

Aspiration hazard

Name	Result
Fuels, diesel	ASPIRATION HAZARD - Category 1
Alkanes, C10-20-branched and linear	ASPIRATION HAZARD - Category 1

Information on likely routes of exposure

Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact	No known significant effects or critical hazards.
Inhalation	Harmful if inhaled.
Skin contact	Causes skin irritation.
Ingestion	Irritating to mouth, throat and stomach. Aspiration hazard if swallowed -- harmful or fatal if liquid is aspirated into lungs.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	Adverse symptoms may include the following: pain or irritation watering redness
Inhalation	Adverse symptoms may include the following: nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
Skin contact	Adverse symptoms may include the following: irritation redness
Ingestion	Adverse symptoms may include the following: nausea or vomiting

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Eye contact	Vapour, mist or fume may cause eye irritation. Exposure to vapour, mist or fume may cause stinging, redness and watering of the eyes.
Inhalation	Vapour, mists or fumes may contain polycyclic aromatic hydrocarbons some of which are known to produce skin cancer. Vapour, mists or fumes may contain polycyclic aromatic hydrocarbons some of which are known to produce skin cancer. Vapour, mist or fume may irritate the nose, mouth and respiratory tract.
Skin contact	As with all such products containing potentially harmful levels of polycyclic aromatic hydrocarbons, prolonged or repeated skin contact may eventually result in dermatitis or more serious irreversible skin disorders including cancer.
Ingestion	If swallowed, may irritate the mouth, throat and digestive system. If swallowed, may cause abdominal pain, stomach cramps, nausea, vomiting, diarrhoea, dizziness and drowsiness.
General	May cause damage to organs through prolonged or repeated exposure. Vapour, mists or fumes may contain polycyclic aromatic hydrocarbons some of which are known to produce skin cancer. Vapour, mists or fumes may contain polycyclic aromatic hydrocarbons some of which are known to produce skin cancer.

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Section 11. Toxicological information

Carcinogenicity	Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	No known significant effects or critical hazards.
Teratogenicity	No known significant effects or critical hazards.
Developmental effects	No known significant effects or critical hazards.
Fertility effects	No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Inhalation (dusts and mists)	1.895 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Fuels, diesel	EL50 >1000 mg/l Nominal Fresh water	Micro-organism	40 hours
	NOELR 3.217 mg/l Nominal Fresh water	Micro-organism	40 hours
	Acute EL50 22 mg/l Nominal Fresh water	Algae	72 hours
	Acute EL50 210 mg/l Nominal Fresh water	Daphnia	48 hours
	Acute EL50 68 mg/l Nominal Fresh water	Daphnia	48 hours
	Acute ErL50 78 mg/l Nominal Fresh water	Algae	72 hours
	Acute LL50 65 mg/l Nominal Fresh water	Fish	96 hours
	Acute LL50 21 mg/l Nominal Fresh water	Fish	96 hours
	Acute NOELR 10 mg/l Nominal Fresh water	Algae	72 hours
	Acute NOELR 1 mg/l Nominal Fresh water	Algae	72 hours
	Acute NOELR 46 mg/l Nominal Fresh water	Daphnia	48 hours
	Chronic NOEL 0.083 mg/l Nominal Fresh water	Fish	14 days
	Chronic NOELR 0.2 mg/l Nominal Fresh water	Daphnia	21 days

Conclusion/Summary	Toxic to aquatic life with long lasting effects.
---------------------------	--

Persistence and degradability

Partially biodegradable.

Product/ingredient name	Test	Result	Dose	Inoculum
Fuels, diesel	OECD 301 F	60 % - Readily - 28 days	30 mg/l	-
	OECD 301 F	57.5 % - Not readily - 28 days	25 mg/l	-
	Equivalent to EPA OTS 796.3100	35 % - Not readily - 28 days	5 mg/l	-

Conclusion/Summary	Non-persistent per IMO criteria
---------------------------	---------------------------------

Section 12. Ecological information

Bioaccumulative potential

This product is not expected to bioaccumulate through food chains in the environment.

Mobility in soil

Soil/water partition
coefficient (K_{oc})

Not available.

Mobility

Spillages may penetrate the soil causing ground water contamination. This material may accumulate in sediments.

Other ecological information

Spills may form a film on water surfaces causing physical damage to organisms. Oxygen transfer could also be impaired.

Section 13. Disposal considerations



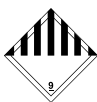

Disposal methods

The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapour from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Special Precautions for Landfill or Incineration

Empty packages may contain some remaining product. Hazard warning labels are a guide to the safe handling of empty packaging and should not be removed.

Section 14. Transport information

	ADG	IMDG	IATA
UN number	Not regulated.	UN3082	UN3082
UN proper shipping name	-	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fuels, diesel)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fuels, diesel)
Transport hazard class(es)	-	9  	9  
Packing group	-	III	III
Environmental hazards	No.	Yes.	Yes.

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Section 14. Transport information

Additional information	Remarks Combustible liquid Class C1 (AS 1940). Hazchem code 3Z Initial emergency response guide 47	This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8. Emergency schedules (EmS) F-A, S-F	This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8.
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Special precautions for user Not available.

Transport in bulk according to Annex II of Marpol and the IBC Code **Proper shipping name** MARPOL Annex 1 rules apply for bulk shipments by sea.
Category: gas oils, including ship's bunkers

Section 15. Regulatory information

Standard Uniform Schedule of Medicine and Poisons

Not scheduled

Consumer products - This product is exempt per Appendix A of the SUSMP.

Industrial Products - Labelling requirements for SUSMP do not apply to a poison that is packed and sold solely for industrial, laboratory or manufacturing use. However, this product is labelled in accordance with NOSHC National Code of Practice for labelling of workplace substances.

Model Work Health and Safety Regulations - Scheduled Substances

No listed substance

International lists

National inventory

REACH Status

For the REACH status of this product please consult your company contact, as identified in Section 1.

Australia inventory (AICS)

All components are listed or exempted.

Canada inventory

All components are listed or exempted.

China inventory (IECSC)

Not determined.

Japan inventory (ENCS)

Not determined.

Korea inventory (KECI)

Not determined.

Philippines inventory (PICCS)

Not determined.

Taiwan Chemical Substances Inventory (TCSI)

All components are listed or exempted.

United States inventory (TSCA 8b)

All components are listed or exempted.

Section 16. Any other relevant information

History

Date of printing	07/04/2016
Date of issue/Date of revision	07/04/2016
Date of previous issue	07/04/2016
Version	1

Product Stewardship

Key to abbreviations

ADG = Australian Dangerous Goods
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
NOHSC = National Occupational Health and Safety Commission
STEL = Short term exposure limit
SUSMP = Standard Uniform Schedule of Medicine and Poisons
UN = United Nations
TWA = Time weighted average
VOC = Volatile Organic Compound
SADT = Self-Accelerating Decomposition Temperature
Varies = may contain one or more of the following 101316-69-2, 101316-70-5, 101316-71-6, 101316-72-7, 64741-88-4, 64741-89-5, 64741-95-3, 64741-96-4, 64741-97-5, 64742-01-4, 64742-44-5, 64742-45-6, 64742-52-5, 64742-53-6, 64742-54-7, 64742-55-8, 64742-56-9, 64742-57-0, 64742-58-1, 64742-62-7, 64742-63-8, 64742-64-9, 64742-65-0, 64742-70-7, 72623-85-9, 72623-86-0, 72623-87-1, 74869-22-0, 90669-74-2

Procedure used to derive the classification

Classification	Justification
Flam. Liq. 4, H227 Acute Tox. 4, H332 Skin Irrit. 2, H315 Carc. 2, H351 STOT RE 2, H373 (bone marrow, liver and thymus) Asp. Tox. 1, H304	On basis of test data Calculation method Calculation method Calculation method Calculation method Calculation method

Indicates information that has changed from previously issued version.

Notice to reader

All reasonably practicable steps have been taken to ensure this data sheet and the health, safety and environmental information contained in it is accurate as of the date specified below. No warranty or representation, express or implied is made as to the accuracy or completeness of the data and information in this data sheet.

The data and advice given apply when the product is sold for the stated application or applications. You should not use the product other than for the stated application or applications without seeking advice from BP Group.

It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. The BP Group shall not be responsible for any damage or injury resulting from use, other than the stated product use of the material, from any failure to adhere to recommendations, or from any hazards inherent in the nature of the material. Purchasers of the product for supply to a third party for use at work, have a duty to take all necessary steps to ensure that any person handling or using the product is provided with the information in this sheet. Employers have a duty to tell employees and others who may be affected of any hazards described in this sheet and of any precautions that should be taken. You can contact the BP Group to ensure that this document is the most current available. Alteration of this document is strictly prohibited.

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Appendix 1: Site risk assessment/classification for activities generating uncontaminated dust

Sheet 1: Site classification assessment chart

Part A. Nature of site

Item	Score options				Allocated score
1. Nuisance potential of soil, when disturbed	Very low.....1	Low.....2	Medium.....4	High.....6	1
2. Topography and protection provided by undisturbed vegetation	Sheltered and screened.....1	Medium screening....6	Little screening.....12	Exposed and wind prone.....18	6
3. Area of site disturbed by the works	Less than 1ha.....1	Between 1 and 5ha..3	Between 5 and 10ha.....6	More than 10ha.....9	6
4. Type of work being done	roads or shallow trenches.....1	roads, drains and medium depth sewers.....3	Roads, drains, sewers and partial earthworks.....6	Bulk earthworks and deep trenches.....9	1
TOTAL score for Part A					14

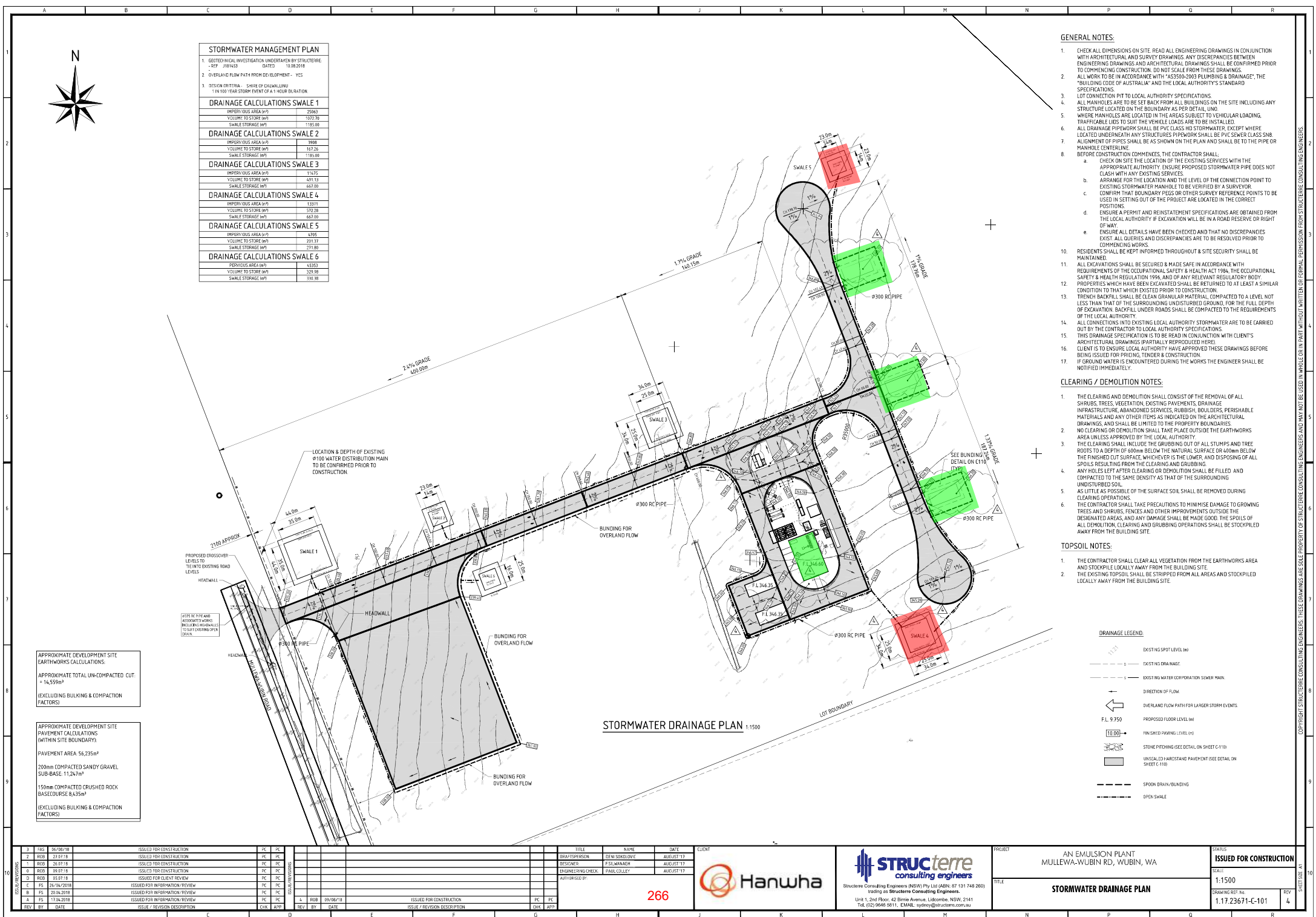
Part B. Proximity of site to other land uses

Item	Score options				Allocated score
1. Distance of other land uses from site	More than 1km.....1	Between 1km and 500m.....6	Between 100m and 500m.....12	Less than 100m.....18	1
2. Effect of prevailing wind direction (at time of construction) on other land uses	Not affected.....1	Isolated land uses affected by one wind direction.....6	Dense land uses affected by one wind direction.....12	Dense/sensitive land uses highly affected by prevailing winds.....18	6
TOTAL score for Part B					7

SITE CLASSIFICATION SCORE (A X B) =	98
--	-----------

Notes

1. Rural land uses surround the site
2. Closest sensitive land use (dwelling) is located approximately 1.9km to the north-east
3. Some shelter to the site is provided by vegetation present within the adjacent road reserves and along the site boundary
4. Area of disturbance is approximately 5.6ha



Ammonium Nitrate Emulsion Facility, Wubin - Aspects and Impacts Register

Activity	Aspect	Impact	Likelihood <i>Almost certain Likely Possible Unlikely Rare</i>	Consequence <i>Extremely serious Serious Highly significant Significant Notable</i>	Risk Rating <i>Extreme High Medium Low</i>	Controls	Responsible Person	Verification	Frequency of verification
Chemical Management									
Load/ unload of CN	Chemical spill	Land and groundwater contamination	Likely	Notable	Low	1. Install concrete in loading area during construction phase 2. Train and assess operator as being competent in work instructions and spill management	Hanwha project coordinator and Site supervisor	1. Construction plans 2. Verified through training records and site induction program	1. Once prior to construction 2. Based on validity of competency assessment
Load/ unload of ANSOL	Chemical spill	Land and groundwater contamination	Likely	Significant	Medium	1. Install concrete in loading area during construction phase 2. Train and assess operator as being competent in work instructions and spill management	Hanwha project coordinator and Site supervisor	1. Construction Plans 2. Verified through training records and site induction program	1. Once prior to construction 2. Based on validity of competency assessment
Loading ANE onto truck	Chemical spill	Land and groundwater contamination	Likely	Significant	Medium	1. Install concrete in loading area during construction phase 2. Train and assess operator as being competent in work instructions and spill management	Hanwha project coordinator and Site supervisor	1. Construction Plans 2. Verified through training records and site induction program	1. Once prior to construction 2. Based on validity of competency assessment
ANE manufacture	Valve failure leading to loss of product	Land and Groundwater Contamination	Rare	Significant	Low	1. Regular inspection and maintenance of valves 2. Replace valve if found to be leaking	Site supervisor	1. Inspection records 2. Maintenance records	1. Daily 2. As required
ANE manufacture	Leaking seal on ANE pump leading to loss of product	Land and Groundwater Contamination	Rare	Notable	Low	1. Regular inspection and maintenance of pump 2. Replace seal if found to be leaking	Site supervisor	1. Inspection records 2. Maintenance records	1. Bi-annual 2. As required

Activity	Aspect	Impact	Likelihood <i>Almost certain Likely Possible Unlikely Rare</i>	Consequence <i>Extremely serious Serious Highly significant Significant Notable</i>	Risk Rating <i>Extreme High Medium Low</i>	Controls	Responsible Person	Verification	Frequency of verification
ANE Storage	ANE storage silo overflow during loading or due to equipment failure	Land and Groundwater Contamination	Unlikely	Notable	Low	1. Alarms built in to the storage tanks 2. Alarms to be checked and maintained as required. 3. Ensure spill management kit is available for use at all times	Site supervisor	1. Construction plans 2. Maintenance records 3. Spill kit location plan (to be part of the induction package)	1. Once prior to construction 2. Inspection and maintenance records 3. Confirm spill kits are in their correct locations at least monthly
ANE Manufacture	Loss or hot AN/CN solution from failure of transfer line	Land and Groundwater Contamination	Rare	Significant	Low	1. Regular inspection and maintenance of line 2. Replace flange if found to be leaking	Site supervisor	1. Inspection and maintenance records 2. Maintenance records	1. Quarterly 2. As required
ANE Manufacture	Loss of hot ANE from failure of transfer line	Land and Groundwater Contamination	Rare	Significant	Low	1. Regular inspection and maintenance of line 2. Replace flange if found to be leaking	Site supervisor	1. Inspection and maintenance records 2. Maintenance records	1. Quarterly 2. As required
ANE Manufacture	ANE splash from hose burst while loading truck	Land and groundwater contamination	Rare	Significant	Low	1. Regular inspection and maintenance of hose 2. Replace hose if found to be leaking	Site supervisor	1. Inspection and maintenance records 2. Maintenance records	1. Quarterly 2. As required

Activity	Aspect	Impact	Likelihood <i>Almost certain Likely Possible Unlikely Rare</i>	Consequence <i>Extremely serious Serious Highly significant Significant Notable</i>	Risk Rating <i>Extreme High Medium Low</i>	Controls	Responsible Person	Verification	Frequency of verification
ANE Manufacture	Residues	Generation of waste	Likely	Notable	Low	1. Install concrete floor within plant 2. Clean up and report any leaks 3. Train and assess operator as being competent in work instructions and spill management instructions	Hanwha project coordinator and Site supervisor	1. Construction Plans 2. Visual observation and spill/clean-up records 3. Verified through training records and site induction program	1. Once prior to construction 2. As required 3. Based on validity of competency assessment
Material Storage	Loss of product from leak of emulsifier boxes	Land and groundwater contamination	Rare	Significant	Low	1. Install concrete base in emulsifier storage area 2. Inspect emulsifier storage area regularly to identify any leaks 3. Train and assess operator as being competent in spill management	Hanwha project coordinator and Site supervisor	1. Construction Plans 2. Visual observation and spill/clean-up records 3. Verified through training records and site induction program	1. Once prior to construction 2. As required 3. Based on validity of competency assessment

Activity	Aspect	Impact	Likelihood <i>Almost certain Likely Possible Unlikely Rare</i>	Consequence <i>Extremely serious Serious Highly significant Significant Notable</i>	Risk Rating <i>Extreme High Medium Low</i>	Controls	Responsible Person	Verification	Frequency of verification
Diesel storage and use	Hydrocarbon spill	Land and groundwater contamination	Likely	Notable	Low	1. The diesel storage tank will be bunded. 2. All hoses and valves within the system which transfer the diesel to the onsite generator will be checked regularly for leaks. 3. Refuelling of vehicles and equipment onsite from the diesel tank will be undertaken over spill catchment trays (or similar) to contain any leaks or spills. 4. Train and assess operator as being competent in work instructions and spill management instructions.	Site supervisor	1. Construction plans 2. Inspection and maintenance records 3. Operating procedures and visual observation 4. Verified through training records and site induction program	1. Once prior to construction 2. Quarterly 3. As required 4. Based on validity of competency assessment
Stormwater Management									
Stormwater washing down work area	Contamination of stormwater	Land and groundwater contamination	Unlikely	Significant	Low	1. Install bunds around the work area to prevent stormwater falling outside of this area flowing across the work site. 2. Install a bio-retention basin for stormwater treatment and infiltration adjacent to the work site	Site supervisor	1. Construction plans 2. Construction plans and visual observation of plant health within the basin	1. Once prior to construction 2. Once prior to construction and plant health observation to be undertaken twice yearly
Waste Generation									
Repairs	Workshop waste	Waste generation	Likely	Notable	Low	1. Contact licensed waste management company to collect and dispose of waste	Site supervisor	1. Record waste management company in waste register 2. Retain waste disposal dockets/receipts	1. N/A

Activity	Aspect	Impact	Likelihood <i>Almost certain Likely Possible Unlikely Rare</i>	Consequence <i>Extremely serious Serious Highly significant Significant Notable</i>	Risk Rating <i>Extreme High Medium Low</i>	Controls	Responsible Person	Verification	Frequency of verification
Daily operations/ work	General office waste	Waste generation	Likely	Notable	Low	1. Dispose in designated bins 2. Contact licensed waste management company to collect and dispose of waste	Site supervisor	1. Record waste management company in waste register 2. Retain waste disposal dockets/ receipts	1. N/A
Daily operations/ work	Sewerage from washrooms	Land and Groundwater Contamination	Likely	Notable	Low	1. Install a septic tank and leach drain system to connect to the onsite amenities. 2. Maintain the septic system as per the manufacturers recommendations	Site supervisor	1. Construction plans 2. Maintenance records	1. Once prior to construction 2. As per recommended maintenance schedule



WUBIN, WESTERN AUSTRALIA EXPLOSIVE MANUFACTURING PLANT

**LOT 115 & 117, CORNER OF MULLEWA-WUBIN ROAD AND
THOMAS ROAD, WUBIN, WESTERN AUSTRALIA**

Separation Distances Compliance Review

APPROVAL AND REVISION RECORD					
Issue No.	Date	Prepared	Reviewed	Approved	Revision Notes
A draft	21Jan 2020	Daniela Tutman			Draft Issued for comment

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1. Abbreviations and Definitions

Term	Description
ADG	Australian Dangerous Goods Code for the Transport
ANSOL	Ammonium Nitrate solution, UN 2426, DG Class 5 Oxidizing agent.
AN	Ammonium Nitrate, meeting the requirements of UN 1942 under the UN classification system
ANE	Ammonium Nitrate Emulsion, meeting the requirements of UN 3375 under the UN classification system
AS	Australian Standard
AS 2187	Explosives –Storage, transport and use
AS 4326	Australian Standard for Storage and handling of oxidizing agents
Credible evacuation	That is likely within 45 minutes, there is no person in a building, inside protected works, Class B distance and there is no person in the open, inside protected works, Class A distance. The target evacuation is 30 minutes and 45 minutes is worst case scenario.
DG	Dangerous Goods
DMIRS	Department of Mines, Industry Regulations, Government of Western Australia
ERP	Emergency Response Plan
ES	Exposed Sites, a Vulnerable Facility, Protected Work or ANE Associated Work that may be affected by an explosion of the PES under consideration. (As defined in AS2187.0)
HMS	Hanwha Mining Services
kg	kilograms
kL	kilo Litres
L	Litres
m	meters
N/A	Not Applicable
NEQ	Net explosive quantity, mass of explosive material contained in an explosive.
No Warning Explosion	An explosion which occurs which is not as a consequence of some other cause which would be obvious to an observer in the vicinity.
PES	Potential Explosion Site, a location that could be the source of an explosion
PG	Packaging Group is the grading of danger within a class or division according to the relative hazard presented by the material. It is represented by the roman numerals, where 'I'= great danger, 'II'= medium danger, 'III'= minor danger
Proper shipping name	The name assigned to the DG in the ADG Code
Protected Works Class A	Public road, railway, mine working, haul roads

Term	Description
Protected Works Class B	Mine offices, workshops, processing plant, town, farmhouses
Protected Places	<p>(a) A dwelling, place of worship, public building, school or college, hospital, theatre, or any building or open area in which persons are accustomed to assemble, whether within or outside the property boundary of the installation.</p> <p>(b) A factory, workshop, office, store, warehouse, shop, or building where persons are employed.</p> <p>(c) An accumulation of flammable or combustible materials of a type and quantity sufficient to constitute a significant heat-radiation hazard in the event of fire in those materials.</p> <p>(e) Any storage facility for dangerous goods, other than minor storage, outside the property boundary of the installation.</p> <p>(f) An environmentally sensitive area.</p>
Risk assessment for a dangerous goods site	<p>a document that, in relation to the site as it exists or will exist, at the relevant time:</p> <ul style="list-style-type: none"> • identifies all hazards relating to dangerous goods at the site; • for each hazard, assesses – the probability of the hazard causing a dangerous goods incident; and – the nature of the harm to people, property and the environment that would result from the occurrence of that incident; • for each hazard, identifies the risk control measures; • in relation to each judgment required above, explains the methods used to make the judgment and the reasons for the judgment; and • has been prepared in a form acceptable to the Chief Officer.
SSAN	Ammonium nitrate, ammonium nitrate emulsions and ammonium nitrate mixtures containing greater than 45% ammonium nitrate, excluding solutions. Note: In this definition 'greater than 45%' shall be taken as 'greater than 45% by mass'.
UN classification	United Nations classification as outlined in the current edition of the document titled Recommendations on the Transport of Dangerous Goods, published by the United Nations (UN). The detailed tests supporting the Recommendations are described in a companion UN publication namely the Manual of Tests and Criteria.
UN number	(in relation to dangerous goods) – the identification number shown in the Australian Dangerous Goods Code for Transport by Road and Rail in relation to those goods.
Unsupervised access	<p>access to explosives or SSDS in circumstances where no other person who is authorised under a licence to store or handle explosives or SSDS is present and includes:</p> <ul style="list-style-type: none"> • access to the secure store • access to the keys to the secure store • access to explosives or SSDS while it is being transported
Vulnerable facility	<p>A category of facility that includes, but is not restricted to, the following:</p> <p>(a) Multistorey buildings, e.g. above 4 storeys.</p> <p>(b) Large glass fronted buildings of high population.</p> <p>(c) Health care facilities, child care facilities, schools, old age home in town.</p>

Term	Description
	(d) Public buildings or structures of major historical value. (e) Major traffic terminals, e.g. railway stations, airports. (f) Major public utilities, e.g. gas, water, electricity works.
WA	Western Australia
With Warning Explosion	An explosion which occurs as a consequence of some other cause which would be obvious to an observer in the vicinity. (Two examples of obvious causes are large fires, or large amounts of fumes coming out of an ANE tank.)

2. Introduction

Hanwha Mining Services (HMS) supplies explosive products and services into the Australian Mining Industry. HMS proposes to build a new Detonator Assembly Plant at the Ammonium Nitrate Emulsion (ANE) Plant in the corner of Mullewa-Wubin Road and Thomas Road, Wubin, Western Australia. The facility is built as a greenfield site. The proposed development will be located on Lots 115 (103.98 ha) and 117 (40.272 ha), which have a combined area of 144.282 ha.

For this purpose, HMS are required to use and store explosives and SSAN in a secure compound 1.4 km north of Wubin town site located in the northern wheatbelt region, 273 km north-north-east of Perth and 21 km north of Dalwallinu, within the Shire of Dalwallinu.

The surrounding land is used for agricultural purposes, predominantly grazing, a use which would continue within the surrounding property which will also serve as a buffer surrounding the facility, minimising line of sight viewing by the general public.

The storage, security, management and emergency arrangements of the Explosives, DG and SSAN include control measures compliant with the regulatory requirements.

This report refers to the separation distance compliance requirements.

3. Regulatory Framework

The following regulations and supporting code of practice apply for this facility:

- Dangerous Goods Safety Act 2007
- Dangerous Goods Safety (Explosives) Regulations 2007
- Dangerous Goods Safety (Security Sensitive Ammonium Nitrate) Regulations 2007
- Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007
- AS 2187.0 Explosives Storage, Transport and Use Part 0 Terminology
- AS 2187.1 Explosives Storage, Transport and Use Part 1 Storage
- AS 2187.2 Explosives Storage, Transport and Use Part 2 Use
- Australian Code for the Transport of explosives by road and rail, ADG7.4
- AEISG Code of Practice Storage and handling of UN3375, Ed. 4, May 2017
- Safe storage of solid ammonium nitrate, third edition, WA
- AS 4326 The storage and handling of oxidizing agents.

4. Overview of Proposed Storages

On this proposed site, there are energetic materials, in the form of Class 1 explosives. This section identifies the PES, as well as how far any explosion might propagate through sympathetic initiation (knock-on). This site is subject to “No-warning” explosions and “with-warning” explosions, where evacuation would be an option to mitigate or manage the risks.

According to the AEISG CoP for ANE, any ANSOL tanks are disregarded as PES; they are not considered susceptible to initiation.

The following materials are stored and handled at the Wubin proposed AN Emulsion Plant:

Item	Product	DG Class	UN	PG	Storage
1	Detonators	Class 1.1			20 kg Detonator Assembly (DAB) Building (PES 1)
2	Detonators	Class 1.1			1 kg Detonator Test (DTB) Building (PES 2)
3	High Explosives	Class 1.1			10,000 kg HE (HEM) each Magazine x 5 Magazines (PES 3)
4	Detonators	Class 1.1			1,000 kg Detonator Assembly (DAM) Magazine (PES 4)
5	AN Emulsion	5.1	3375	II	20-TK-03A/B 2 x 55 kL = 110 kL = 176 T (PES 5)
6	AN Prill	5.1	1942	III	3 x 500 T Stock Piles 1,500 T (PES 6)
7	AN Solution	5.1	2426	II	10-TK-04A/B/C/D/E/F 6 x 26 kL = 156 kL
8	Mineral Oil	Combustible Liquid C1	None	None	10-TK-01A/B 2 x 68.8 kL = 136 kL
9	Diesel	Combustible Liquid C1	None	None	30-TK-01 = 30,000 L

Item	Product	DG Class	UN	PG	Storage
10	Diesel - Day Tank	Combustible Liquid C1	None	None	30-TK-02 = 5,500 L
11	Calcium Nitrate	None	None	None	1,000 T bulka bags of 1.2 T each (833 bags)
12	Emulsifier	None	None	None	50 kL 50 x 1 kL IBC
13	AN Solution	5.1	2426	II	20-TK-01A/B 2 x 5.7 kL = 11.4 kL
14	AN Emulsion	5.1	3375	II	20-TK-02A/B 2 x 6.2 kL = 12.4 kL

5. Location of Potential Explosive Sites

The location of the depot is subject to acceptance by the Department of Mines, Industry Regulations (DMIRS), WA.

The adjusted NEQ is the mass of TNT that would produce an equivalent explosive effect to the inventory under consideration.

Separation distances are intended to give additional back-up protection to the community and are a consequence reduction control – and forms part of Hanwha’s diligent application of the prevention controls of the applicable standards AIESG Code of Practice Storage and Handling of UN3375 and AS 2187.1 Explosives – Storage.

5.1 Identification and categorisation of all Potential Explosive Sites (PES)

1. Detonator Assembly Building PES1 (DAB) – potential “No Warning” explosion
2. Base Cap Store Building – PES 2 (DTB) potential “No Warning” explosion
3. High Explosive Magazines – PES 3 (HEM) potential “No Warning” explosion
4. Detonator Magazines – PES 4 (DAM) potential “No Warning” explosion
5. ANE Tanks – PES 5 (20-TK-03A/B) potential “With Warning” explosion
6. AN Domes – PES 6 (Dome 1/2/3) potential “With Warning” explosion

5.1.1 Separation Distances for PES1 Detonator Assembly (DAB) Building

PES 1 is DA Building “No-warning Explosion” will be Licenced for 20 kg of Class 1.1 Explosives at 100% TNT equivalent as the donor explosive, NEQ = 20 kg

- DA Building - maximum of 4 pallets of finished product as Work in Progress and be emptied of base caps and finished assemblies at the end of every day.
- Each pallet of finished product holds on average 3,000 units, NEQ = 3 kg.

The following table describes the regulatory requirements regarding the separation distances according to AS 2187.1, Table 3.2.3.2:

Item	Possible impact of PSE 1 (DAB) NEQ = 20 kg	Required Distance	Actual separation	Result
1.	To AN storage There are three dome structures with 500 T AN each $D = 1.8 Q^{1/3}$	5 m	- m to AN Dome 1 - m to AN Dome 2 - m to AN Dome 3	
2.	To ANE storage There are two vertical storage tanks each 55 kL = 88 T $D = 1.8 Q^{1/3}$	5 m	- m to TK-101 - m to TK-102	
3.	To Protected Works Class A (PWA) (public roads) AS 2187. 1 Table 3.2.3.2 $D = 14.8 Q^{1/3}$	40 m	- m to Mullewa - Wubin Road - m to Thomas Rd	
4.	To Protected Works Class B (PWB) (town, residences/ houses, public buildings, factory, warehouse, depot of DG, building with employed persons) AS 2187. 1 Table 3.2.3.2 $D = 22.2 Q^{1/3}$ 5.5 kPa blast overpressure	60 m	Closest residences are located at - m to Residence 1 - m to Residence 2 - m to Residence 3	
5.	To Protected Works Class B (PWB) (on site Mine office, mine workshop) AS 2187. 1 Table 3.2.3.2 $D = 22.2 Q^{1/3}$	60 m		

Item	Possible impact of PSE 1 (DAB) NEQ = 20 kg	Required Distance	Actual separation	Result
	5.5 kPa blast overpressure			
6.	To vulnerable facilities and critical infrastructure (hospitals, schools, child care, old age housing, major public utilities): AS 2187. 1 Table 3.2.3.2 $D=44.4 Q^{1/3}$	121 m	No vulnerable facilities or critical infrastructure in the nearest towns 1.4 km to Wubin 21 km to Dalwallinu	Sufficient separations distances
7.	Process buildings AS 2187. 1 Table 3.2.3.2 $7.8 Q^{1/3}$ 21 kPa blast overpressure	22 m		
8.	To explosive storage unmounted AS 2187. 1 Table 3.2.3.2 $D = 4.8 Q^{1/3}$ Magazine distances are edge-to-edge	13 m	Explosive Magazines - m Magazine - m Magazine - m Magazine - m Magazine - m Magazine	
9.	To explosive storage Mounded AS 2187. 1 Table 3.2.3.2 $D = 2.4 Q^{1/3}$ Magazine distances are edge-to-edge	7 m	Explosive Magazines - m Magazine - m Magazine - m Magazine - m Magazine - m Magazine	

5.1.2 Separation Distances for PES 2 Detonator Test (DTB) Building

PES 2 is Detonator Test (DTB) Building “No-warning Explosion” will be Licenced for 1 kg of Class 1.1 Explosives at 100% TNT equivalent as the donor explosive, NEQ = 1 kg

The following table describes the regulatory requirements regarding the separation distances according to AS 2187.1, Table 3.2.3.2:

Item	Possible impact of PSE 2 (DTB) NEQ = 1 kg	Required Distance	Actual separation	Result
1.	To AN storage There are three dome structures with 500 T AN each $D = 1.8 Q^{1/3}$	2 m	- m to AN Dome 1 - m to AN Dome 2 - m to AN Dome 3	
2.	To ANE storage There are two vertical storage tanks each 55 kL = 88 T) $D = 1.8 Q^{1/3}$	2 m	- m to TK-101 - m to TK-102	
3.	To Protected Works Class A (PWA) (public roads) AS 2187. 1 Table 3.2.3.2 $D = 14.8 Q^{1/3}$	15 m	- m to Mullewa - Wubin Road - m to Thomas Rd	
4.	To Protected Works Class B (PWB) (town, residences/ houses, public buildings, factory, warehouse, depot of DG, building with employed persons) AS 2187. 1 Table 3.2.3.2 $D = 22.2 Q^{1/3}$ 5.5 kPa blast overpressure	22 m	Closest residences are located at - m to Residence 1 - m to Residence 2 - m to Residence 3	
5.	To Protected Works Class B (PWB) (on site Mine office, mine workshop) AS 2187. 1 Table 3.2.3.2 $D = 22.2 Q^{1/3}$ 5.5 kPa blast overpressure	22 m		
6.	To vulnerable facilities and critical infrastructure (hospitals,	44 m	No vulnerable facilities or critical	Sufficient separations distances

Item	Possible impact of PSE 2 (DTB) NEQ = 1 kg	Required Distance	Actual separation	Result
	schools, child care, old age housing, major public utilities): AS 2187. 1 Table 3.2.3.2 $D=44.4 Q^{1/3}$		infrastructure in the nearest towns 1.4 km to Wubin 21 km to Dalwallinu	
7.	Process buildings AS 2187. 1 Table 3.2.3.2 $7.8 Q^{1/3}$ 21 kPa blast overpressure	8 m		
8.	To explosive storage unmounted AS 2187. 1 Table 3.2.3.2 $D = 4.8 Q^{1/3}$ Magazine distances are edge-to-edge	5 m	Explosive Magazines - m Magazine - m Magazine - m Magazine - m Magazine - m Magazine	
9.	To explosive storage Mounded AS 2187. 1 Table 3.2.3.2 $D = 2.4 Q^{1/3}$ Magazine distances are edge-to-edge	2 m	Explosive Magazines - m Magazine - m Magazine - m Magazine - m Magazine - m Magazine	

5.1.3 Separation Distances for PES 3 High Explosive (HEM) Magazine

PES 3 is High Explosive Magazine “No-warning Explosion” will be Licenced for 10 T of Class 1.1 Explosives at 100% TNT equivalent as the donor explosive, NEQ = 10,000 kg

- There is proposed 5 x HE Magazines with 10 T each

The following table describes the regulatory requirements regarding the separation distances according to AS 2187.1, Table 3.2.3.2:

Item	Possible impact of PSE 3 (HEM) NEQ = 10,000 kg	Required Distance	Actual separation	Result
1.	To AN storage There are three dome structures with 500 T AN each $D = 1.8 Q^{1/3}$	39 m	- m to AN Dome 1 - m to AN Dome 2 - m to AN Dome 3	
2.	To ANE storage There are two vertical storage tanks each 55 kL = 88 T) $D = 1.8 Q^{1/3}$	39 m	- m to TK-101 - m to TK-102	
3.	To Protected Works Class A (PWA) (public roads) AS 2187. 1 Table 3.2.3.2 $D = 14.8 Q^{1/3}$	320 m	- m to Mullewa - Wubin Road - m to Thomas Rd	
4.	To Protected Works Class B (PWB) (town, residences/ houses, public buildings, factory, warehouse, depot of DG, building with employed persons) AS 2187. 1 Table 3.2.3.2 $D = 22.2 Q^{1/3}$ 5.5 kPa blast overpressure	480 m	Closest residences are located at - m to Residence 1 - m to Residence 2 - m to Residence 3	
5.	To Protected Works Class B (PWB) (on site Mine office, mine workshop) AS 2187. 1 Table 3.2.3.2 $D = 22.2 Q^{1/3}$ 5.5 kPa blast overpressure	480 m		

Item	Possible impact of PSE 3 (HEM) NEQ = 10,000 kg	Required Distance	Actual separation	Result
6.	To vulnerable facilities and critical infrastructure (hospitals, schools, child care, old age housing, major public utilities): AS 2187. 1 Table 3.2.3.2 $D=44.4 Q^{1/3}$	960 m	No vulnerable facilities or critical infrastructure in the nearest towns 1.4 km to Wubin 21 km to Dalwallinu	Sufficient separations distances
7.	Process buildings AS 2187. 1 Table 3.2.3.2 $7.8 Q^{1/3}$ 21 kPa blast overpressure	175 m		
8.	To explosive storage unmounted AS 2187. 1 Table 3.2.3.2 $D = 4.8 Q^{1/3}$ Magazine distances are edge-to-edge	105 m	Explosive Magazines - m Magazine - m Magazine - m Magazine - m Magazine - m Magazine	
9.	To explosive storage Mounded AS 2187. 1 Table 3.2.3.2 $D = 2.4 Q^{1/3}$ Magazine distances are edge-to-edge	52 m	Explosive Magazines - m Magazine - m Magazine - m Magazine - m Magazine - m Magazine	

5.1.4 Separation Distances for PES 4 Detonator Assembly (DAM) Magazine

PES 4 is Detonator Assembly Magazine “No-warning Explosion” will be Licenced for 1 T of Class 1.1 Explosives at 100% TNT equivalent as the donor explosive, NEQ = 1,000 kg

- There is proposed 1 x DAM Magazine with 1 T each

The following table describes the regulatory requirements regarding the separation distances according to AS 2187.1, Table 3.2.3.2:

Item	Possible impact of PSE 4 (DAM) NEQ = 1,000 kg	Required Distance	Actual separation	Result
1.	To AN storage There are three dome structures with 500 T AN each $D = 1.8 Q^{1/3}$	18 m	- m to AN Dome 1 - m to AN Dome 2 - m to AN Dome 3	
2.	To ANE storage There are two vertical storage tanks each 55 kL = 88 T) $D = 1.8 Q^{1/3}$	18 m	- m to TK-101 - m to TK-102	
3.	To Protected Works Class A (PWA) (public roads) AS 2187. 1 Table 3.2.3.2 $D = 14.8 Q^{1/3}$	100 m	- m to Mullewa - Wubin Road - m to Thomas Rd	
4.	To Protected Works Class B (PWB) (town, residences/ houses, public buildings, factory, warehouse, depot of DG, building with employed persons) AS 2187. 1 Table 3.2.3.2 $D = 22.2 Q^{1/3}$ 5.5 kPa blast overpressure	180 m	Closest residences are located at - m to Residence 1 - m to Residence 2 - m to Residence 3	
5.	To Protected Works Class B (PWB) (on site Mine office, mine workshop) AS 2187. 1 Table 3.2.3.2 $D = 22.2 Q^{1/3}$ 5.5 kPa blast overpressure	180 m		

Item	Possible impact of PSE 4 (DAM) NEQ = 1,000 kg	Required Distance	Actual separation	Result
6.	To vulnerable facilities and critical infrastructure (hospitals, schools, child care, old age housing, major public utilities): AS 2187. 1 Table 3.2.3.2 $D=44.4 Q^{1/3}$	450 m	No vulnerable facilities or critical infrastructure in the nearest towns 1.4 km to Wubin 21 km to Dalwallinu	Sufficient separations distances
7.	Process buildings AS 2187. 1 Table 3.2.3.2 $7.8 Q^{1/3}$ 21 kPa blast overpressure	80 m		
8.	To explosive storage unmounted AS 2187. 1 Table 3.2.3.2 $D = 4.8 Q^{1/3}$ Magazine distances are edge-to-edge	55 m	Explosive Magazines - m Magazine - m Magazine - m Magazine - m Magazine - m Magazine	
9.	To explosive storage Mounded AS 2187. 1 Table 3.2.3.2 $D = 2.4 Q^{1/3}$ Magazine distances are edge-to-edge	28 m	Explosive Magazines - m Magazine - m Magazine - m Magazine - m Magazine - m Magazine	

5.1.5 Separation Distances for PES 5 AN Emulsion Storage

PES 5 is the ANE storage tanks potential “With Warning” explosion is already licensed.

PES 5 consists of two vertical tanks of 55 kL = 88 T each 20-TK-03A/B = 176 T ANE

The adjusted NEQ for this PES, assuming the following TNT equivalents:

- 75% equivalent TNT for ANE (Class 5.1)
- PES 1 (ANE) “with-warning” NEQ = 132 T

The following table describes the regulatory requirements regarding the separation distances according to AS 2187.1, Table 3.2.3.2:

Item	Possible impact of PSE 5 (ANE) 176 T NEQ = 132 T	Required Distance	Actual separation	Result
1.	To AN storage (There are three dome structures with 500 T of AN each) $D = 1.8 Q^{1/3}$	92 m	98 m to AN Dome 1 135 m To AN Dome 2 238 m To AN Dome 3	Sufficient separations distance
2.	To Protected Works Class A (PWA) (public roads) AIESG Sect.6 AS 2187. 1 Table 3.2.3.2 $D = 14.8 Q^{1/3}$	754 m	529 m to PWA Mullewa - Wubin Road 600 m to PWA Thomas Rd	Insufficient separations distance ERP will include road closure by emergency services and regular drills
3.	To Protected Works Class B (PWB) (town, residences/ houses, public buildings, factory, warehouse, depot of DG, building with employed persons) AIESG Sect.6 AS 2187. 1 Table 3.2.3.2 $D = 22.2 Q^{1/3}$ 5.5 kPa blast overpressure	1,130 m	Closest residences are located at PWB to Residence 1 = 1,318 m SE PWB to Residence 2 = at 1,352 m NW	Sufficient separations distance

Item	Possible impact of PSE 5 (ANE) 176 T NEQ = 132 T	Required Distance	Actual separation	Result
4.	To Protected Works Class B (PWB) (on site Mine office, mine workshop) AIESG Sect.6 AS 2187. 1 Table 3.2.3.2 $D = 22.2 Q^{1/3}$ 5.5 kPa blast overpressure	1,130 m	None inside the required separation distance.	Not applicable
5.	To vulnerable facilities and critical infrastructure (hospitals, schools, child care, old age housing, major public utilities): AIESG Sect.6 AS 2187. 1 Table 3.2.3.2 $D=44.4 Q^{1/3}$	2,261 m	There are no vulnerable facilities or critical infrastructure in the nearest town, Wubin – town boundary 1.4 km away 21 km to Dalwallinu	Sufficient separations distances
7.	Process buildings AIESG Sect.6 AS 2187. 1 Table 3.2.3.2 $7.8 Q^{1/3}$ 21 kPa blast overpressure	407 m		
9.	To other explosive storage Mounded AIESG Sect.6 AS 2187. 1 Table 3.2.3.2 $D = 2.8 Q^{1/3}$	122 m	Explosive Magazines - m Magazine - m Magazine - m Magazine - m Magazine - m Magazine	Mounded distance is insufficient, therefore the explosive storages within this distance will aggregate

5.1.6 Separation Distances for Site PES 6 AN Domes 1/2/3

PES 6 is AN Domes 1/2/3 potential “With Warning” explosion is already licensed.

Total quantity of SSAN = 1,500 T, in 1.2 T bulka bags stored three high in three dome structures with 500 T.

The AN storage domes are located beyond the required AN separation distance (AS 2187), these AN storages can’t be knocked-on.

The adjusted NEQ for the AN store, assuming the following TNT equivalents:

- 32% equivalent TNT for AN (Class 5.1)
- AN “with-warning” NEQ = 160 T

The following table describes the regulatory requirements regarding the separation distances according to AS 2187.1, Table 3.2.3.2:

Item	Possible impact of AN 500 T NEQ = 160 T	Distance requirements	Actual separation to ANE	Result
1.	To AN storage (There are three dome structures with 500 T of AN each) $D = 1.8 Q^{1/3}$	98 m	98 m 140 m 239 m	Sufficient separations distance
2.	To Protected Works Class A (PWA) public road AIESG Sect.6 AS 2187. 1 Table 3.2.3.2 $D = 14.8 Q^{1/3}$	803 m	625 m AN Dome Store 1,2,3 to PWA Mullewa - Wubin Road 583 m AN Dome Store 1 to PWA Thomas Rd	Sufficient separations distance
3.	To Protected Works Class B (PWB) (town, residences/ houses, public buildings, factory, warehouse, depot of DG, building with employed persons) AIESG Sect.6 AS 2187. 1 Table 3.2.3.2 $D = 22.2 Q^{1/3}$	966 m	1,180 m AN Dome Store 3 to PWB Residence 1 1,285 m AN Dome Store 3 to PWB Residence 2	Sufficient separations distance

Item	Possible impact of AN 500 T NEQ = 160 T	Distance requirements	Actual separation to ANE	Result
	5.5 kPa blast overpressure			
4.	To Protected Works Class B (PWB) (on site Mine office, mine workshop) AIESG Sect.6 AS 2187. 1 Table 3.2.3.2 $D = 22.2 Q^{1/3}$ 5.5 kPa blast overpressure	1,205 m		
5.	To vulnerable facilities and critical infrastructure (hospitals, schools, child care, old age housing, major public utilities): AIESG Sect.6 AS 2187. 1 Table 3.2.3.2 $D=44.4 Q^{1/3}$	2,410 m	There are no vulnerable facilities or critical infrastructure in the nearest town, Wubin – town boundary 1.4 km away 21 km to Dalwallinu	Sufficient separations distances
8.	Process buildings AIESG Sect.6 AS 2187. 1 Table 3.2.3.2 $7.8 Q^{1/3}$ 21 kPa blast overpressure	423 m		
9.	To other explosive storage Mounded AIESG Sect.6 AS 2187. 1 Table 3.2.3.2 $D = 4.8 Q^{1/3}$	130 m	Explosive Magazines - m Magazine - m Magazine - m Magazine - m Magazine - m Magazine	

6. Occupancy

The site is attended with a maximum of three people present during one shift operation. The site has “low” activity levels. Usually, there will be two people, maximum seven people at the following locations:

- 1 - Office/ crib room
- 3 - ANE Manufacturing Area or Process Area
- 1 - ANSOL unloading Area
- 1 - ANE load out Area
- 1 - Workshop

The secure depot will be accessed by Hanwha’s secure nominees or authorised persons, or by persons supervised by Hanwha’s secure nominees.

There will be no activity during night time.

Evacuation for the ANE Plant personnel is credible within 20 minutes to the evacuation Point which is 1.2 km away, North of the ANE Plant. This distance is more than 20% greater than the minimum separation distance (PWA) required, based on the worst-case scenario of an uncontrolled fire (with a substantial source of fuel) capable of engulfing the ANE tanks, assuming that the ANE may explode and evacuation shall take place.

There is an exclusion zone at 0.75 km, based on the required separation distance to Protected Works Class A (PWA), (public road, public places, railway, open place of work in another occupancy, AIESG Sect.6, AS 2187. 1 Table 3.2.3.2, $D = 14.8 Q^{1/3}$.)

Appendix A – Location Drawings

Appendix B – Site Drawings

COTERRA ENVIRONMENT

Level 3, 25 Prowse Street
West Perth WA 6005

T (08) 9381 5513

www.coterra.com.au
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ATTACHMENT 5

EXPLOSIVES MANAGEMENT PLAN -
COMMERCIAL IN CONFIDENCE

ATTACHMENT 6

TRAFFIC IMPACT ASSESSMENT



Ammonium Nitrate Emulsion Plant

TRAFFIC IMPACT STATEMENT

PROJECT	Hanwha Mining Services Australia Pty Ltd - Ammonium Nitrate Emulsion Plant			
Revision	Description	Originator	Review	Date
0	Issued Draft	CXS	CAS	17/01/18
1	Final Draft	CAS	CXS	06/02/18
2	Final	CAS	CXS	07/02/18

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1. INTRODUCTION

1.1 Traffic Impact Statement

Hanwha Mining Services Australia Pty Ltd propose to develop an Ammonium Nitrate Emulsion Plant 1.4km to the north of the Wubin townsite within the Shire of Dalwallinu. This Traffic Impact Statement (TIS) has been prepared by Flyt in support of the proposed development, to meet the requirements of the Western Australian Planning Commission's (WAPC) Transport Impact Assessment Guidelines Part 4 – Individual Developments. The TIS was requested by Main Roads WA (MRWA) to address specific issues relevant to this site location and truck movements.

The key issues addressed in this TIS are the:

- ▶ The traffic generated by the operation of the Ammonium Nitrate Emulsion Plant; and
- ▶ The appropriate design of the development access, including a swept path of a 36.5m road train, reduced impact on Mullewa-Wubin Road and an assessment of the required sight distances.

Due to the nature of the proposed development and its location, approximately 235 km northeast of Perth, the TIS will not address pedestrian, cycle and public transport access.

2. PROPOSED DEVELOPMENT

2.1 Development

Hanwha Mining Services Australia Pty Ltd propose to construct an Ammonium Nitrate Emulsion Plant at Lots 115 and 117 Mullewa-Wubin Road, approximately 1.4km north of the Wubin townsite. The development site and its proximity to the Wubin townsite are shown in Figure 1.

Figure 1 Development site location (source: Google)



The proposed plant would produce an ammonium nitrate emulsion product to be used as a precursor ingredient for explosives in the mining industry. The product produced at the plant would not be explosive until transported off-site and mixed with other ingredients.

It is estimated the plant will produce 12,250 tonnes of ammonium nitrate emulsion product per annum, however the plant could accommodate an increase to 24,500 tonnes per annum.

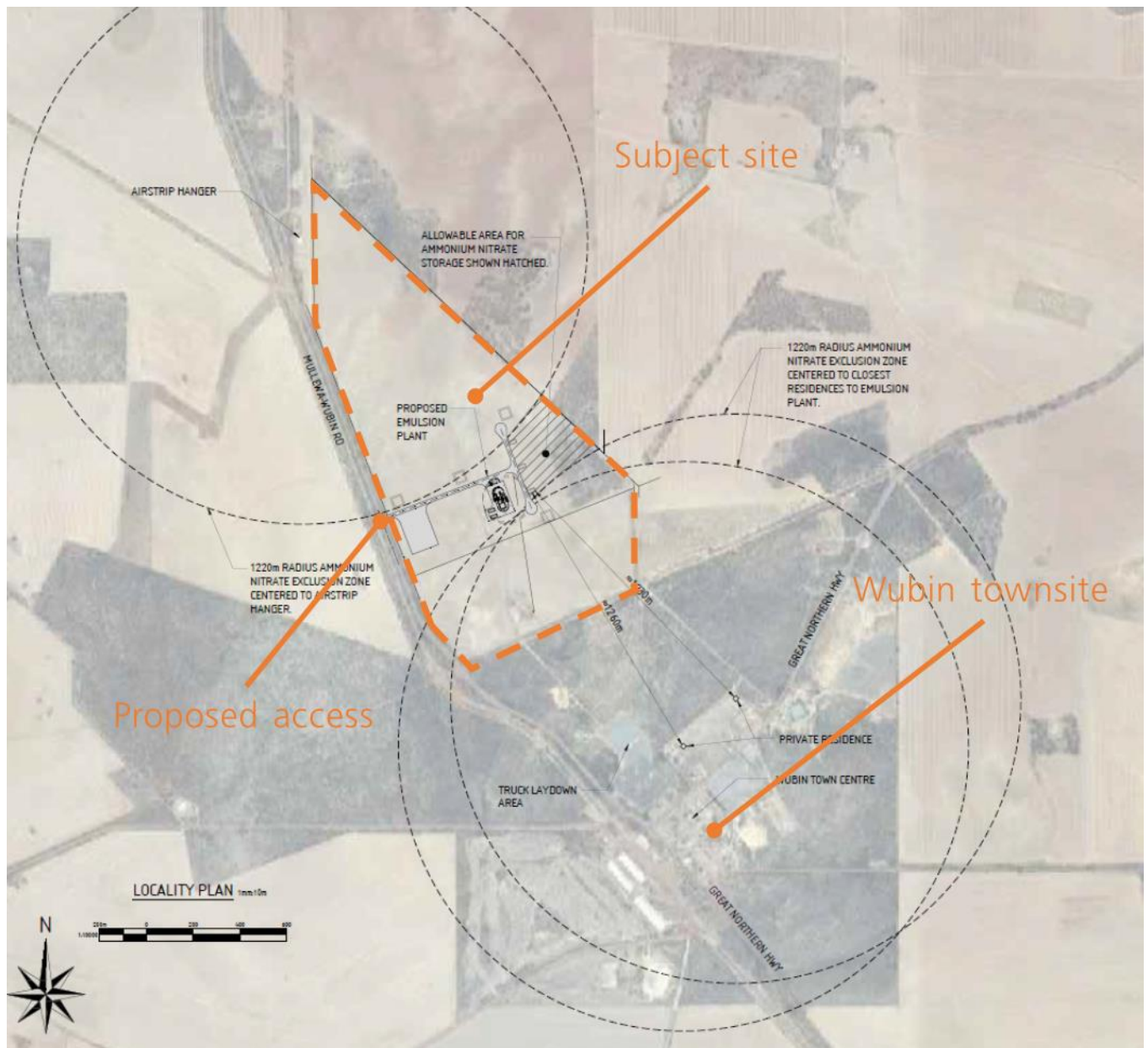
The site has been previously used for farming. Land uses surrounding the proposed development site include extensive farming, an airstrip and associated hanger, unallocated crown land and a truck assembly area. The closest residences are located to the north of the Wubin townsite, just over 1.2km to the south of the development site, while the closest farmhouse is located approximately 1.9km to the north-east.

3. VEHICLE ACCESS AND PARKING

3.1 Access

The development site will be accessed from the Mullewa-Wubin Road, approximately 2km north of the Wubin townsite along the Mullewa-Wubin Road. The location of the proposed access is shown in Figure 2.

Figure 2 Proposed development access location



Traffic generated by the proposed development would include:

- Employee travel to and from the plant. Up to six people would be employed in the operation, with the intention for these employees to live locally.
- Trucks delivering raw materials to the site (mainly from Perth).
- Trucks transporting emulsion product to mine sites within the Goldfields, Pilbara and Midwest.

All employee vehicles would be parked on-site. Trucks associated with the delivery of raw materials and the collection of finished product would be parked on-site during loading and unloading.

4. PROVISION FOR SERVICE VEHICLES

4.1 Service Vehicles

Large trucks would transport raw materials to site and collect finished product from the site to deliver to mine sites throughout the state.

Raw materials to be delivered to the site include ammonium nitrate solution, mineral oil, calcium nitrate, emulsifier and diesel, to be delivered from Perth; and water from Dalwallinu. All deliveries will be made by B-doubles.

It is estimated the plant will produce 12,250 tonnes of Ammonium Nitrate Emulsion product per annum, however the plant could accommodate an increase to 24,500 tonnes per annum. Product will be transported to mine sites within the Goldfields, Pilbara and Midwest using B-doubles and B-triples.

5. HOURS OF OPERATION

5.1 Operations

The proposed hours of operation for the plant would be 6.00AM to 6.00PM six days a week (Monday to Saturday). At times of peak demand, it is possible the plant may operate up to 24 hours day.

6. DAILY TRAFFIC VOLUMES / VEHICLE TYPES

6.1 Traffic

Traffic generated by the proposed development includes:

- Employees travelling to and from site;
- Trucks transporting raw materials to site; and
- Trucks collecting finished product from the site to deliver to mine sites throughout the state.

It is estimated the plant will produce 12,250 tonnes of Ammonium Nitrate Emulsion product per annum, however the plant could accommodate an increase to 24,500 tonnes per annum. Therefore, two scenarios for truck traffic have been developed, the base case scenario (with 12,250 tonnes produced) and the growth scenario (with 24,500 tonnes produced).

6.2 Employees

Up to 6 local employees will travel to and from the site each day. It is assumed one-third will travel to and from Mullewa-Wubin Road north and two-thirds will travel to and from Mullewa-Rubin Road south. All employee trips are assumed as light vehicles.

6.3 Delivery of Raw Materials

Raw materials to be delivered to the site include ammonium nitrate solution, mineral oil, calcium nitrate, emulsifier and diesel, to be delivered from Perth; and water from Dalwallinu. All deliveries will be made by B-doubles. Forecasts for annual and typical weekday truck movements are shown in Table 1.

Table 1 Estimate of daily and annual truck traffic – delivery of raw materials

Scenario	Product	Volume per year	No. Trucks/ year	No. Trucks/ day
Base scenario – 12,250 tonnes p.a.	Ammonium nitrate solution	5,750 tonnes	160	0.5
	Mineral oil	1,350 tonnes	28	0.1
	Calcium nitrate	6,000 tonnes	188	0.6
	Emulsifier	160 tonnes	5	0.02
	Diesel	180 KL	6	0.02
	Water	180 KL	6	0.02
Growth scenario – 24,500 tonnes p.a.	Ammonium nitrate solution	11,500 tonnes	320	1.0
	Mineral oil	2,700 tonnes	57	0.2
	Calcium nitrate	12,000 tonnes	375	1.2
	Emulsifier	320 tonnes	10	0.03
	Diesel	360 KL	12	0.04
	Water	360 KL	12	0.04

In the base scenario producing 12,250 tonnes of product per annum, there would be 1 B-double carrying raw materials to the site from the south each day (6 days a week), with 1 empty B-double per day turning left into Mullewa-Wubin Road.

In the growth scenario producing 24,500 tonnes of product per annum, there would be up to 3 B-doubles carrying raw materials to the site from the south each day (6 days a week), with up to 3 empty B-doubles per day turning left into Mullewa-Wubin Road.

6.4 Collection of Product from Site

Assuming a B-double can transport 44 tonnes of finished product, and a B-triple can transport 66 tonnes of finished product, a range of forecasts for annual and typical weekday truck movements are shown in Table 2. These forecasts represent laden trucks traveling away from the site, an equal number of empty trucks would travel to the site prior to product collection.

Table 2 Estimate of daily and annual truck traffic – product collection

Scenario	B-Double Trucks		B Triple Trucks	
	No. Trucks/ year	No. Trucks/ day	No. Trucks/ year	No. Trucks/ day
Base scenario – 12,250 tonnes p.a.	278	0.9	186	0.6
Growth scenario – 24,500 tonnes p.a.	557	1.8	371	1.2

Finished product would be destined to mine sites within the Goldfields (approximately 35%), Pilbara (approximately 51%) and the Midwest (approximately 14%). Trucks destined for the Goldfields and Pilbara would turn left out of the site access into the Mullewa-Wubin Road, while trucks destined for the Midwest would turn right into the Mullewa-Wubin Road.

In the base-case scenario with 12,250 tonnes of product per annum (where all product is transported in B-double trucks), there would be 1 empty truck travelling to the site from the south each day (6 days a week), with 1 laden truck every 2 days turning left into Mullewa-Wubin Road every and 1 laden truck every 3 days turning right into Mullewa-Wubin Road.

In the highest-case scenario with 24,500 tonnes of product per annum (where all product is transported in B-double trucks), there would be up to 2 empty trucks travelling to the site from the south each day (6 days a week), with 1 laden truck per day turning left into Mullewa-Wubin Road and up to 1 laden truck per day turning right into Mullewa-Wubin Road.

6.5 Total Forecast Traffic Volumes

The total daily forecast traffic volumes for the base case scenario are shown in Figure 3, while the daily forecast traffic volumes for the growth scenario are shown in Figure 4.

Figure 3 Daily forecast traffic – base case



Figure 4 Daily forecast traffic – growth scenario

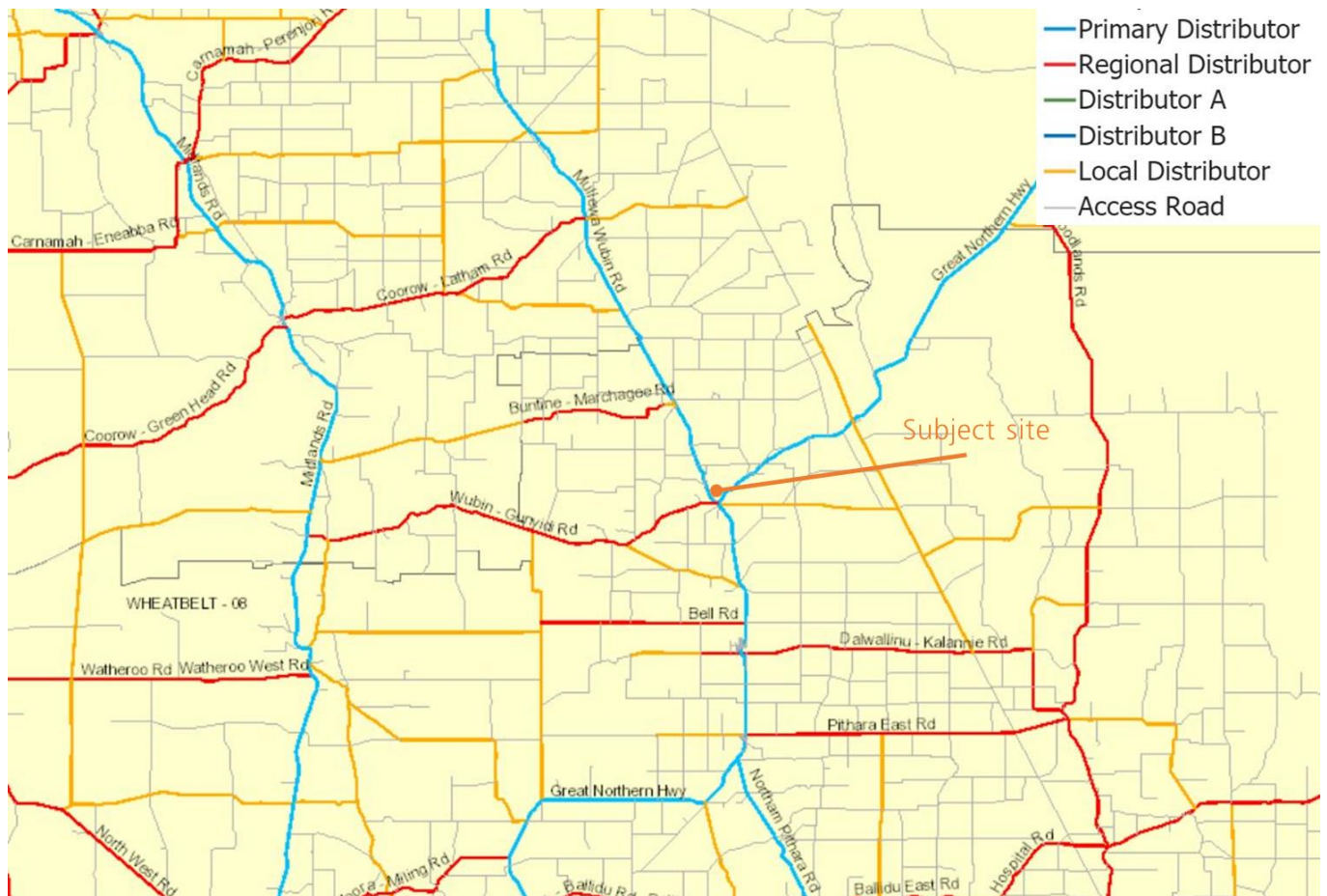


7. TRAFFIC MANAGEMENT ON FRONTAGE STREETS

7.1 Street Management

Mullewa-Wubin Road is classified as a Primary Distributor, as shown in Figure 5. As a Primary Distributor, the Mullewa-Wubin Road provides for major regional and inter-regional traffic and carries generally fast-moving traffic. It is a State Road, managed by Main Roads WA.

Figure 5 Road hierarchy designation



The speed limit along the Mullewa-Wubin Road development frontage is 110 kph, as shown in Figure 6, reducing to 90 kph in advance of, and 60 kph through townsites.

The road is constructed as two 3.5m sealed traffic lanes with 1.5m gravel shoulders within a 60m road reserve. A cross section of the road, looking south at the approximate location of the proposed access, is shown in Figure 7.

The Mullewa-Wubin Road is part of the Restricted Access Vehicle (RAV) Network 7 and can safely accommodate heavy vehicles up to 36.5m in length and 107.5 tonnes.

Figure 6 Posted speed limit for roads in vicinity of development site

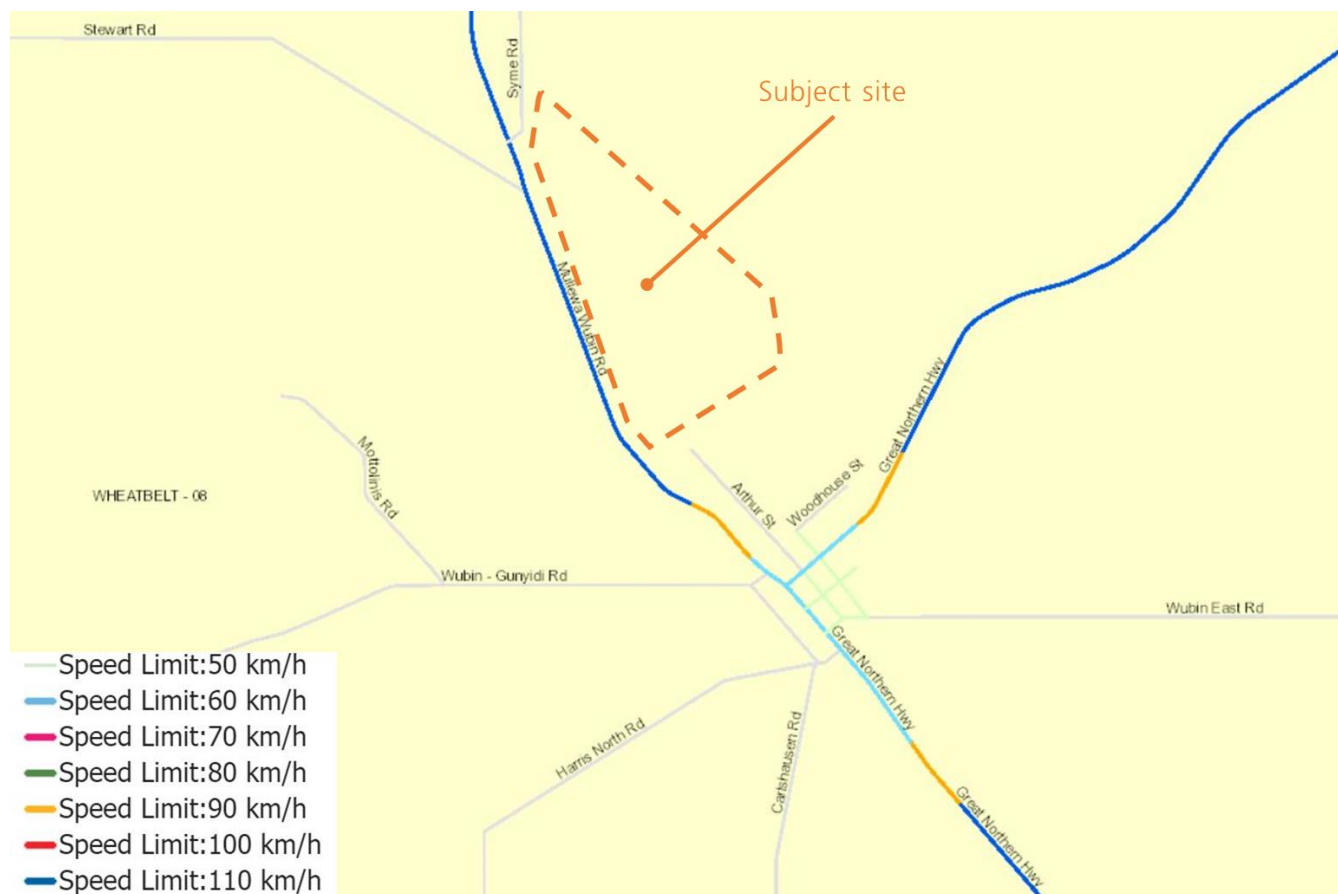


Figure 7 Cross section of Mullewa-Wubin Road, looking south (source: Google)



Main Roads WA have a permanent count station along the Mullewa-Wubin Road, south of the Morawa-Three Springs Road (site 2902, approximately 120km to the north of the development site). Although not adjacent to the development site, the traffic data gives a general indication of the volume and composition of traffic on the Mullewa-Wubin Road.

Traffic along the Mullewa-Wubin Road is highly seasonal, with the peak daily traffic volume of 488 vehicles per day (vpd) with 9.2% heavy vehicles, compared to the annual average daily traffic volume of 209 vpd with 29.7% heavy vehicles.

Annual average daily traffic (AADT), a measure of the average daily over the period of an entire year, and average daily traffic (ADT), in this case the average daily traffic (Monday to Sunday) over one week, for the Mullewa-Wubin Road are presented in Table 3.

Table 3 Mullewa-Wubin Road traffic data (source: Main Roads WA)

Direction	AADT for the period 1 July 2016 – 30 June 2017				ADT for peak week starting 19 th Sep 2016			
	Total	Light (1-2)	Heavy (3-9)	Heavy (10-12)	Total	Light (1-2)	Heavy (3-9)	Heavy (10-12)
Northbound	104	75	21	9	182	148	28	5
Southbound	105	74	22	10	166	133	28	5

Assuming an annual rate of growth of 1.5%, the forecast AADT volumes in 10 years are summarised in Table 4.

Table 4 Mullewa-Wubin Road forecast AADT – 10-year growth

Direction	Total	Light (class 1-2)	Heavy (class 3-9)	Heavy (class 10-12)
Northbound	121	87	24	10
Southbound	122	86	26	12

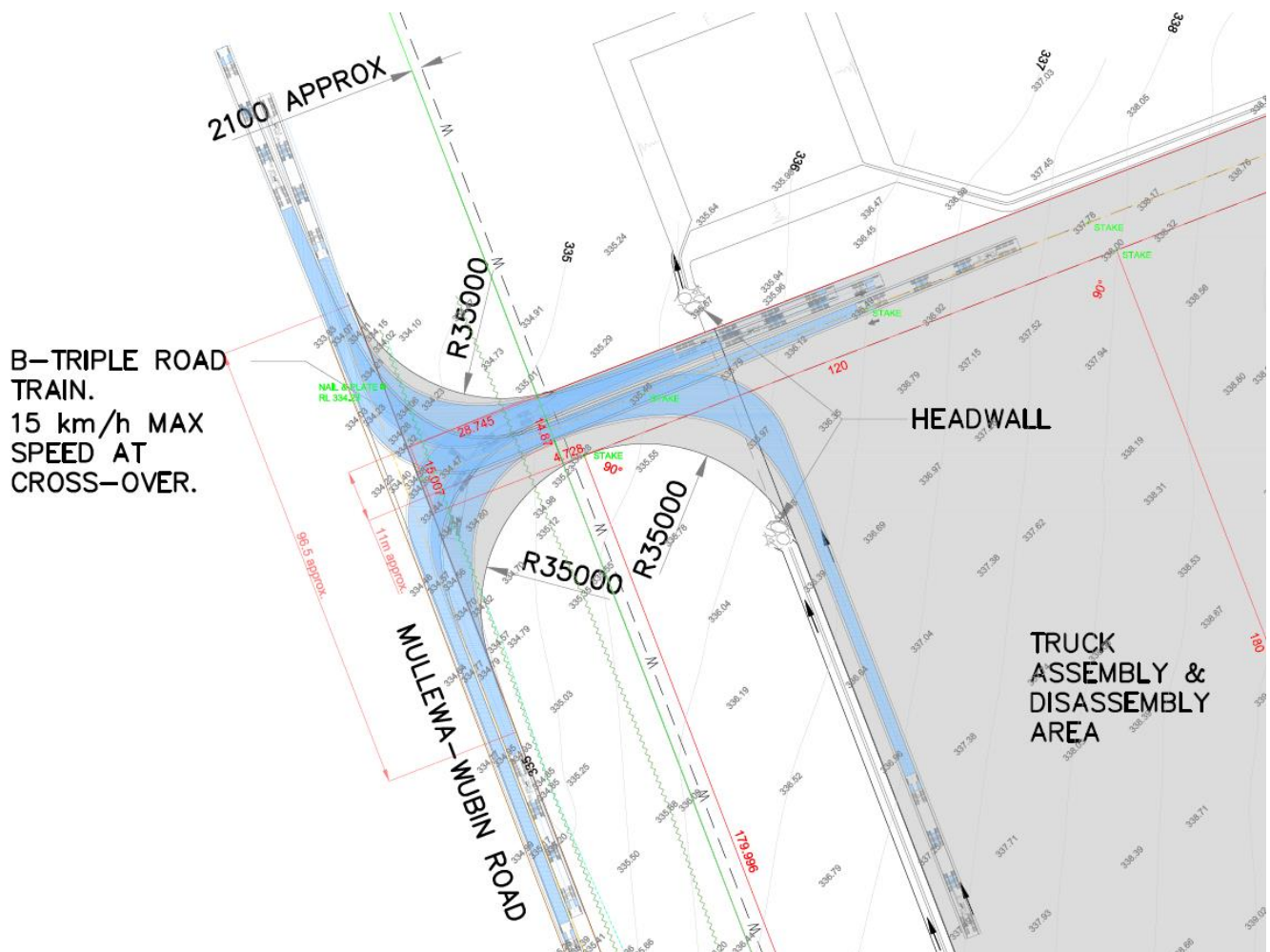
8. SITE SPECIFIC ISSUES

Due to the nature of the trucks proposed to access the development site, it is necessary to assess the swept path and check the available sight distances at the proposed access location.

8.1 Swept Path Analysis

The swept paths of B triple road trains turning in and out of the proposed development access are shown in Figure 8. The width of the crossover and approach from with Lot has been designed to achieve Main Roads WA design parameters, reduce the impact on Mullewa-Wubin Road and accommodate required sight lines.

Figure 8 Swept path of 36.5m B triple



This design approach has replicated the outcomes that are already evident in Wubin at two other locations, as shown in the aerial image in Figure 9. These assembly areas, off Mullewa-Wubin Road and Great Northern Highway, accommodate the turning movement of exiting trucks within the site boundaries.

Figure 9 Existing road train assembly areas in Wubin (source: Google)



8.2 Required Sight Distance

The following sight distances are required at the proposed access location:

- Approach sight distance; and
- Entering sight distance.

The required sight distances have been obtained from Main Roads WA Heavy Vehicle Services Standard Restricted Access Vehicle Route Assessment Guidelines.

8.2.1 Approach Sight Distance

From Appendix E of the RAV Route Assessment Guidelines, a RAV Category 7-8, with an operating speed of 100 kph, and assuming level grade, requires an approach sight distance of 261m.

8.2.2 Entering Sight Distance

From Appendix F of the RAV Route Assessment Guidelines, a RAV Category 7-8, entering a street with an operating speed of 110 kph, and assuming level grade, requires an entering sight distance of 382m.

8.2.3 Available Sight Distance

Based on aerial imagery, from the proposed site access point on Mullewa-Wubin Road there is 600m of sight distance to the south and 900m of sight distance to the north.

9. SUMMARY AND CONCLUSIONS

9.1 Conclusions

The proposed Ammonium Nitrate Emulsion Plant could generate up to:

- ▶ 12 light vehicles and 4 B-doubles per day (over a 12-hour day, 6 days per week) in the base scenario; and
- ▶ 12 light vehicles and 10 B-doubles per day (over a 12-hour day, 6 days per week) in the growth scenario.

The development site will be accessed from the Mullewa-Wubin Road, approximately 2km north of the Wubin townsite along the Mullewa-Wubin Road.

It is estimated that only 5% of all RAVs will travel on the section of Mullewa-Wubin Road north of the site, while 95% of the RAVs are expected to travel on the section of Mullewa-Wubin Road between the site and the Wubin townsite.

There is sufficient sight distance available at this location, with the swept paths of the large vehicles being contained within the site as per Main Roads WA standards. No widening of the Mullewa-Wubin Road would be required. This design outcome replicates two existing road train assembly areas in Wubin as indicated in the analysis included in Section 8.1.

Ms Gail Baker
21735 Mullewa-Wubin Road
(Lot 250 Mullewa-Wubin Road)
Wubin WA 6612
5th April 2020

The Chief Executive Officer
Shire of Dalwallinu
PO Box 141
Dalwallinu WA 6609

Dear Councillors

Re: Proposed Detonator Manufacturing Facility and Storage Magazines

I would like to express my opposition to the proposal to build a detonator plant on the property adjacent to ours, where an ammonium nitrate emulsion manufacturing plant has been built by Hanwha Mining Services.

Section 2.4 of the Development Application entitled Surrounding Land Uses, identifies our property as a light aircraft strip to the immediate north, identifies our neighbouring farmhouse 2.0km to the northeast and mentions Wubin townsite 1.5km to the south. It fails to mention, however, the nearest residence which is our residence and which lies approximately 1km to the north and that our aircraft hangars, sheds, outbuildings, rainwater tanks and fuel storage tanks are even closer to this proposed explosives plant area.

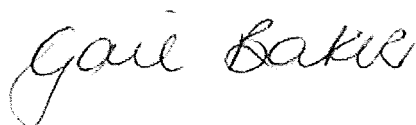
This is a high risk land use and as such constitutes a high risk operation for bushfire events, therefore we feel this will have a serious potential impact on our home, our livelihood, our safety and our fuel storage capabilities and as a direct result, our aircraft and building insurance.

Further to this, we now have extended family living in our residence, including small children. These children spend their time on all areas of our property when no aerial operations are taking place, including the area adjacent to the southern boundary which falls within separation distances from the ammonium nitrate emulsion manufacturing and storage facility, as per the initial proposal, Location and Separation Distances Plan (Figure 3).

When initial consideration of this manufacturing facility was proposed we had objections to this and Hanwha executives made a point of coming to meet with us at home to discuss our concerns. I refer to correspondence to the Dalwallinu Shire dated 04 May 2016 detailing our objections.

At that meeting we were assured, among other things, that no explosive reagents were to be stored or manufactured at any time on site and as a result of that meeting, and at the request of those executives, further correspondence (dated 03 June 2016) was provided to the Dalwallinu Shire to withdraw our objections. It would appear, however, that now this is no longer the case. Therefore, for the above reasons, I strenuously object to the proposed explosives/detonator plant being built.

Yours sincerely,



Gail Baker

Job Ref: 9125
7 May 2020

Chief Executive Officer
Shire of Dalwallinu
58 Johnston Street
DALWALLINU WA 6609

Attention: Doug Burke – Manager Planning & Development

Dear Mr Burke

**Proposed Detonator Manufacturing Facility and Storage Magazines
Lots 115 and 117 Thomas Road, Wubin**

Rowe Group acts on behalf of Hanwha Mining Services Pty Ltd, the landowner of Lots 115 and 117 Thomas Road, Wubin (the 'subject land'). We provide the following comments in response to the letter of objection received by the Shire of Dalwallinu (the 'Shire') from the landowner at Lot 250 Mullewa-Wubin Road, Wubin, outlining the landowner's concerns with regard to bushfire risk, safety and proximity of the proposed detonator manufacturing facility and storage magazines to the adjacent residence, aerial operations and other development on their property.

Our Client acknowledges the landowner's concerns regarding the perceived risk of the proposal on their property and land uses. It is noted, however, that appropriate management procedures are to be implemented with the relevant authorities to deal with the risks associated with the proposed 'Detonator Manufacturing Facility and Associated Storage Magazines', detailed as follows.

Risk Management Procedures

Explosives Management Plan

In accordance with the requirements of Department of Mines, Industry Regulation and Safety, an Explosives Management Plan ('EMP') has been prepared in support of the proposed development. The EMP ensures that safety and security risks associated with the storage of explosives have been adequately addressed in accordance with the relevant regulatory requirements, and ensures that any explosives on site are not accessed by unauthorised persons and are not used inappropriately through the implementation of risk minimisation measures.

Our Client confirms that a security plan is in place for the facility, and the facility is fully fenced to prevent unauthorised access to any explosive materials.

Bushfire Management Plan

The submission received by the adjoining landowner indicated that the proposed development is a “high risk land use” and as such, constitutes “high risk operation for bushfire events”. In this regard, it is noted that a Bushfire Management Plan (‘BMP’) has been prepared for the subject site with respect to the proposed land use. The proposed Detonator Manufacturing Facility and associated storage magazines are also required to comply with the Dangerous Goods Safety Act 2004 (the ‘Act’), which requires the preparation of a Bushfire Management Plan and Risk Management Plan to address onsite flammable hazards.

Consistent with the requirements of the Act, the BMP requires a 50 metre Asset Protection Zone around all existing and proposed structures and that safe access and egress is provided at all times from the site. Further, a minimum 50,000 litres of stored water dedicated for firefighting purposes only will be installed by the developer prior to occupancy to assist with risk management associated with the proposed operations.

The Class 8 buildings proposed by the development will be located in areas with a BAL rating of BAL-LOW, which are not required to comply with the AS3959-2018 Construction of Buildings in Bushfire Prone Areas construction specifications. To provide additional protection in the event of a bushfire, the BMP recommends the proposed buildings be constructed to the specifications for a BAL-12.5 rating.

In this regard, the proposed development complies with the relevant bushfire legislation, with appropriate measures to be in place prior to occupancy. The development is therefore considered to be well managed and as such, does not present as a “high risk”.

Flammable Onsite Hazards Risk Management Plan

In accordance with the requirements of the Act, a Flammable Onsite Hazards Risk Management Plan (‘RMP’) has been prepared for the subject site and includes an assessment of potential risks associated with the proposed land use and mitigation measures to address the perceived risks.

The RMP requires that the proposed Detonator Manufacturing Facility and associated structures be managed and maintained from a high-risk bushfire perspective. It is noted that following the implementation of the recommended actions, the inherent threat from bushfire and resultant risk of ignition from onsite flammable hazards will be reduced to an acceptable level of risk.

Summary

As outlined above, the potential risks associated with the proposed Detonator Manufacturing Facility and Associated Storage Magazines at Lots 155 and 117 Thomas Road, Wubin (the ‘subject site’) have been adequately addressed through appropriate management procedures.

We trust that the information contained within this correspondence is sufficient to allow the Shire of Dalwallinu to favourably determine the proposal and respond to the concerns raised by the landowners at Lot 250 Mullewa-Wubin Road.

Should you require any further information or clarification in relation to this matter, please contact the undersigned or Reyne Dial on 9221 1991.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Ella Compton', written in a cursive style.

Ella Compton
Rowe Group

Draft Sea Container Planning Policy

Subject

Sea containers. Sea containers are defined as being redundant shipping containers that have been repurposed. Sea containers are often being used on land in a manner that is unsightly and that is detracting significantly from the amenity of the locality in which the land is situated. Sea containers are used in Residential areas as an alternative to sheds and in Commercial and Industrial areas for storage and other purposes.

Objectives

Ensure that the use of Sea containers is not unsightly and does not detract significantly from the amenity of the locality in which it is situated.

Establish guidelines for the assessment of applications for a permit to establish sea containers within the whole of the Shire area.

Set acceptable standards for an application to obtain Shire approval to establish a sea container on a particular property.

General Provisions:

The following provisions, if adopted, will apply to all sea containers located within any land use zone.

Sea containers:

- are only to be used in conjunction with an approved use on the lot
- must not be located over effluent disposal areas/systems
- must not be located over water mains, waste water or storm water drains, or underground power lines.
- must be setback from overhead power lines in compliance with the requirements of the relevant electricity authority
- will not be permitted in a Heritage Conservation Area.
- must not contain sanitary facilities (ablutions)
- must not be used for human habitation
- must not be placed on verges, or road reserves or other public places

Specific Zone Provisions:

Land use zones are incorporated into the Scheme to distinguish allowable land uses that do not detract from the amenity or character of a given area. The following provisions, if adopted, will apply to their respective land use zones.

Residential Zone

- A maximum of one shipping container per allotment is allowable provided that it can be demonstrated that it meets the criteria as an 'Outbuilding' as defined in the *State Planning Policy 7.3 – Residential Design Codes Volume 1*
- Sea containers will not be permitted in the Residential Zone on land where there is no existing dwelling or where there is no dwelling under construction
- Sea containers are not to be located within the front setback of the property
- Sea containers must be screened from the streetscape (nearby roads, other public places and adjoining neighbours) by suitable vegetation or other appropriate screening
- Where sea containers cannot be screened, the Shire will require additional design features to be incorporated, e.g. roof structures, doors, cladding
- Refrigerated sea containers are not permitted on Residential zoned land anywhere within the Shire
- With the exception of an approved Home Occupation, the sea container shall not be used for any commercial or industrial purpose.

Commercial Zone

- A maximum of one shipping container per allotment is allowable provided that their use is ancillary to the approved land use
- Sea containers must not be located in areas designated as car parking
- Sea containers must be screened from the streetscape (nearby roads, other public places and adjoining neighbours) by suitable vegetation or other appropriate screening
- Where sea containers cannot be screened, the Shire will require additional design features to be incorporated, e.g. roof structures, doors, cladding
- Refrigerator motors and other cooling devices must be modified to ensure that noise emitted from the unit complies with the *Environmental Protection (Noise) Regulations 1993*.

General Industrial Zone

- An unlimited number shipping containers is allowable provided that their use is ancillary to the approved land use
- Sea containers must not be located in areas designated as car parking or landscaping
- The placement of the sea container is to be in compliance with prescribed setbacks in Table II of Part 5 of the Scheme

Townsite

- A maximum of one shipping container per allotment is allowable provided that their use is ancillary to the approved land use
- The placement of the sea container is to be in compliance with prescribed setbacks in Table II of Part 5 of the Scheme
- Sea containers must be screened from the streetscape (nearby roads, other public places and adjoining neighbours) by suitable vegetation or other appropriate screening
- Where sea containers cannot be screened, the Shire will require additional design features to be incorporated, e.g. roof structures, doors, cladding

Rural Residential

- A maximum of two sea containers per allotment is allowable provided that their use is ancillary to the approved land use
- The placement of the sea container is to be in compliance with prescribed setbacks in Table II of Part 5 of the Scheme
- Is used for domestic storage purposes only
- Refrigerated sea containers are not permitted on Rural Residential zoned land anywhere within the Shire
- Sea containers must not be stacked

Rural

- An unlimited number sea containers is allowable provided that their use is ancillary to the approved land use
- Where located within 200m of a boundary of a lot or road, sea containers are to substantially screened from the road, neighbouring properties or public vantage points

Exemptions

All proposals for the placement of sea containers require the planning approval of the Shire prior to being sited on a lot, except where the sea container is:

- Placed within a fully enclosed buildings
- Associated with the temporary storage of building materials and/or equipment during approved building work being undertaken. The building works must have substantially commenced and the construction works do not lapse for more than 30 consecutive days.
- Placed temporarily on the property for the purposes of furniture and/or goods removal or delivery where they are located for seven days or less
- Proposed to be modified for a dwelling or commercial building. Once a sea container has been modified, it is no longer considered as a sea container for the purposes of this Policy