Appendices

Appendix 1 Chemical Safety Data Sheets

AMC XAN BORE

AMC

Chemwatch Hazard Alert Code: **1**

Chemwatch: **7177-15**
Version No: **7.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **11/01/2019**
Print Date: **04/14/2020**
L.GHS.AUS.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	AMC XAN BORE
Chemical Name	gum xanthan
Synonyms	XCD Polymer
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Drilling fluids compound; drilling viscosifier.

Details of the supplier of the safety data sheet

Registered company name	**AMC**
Address	216 Balcatta Rd, Balcatta WA 6021 Australia
Telephone	+61 (8) 9445 4000
Fax	+61 (8) 9445 4040
Website	www.amcmud.com
Email	amc@imdexlimited.com

Emergency telephone number

Association / Organisation	**Chemwatch**	**CHEMWATCH EMERGENCY RESPONSE**
Emergency telephone numbers	**1800 039 008**	**+61 1800 951 288**
Other emergency telephone numbers	**Not Available**	**+61 2 9186 1132**

Once connected and if the message is not in your prefered language then please dial 01

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

NON-HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	**1**	
Toxicity	**0**	
Body Contact	**0**	
Reactivity	**1**	
Chronic	**0**	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	Not Applicable
Classification [1]	Not Applicable

Label elements

Hazard pictogram(s)	Not Applicable

SIGNAL WORD	**NOT APPLICABLE**

Hazard statement(s)

Not Applicable

Precautionary statement(s) General

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
11138-66-2	100	gum xanthan

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If dust is inhaled, remove from contaminated area. ▸ Encourage patient to blow nose to ensure clear passage of breathing. ▸ If irritation or discomfort persists seek medical attention.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

Fire Incompatibility	‣ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ Wear breathing apparatus plus protective gloves in the event of a fire.
Fire/Explosion Hazard	‣ Solid which exhibits difficult combustion or is difficult to ignite. ‣ Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Combustion products include: carbon monoxide (CO) carbon dioxide (CO2) other pyrolysis products typical of burning organic material.
HAZCHEM	Not Applicable

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	‣ Clean up all spills immediately. ‣ Avoid contact with skin and eyes.
Major Spills	‣ Clear area of personnel and move upwind. ‣ Alert Fire Brigade and tell them location and nature of hazard.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	‣ Limit all unnecessary personal contact. ‣ Wear protective clothing when risk of exposure occurs. ‣ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions) ‣ Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame.
Other information	‣ Store in original containers. ‣ Keep containers securely sealed.

Conditions for safe storage, including any incompatibilities

Suitable container	‣ Lined metal can, lined metal pail/ can. ‣ Plastic pail.
Storage incompatibility	Avoid contamination of water, foodstuffs, feed or seed. ‣ Avoid reaction with oxidising agents

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3

AMC XAN BORE	Not Available	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
gum xanthan	Not Available	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
Personal protection	
Eye and face protection	‣ Safety glasses with side shields ‣ Chemical goggles. ‣ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present. ‣ polychloroprene.
Body protection	See Other protection below
Other protection	No special equipment needed when handling small quantities. **OTHERWISE:** ‣ Overalls.

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	- -	PAPR-P1 -
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3	-
		Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Tan granular solid, partly soluble in water.

Physical state	Divided Solid	**Relative density (Water = 1)**	~0.65
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Applicable
pH (as supplied)	Not Applicable	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Applicable

Initial boiling point and boiling range (°C)	Not Applicable	**Molecular weight (g/mol)**	Not Available
Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	Not Applicable	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Applicable	**Surface Tension (dyn/cm or mN/m)**	Not Applicable
Lower Explosive Limit (%)	Not Applicable	**Volatile Component (%vol)**	Not Applicable
Vapour pressure (kPa)	Not Applicable	**Gas group**	Not Available
Solubility in water	Partly miscible	**pH as a solution (1%)**	4.7
Vapour density (Air = 1)	Not Applicable	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	Product is considered stable and hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
Ingestion	The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. Polysaccharides are not substantially absorbed from the gastrointestinal tract but may produce a laxative effect. Larger doses may produce intestinal obstruction or stomach concretions.
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
Eye	Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result.
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. Studies indicate that diets containing large amounts of non-absorbable polysaccharides, such as cellulose, might decrease absorption of calcium, magnesium, zinc and phosphorus. Long term exposure to high dust concentrations may cause changes in lung function (i.e. pneumoconiosis) caused by particles less than 0.5 micron penetrating and remaining in the lung. A prime symptom is breathlessness.

AMC XAN BORE	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
gum xanthan	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

GUM XANTHAN	Evaluation of workers exposed to xanthan gum dust found evidence of a link to respiratory symptoms.. On May 20, 2011, the FDA issued a press release about SimplyThick, a food-thickening additive containing xanthan gum as the active ingredient, warning parents, caregivers and health care providers not to feed SimplyThick, a thickening product, to premature infants[. The concern is that the product may cause premature infants to suffer necrotizing enterocolitis. According to a 2017 safety review by a scientific panel of the European Food Safety Authority (EFSA), xanthan gum (European food additive number E 415) is

	extensively digested during intestinal fermentation, and causes no adverse effects, even at high intake amounts. The EFSA panel found no concern about genotoxicity from long-term consumption. Xanthan gum (E 415) can be regarded as non-toxic based on the results of acute oral toxicity studies.From short-term and subchronic toxicity studies, no toxicological relevant changes were reported apart from a decrease in red blood cell count and haemoglobin concentration in dogs receiving 2,000 mg/kg body weight (bw) per day for 12 weeks. This effect was marginal and it was not reproduced in a dog chronic toxicity study at 1,000 mg/kg bw per day, the highest dose tested. From a human study with repeated intake ranging from 10.4 to 12.9 g of xanthan gum per day(assuming a body weight of 70 kg corresponding to 149–184 mg/kg bw per day), it was reported that xanthan gum acts as a bulk laxative causing no adverse dietary nor physiological effects. The only effects observed were moderate (10%) reduction in serum cholesterol ($p<0.05$) and a significant increase in faecal bile acid concentrations ($p<0.05$) .A study investigating the effect of repeated intake of 15 g xanthan gum/day (assuming a bodyweight of 70 kg corresponding to 214 mg/kg bw per day) on colonic function showed significant increases in stool output ($p<0.01$), frequency of defecation ($p<0.05$) and flatulence ($p<0.01$) due to the ingestion of the xanthan gum.In clinical studies involving infants, the Panel noted that consumption of xanthan gum in infant formula or formula for special medical purposes in infant was well tolerated, did not influence minerals(Ca, P, Mg), fat and nitrogen balance and did not affect growth characteristics up to concentration of 1,500 mg/L (232 mg/kg bw per day). No significant acute toxicological data identified in literature search.

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✗
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

AMC XAN BORE	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
gum xanthan	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	420mg/L	4
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*				

Aquatic Toxicity (based on a similar product): Acute (rainbow trout) LC50: 320-560 ppm/96hrs [Australian Mud]
DO NOT discharge into sewer or waterways.
May be harmful to fauna if not disposed of according to Section 13 and legislative requirements. [AMC]

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. ▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ Recycle wherever possible. ▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

GUM XANTHAN IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

National Inventory Status

National Inventory	Status
Australia - AICS	Yes
Canada - DSL	Yes
Canada - NDSL	No (gum xanthan)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - ARIPS	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Revision Date	11/01/2019
Initial Date	09/07/2007

SDS Version Summary

Version	Issue Date	Sections Updated
5.1.1.1	12/12/2016	Physical Properties

7.1.1.1	11/01/2019	One-off system update. NOTE: This may or may not change the GHS classification

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

AMC RESI DRILL™

AMC

Chemwatch Hazard Alert Code: **1**

Chemwatch: **7177-05**
Version No: **5.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **11/01/2019**
Print Date: **03/26/2020**
L.GHS.AUS.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	AMC RESI DRILL™
Synonyms	Not Available
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Filtrate loss control drilling mud additive.

Details of the supplier of the safety data sheet

Registered company name	**AMC**
Address	216 Balcatta Rd, Balcatta WA 6021 Australia
Telephone	+61 (8) 9445 4000
Fax	+61 (8) 9445 4040
Website	www.amcmud.com
Email	amc@imdexlimited.com

Emergency telephone number

Association / Organisation	**Chemwatch**	**CHEMWATCH EMERGENCY RESPONSE**
Emergency telephone numbers	**1800 039 008**	**+61 1800 951 288**
Other emergency telephone numbers	**Not Available**	**+61 2 9186 1132**

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SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

NON-HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability	**1**		
Toxicity	**0**		
Body Contact	**0**		
Reactivity	**1**		
Chronic	**0**		

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	Not Applicable
Classification [1]	Not Applicable

Label elements

Hazard pictogram(s)	Not Applicable

SIGNAL WORD	NOT APPLICABLE

Hazard statement(s)

Not Applicable

Precautionary statement(s) General

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	100	mixture of vegetable derived materials
Not Available		organic polymers
Not Available		insoluble oxides

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If dust is inhaled, remove from contaminated area. ▸ Encourage patient to blow nose to ensure clear passage of breathing. ▸ If irritation or discomfort persists seek medical attention.
Ingestion	▸ Immediately give a glass of water. ▸ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- Foam.
- Dry chemical powder.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ Wear breathing apparatus plus protective gloves.
Fire/Explosion Hazard	‣ Solid which exhibits difficult combustion or is difficult to ignite. ‣ Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Combustion products include: carbon monoxide (CO) carbon dioxide (CO_2) other pyrolysis products typical of burning organic material.
HAZCHEM	Not Applicable

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	‣ Clean up all spills immediately. ‣ Avoid contact with skin and eyes.
Major Spills	‣ Clear area of personnel and move upwind. ‣ Alert Fire Brigade and tell them location and nature of hazard.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	‣ Limit all unnecessary personal contact. ‣ Wear protective clothing when risk of exposure occurs. ‣ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions) ‣ Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame.
Other information	‣ Store in original containers. ‣ Keep containers securely sealed.

Conditions for safe storage, including any incompatibilities

Suitable container	‣ Lined metal can, lined metal pail/ can. ‣ Plastic pail.
Storage incompatibility	Avoid contamination of water, foodstuffs, feed or seed. ‣ Avoid reaction with oxidising agents

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
AMC RESI DRILL™	Not Available	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
AMC RESI DRILL™	Not Available	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
Personal protection	
Eye and face protection	‣ Safety glasses with side shields ‣ Chemical goggles. ‣ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present. ‣ polychloroprene.
Body protection	See Other protection below
Other protection	No special equipment needed when handling small quantities. **OTHERWISE:** ‣ Overalls.

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	- -	PAPR-P1 -
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3	-
		Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Odourless powder to flake (50-500 mesh),;partly soluble in water.

Physical state	Divided Solid	**Relative density (Water = 1)**	<1.0
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Applicable	**Decomposition temperature**	Not Applicable
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Applicable
Initial boiling point and boiling range (°C)	Not Applicable	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Applicable	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available

Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Applicable
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Applicable
Vapour pressure (kPa)	Not Applicable	**Gas group**	Not Available
Solubility in water	Partly miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Applicable	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	Product is considered stable and hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
Ingestion	The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
Eye	Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result.
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. Long term exposure to high dust concentrations may cause changes in lung function (i.e. pneumoconiosis) caused by particles less than 0.5 micron penetrating and remaining in the lung. A prime symptom is breathlessness.

AMC RESI DRILL™	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✗
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

AMC RESI DRILL™	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE

	Not Available	Not Available	Not Available	Not Available	Not Available
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*				

May be harmful to fauna if not disposed of according to Section 13 and legislative requirements. [AMC]

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. ▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ Recycle wherever possible. ▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

National Inventory Status

National Inventory	Status
Australia - AICS	Yes
Canada - DSL	Yes
Canada - NDSL	Yes
China - IECSC	Yes

Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - ARIPS	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Revision Date	11/01/2019
Initial Date	09/06/2007

SDS Version Summary

Version	Issue Date	Sections Updated
3.1.1.1	12/16/2015	Appearance
5.1.1.1	11/01/2019	One-off system update. NOTE: This may or may not change the GHS classification

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

PRODUCT DATA SHEET

AMC BIOCIDE G™

TREATING CHEMICALS

Description

AMC BIOCIDE G™ is a low toxicity, broad spectrum biocide designed to reduce and prevent bacterial and fungal activity in water based fluids. AMC BIOCIDE G™ is a more environmentally acceptable alternative to glutaraldehyde and does not cause skin sensitisation and dermatitis that can occur through the handling of glutaraldehyde making it safer to handle.

Application

Bacteria multiply and increase in number very rapidly. It is critical to treat the system and arrest the bacteria reproductive cycle. Once the cycle has begun, waste enzymes created by the bacteria and that cause polymer degradation are untreatable. AMC BIOCIDE G™ prevents and controls this reproductive cycle.

Dosage rates will vary according to mud systems, location, water quality and temperature. In locations where environmental conditions are conducive to fast bacterial reproduction rates such as areas of high humidity and temperature, frequency of dosage may need to be increased.

AMC BIOCIDE G™ can be added directly to mud system either in agitated pits or directly to the flowline. Add directly to pre-mixes prior to adding to main mud systems and add regularly to pre-mix pits if they remain static with excess mud for extended periods of time.

Typical Physical Properties

Appearance:	Colourless to pale yellow liquid
Odour:	Amine odour
Specific gravity:	1.1 – 1.2
Solubility:	Soluble in water
pH (1% solution):	3 – 8

Advantages

- Effective at low concentrations
- Effective over a wide pH range
- Easily applied
- Helps prevent polymers such as AMC PAC™ from degrading due to bacterial activity
- Helps prevent corrosion caused by bacterial activity
- Compatible with most water based additives.

Recommended Treatment

AMC BIOCIDE G™ is recommended to be used at concentrations ranging from 0.4 – 4L /m³ (0.1 – 1.5lb / bbl).

Please Note: Several factors will dictate the most appropriate concentration rate. Please contact your nearest AMC representative for optimum results.

ASIA PACIFIC

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E amc@imdexlimited.com

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AMC Potassium Chloride

AMC

Chemwatch Hazard Alert Code: **1**

Chemwatch: **61-0811**
Version No: **4.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **11/10/2017**
Print Date: **05/02/2018**
L.GHS.AUS.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	AMC Potassium Chloride
Chemical Name	potassium chloride
Synonyms	KCl
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Technical grade. Drilling fluid additive.

Details of the supplier of the safety data sheet

Registered company name	**AMC**
Address	216 Balcatta Rd, Balcatta WA 6021 Australia
Telephone	+61 (8) 9445 4000
Fax	+61 (8) 9445 4040
Website	www.amcmud.com
Email	amc@imdexlimited.com

Emergency telephone number

Association / Organisation	**Chemwatch**
Emergency telephone numbers	1800 039 008
Other emergency telephone numbers	Not Available

CHEMWATCH EMERGENCY RESPONSE

Primary Number	Alternative Number 1	Alternative Number 2
1800 039 008	1800 039 008	+612 9186 1132

Once connected and if the message is not in your prefered language then please dial 01

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

NON-HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	0	
Toxicity	1	
Body Contact	1	
Reactivity	0	
Chronic	0	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	Not Applicable
Classification	Not Applicable

Label elements

Hazard pictogram(s)	Not Applicable
SIGNAL WORD	**NOT APPLICABLE**

Hazard statement(s)

Not Applicable

Precautionary statement(s) General

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7447-40-7	>95	potassium chloride

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If dust is inhaled, remove from contaminated area. ▸ Encourage patient to blow nose to ensure clear breathing passages. ▸ Ask patient to rinse mouth with water but to not drink water. ▸ Seek immediate medical attention.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully.

	▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice.

Indication of any immediate medical attention and special treatment needed

For potassium intoxications:

- Hyperkalaemia, in patients with abnormal renal function, results from reduced renal excretion following intoxication.
- The presence of electrocardiographic evidence of hyperkalemia or serum potassium levels exceeding 7.5 mE/L indicates a medical emergency requiring an intravenous line and constant cardiac monitoring.
- The intravenous ingestion of 5-10 ml of 10% calcium gluconate, in adults, over a 2 minute period antagonises the cardiac and neuromuscular effects. The duration of action is approximately 1 hour. [Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves in the event of a fire.
Fire/Explosion Hazard	▸ Non combustible. ▸ Not considered a significant fire risk, however containers may burn. Decomposition may produce toxic fumes of: , hydrogen chloride , metal oxides May emit poisonous fumes.
HAZCHEM	Not Applicable

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Remove all ignition sources. ▸ Clean up all spills immediately.
Major Spills	Moderate hazard. ▸ **CAUTION**: Advise personnel in area.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Glass container is suitable for laboratory quantities ▸ Polyethylene or polypropylene container. ▸ Check all containers are clearly labelled and free from leaks.

Storage incompatibility	Derivative of very electropositive metal. Inorganic alkaline metal derivative ▸ Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride. ▸ These trifluorides are hypergolic oxidisers. |Avoid reaction with bromine trifluoride; potassium permanganate, plus sulfuric acid.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
potassium chloride	Potassium chloride	7.8 mg/m3	86 mg/m3	510 mg/m3

Ingredient	Original IDLH	Revised IDLH
potassium chloride	Not Available	Not Available

MATERIAL DATA

It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.
At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience).

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present. ▸ polychloroprene.
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C.

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	- -	PAPR-P1 -
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3	-
		Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point

organic compounds(below 65 degC)

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Colourless or white, odourless crystals or crystalline powder with a strong saline taste. Soluble in water (26%), slightly soluble in alcohol.

Physical state	Divided Solid	**Relative density (Water = 1)**	1.987
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Applicable
pH (as supplied)	Not Applicable	**Decomposition temperature**	Sublimes @ 1500
Melting point / freezing point (°C)	773	**Viscosity (cSt)**	Not Applicable
Initial boiling point and boiling range (°C)	Sublimes at 1500	**Molecular weight (g/mol)**	74.55
Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	Not Applicable	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Applicable	**Surface Tension (dyn/cm or mN/m)**	Not Applicable
Lower Explosive Limit (%)	Not Applicable	**Volatile Component (%vol)**	Not Applicable
Vapour pressure (kPa)	Not Applicable	**Gas group**	Not Available
Solubility in water (g/L)	Miscible	**pH as a solution (1%)**	7
Vapour density (Air = 1)	Not Applicable	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a

	minimum and that suitable control measures be used in an occupational setting. Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled. If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.
Ingestion	Accidental ingestion of the material may be damaging to the health of the individual. Use as a food additive indicates good tolerance of small amounts, but excessive amounts or overuse may bring irritant and/or harmful effects Acute potassium poisonings following ingestion are rare because large doses usually induce vomiting and a healthy kidney ensures rapid excretion. Potassium poisoning disturbs the rhythm of the heart (a slow, weak pulse, heightened T waves on the ECG, arrhythmias heart block) and eventually produces a fall in blood pressure (due to weakened cardiac contractility). |The material is generally regarded as being of very low toxicity and is used routinely as a food additive. Ingestion of large quantities of the material may produce weakness and circulatory problems.
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. Repeated exposure may cause skin cracking, flaking or drying following normal handling and use. Irritation and skin reactions are possible with sensitive skin Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result.
Chronic	Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following. Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Long term exposure to high dust concentrations may cause changes in lung function (i.e. pneumoconiosis) caused by particles less than 0.5 micron penetrating and remaining in the lung. A prime symptom is breathlessness.

AMC Potassium Chloride	**TOXICITY**	**IRRITATION**
	Oral (man) LDLo: 20 mg/kg[2]	Eye (rabbit): 500 mg/24h - mild
	Oral (rat) LD50: 2600 mg/kg[2]	
	Oral (woman) TDLo: 60 mg/kg[2]	
potassium chloride	**TOXICITY**	**IRRITATION**
	Oral (rat) LD50: 2600 mg/kg[2]	Eye (rabbit): 500 mg/24h - mild
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

POTASSIUM CHLORIDE	The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Acute Toxicity	✗	**Carcinogenicity**	⊘
Skin Irritation/Corrosion	⊘	**Reproductivity**	⊘
Serious Eye Damage/Irritation	⊘	**STOT - Single Exposure**	⊘
Respiratory or Skin sensitisation	⊘	**STOT - Repeated Exposure**	⊘
Mutagenicity	⊘	**Aspiration Hazard**	⊘

Legend: ✗ *– Data available but does not fill the criteria for classification*
✔ *– Data available to make classification*
⊘ *– Data Not Available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

AMC Potassium Chloride	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
potassium chloride	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	29.8000mg/L	4
	EC50	48	Crustacea	83mg/L	4
	EC50	96	Algae or other aquatic plants	1337mg/L	4
	NOEC	48	Crustacea	240.45mg/L	4
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*				

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
potassium chloride	HIGH	HIGH

Bioaccumulative potential

Ingredient	Bioaccumulation
potassium chloride	LOW (LogKOW = -0.4608)

Mobility in soil

Ingredient	Mobility
potassium chloride	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. ▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ Recycle wherever possible or consult manufacturer for recycling options. ▸ Consult State Land Waste Management Authority for disposal.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Source	Product name	Pollution Category	Ship Type
IMO MARPOL (Annex II) - List of Noxious Liquid Substances Carried in Bulk	Potassium chloride solution	Z	3

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

POTASSIUM CHLORIDE(7447-40-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	N (potassium chloride)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	Y
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	Y
USA - TSCA	Y
Legend:	*Y = All ingredients are on the inventory* *N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Revision Date	11/10/2017
Initial Date	Not Available

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

Appendix 2 Groundwater Bore Results

Analyte	Unit	Limit of Reporting	Drinking Water Guideline[1]	Stock Water Guideline[2]	RN018955	RN017657
Associated well					West Mereenie	West Mereenie
Groundwater level	mTOC	-	-	-	No access	No access
Electrical Conductivity	µS/cm	-	-	-	444	810
pH	pH Unit	-	6.5 - 8.5^	-	7.0	7.0
Temperature	° C	-	-	-	28.7	28.5
pH	pH Unit	0.01	6.5 - 8.5^	-	7.62	7.56
Sodium Adsorption Ratio	-	0.01	-	-	2.12	2.54
Electrical Conductivity	µS/cm	1	-	-	406	722
Total Dissolved Solids	mg/L	10	1200	4000	264	469
Total Suspended Solids	mg/L	5	-	-	<5	6
Total Hardness	mg/L	1	200^	-	78	160
Hydroxide Alkalinity	mg/L	1	-	-	<1	<1
Carbonate Alkalinity	mg/L	1	-	-	<1	<1
Bicarbonate Alkalinity	mg/L	1	-	-	55	64
Total Alkalinity	mg/L	1	-	-	55	64
Calcium	mg/L	1	-	1000	13	28
Magnesium	mg/L	1	-	-	11	22
Sodium	mg/L	1	180^	-	43	74
Potassium	mg/L	1	-	-	12	16
Chloride	mg/L	1	250^	-	67	126
Sulfate	mg/L	1	250^	1000	34	101
Fluoride	mg/L	0.1	1.5	-	0.5	0.6
Total Anions	meq/L	0.01	-	-	3.7	6.94
Total Cations	meq/L	0.01	-	-	3.73	6.84
Ionic Balance	%	0.01	-	-	0.46	0.72
Nitrite as N	mg/L	0.01	3	30	<0.01	<0.01
Nitrate as N	mg/L	0.01	50	400	0.44	1.54
Nitrite + Nitrate as N	mg/L	0.01	-	-	0.44	1.54
Silicon as Si02	mg/L	0.1	80^	-	12.8	14.4
Arsenic	mg/L	0.001	0.01	0.5	<0.001	<0.001
Barium	mg/L	0.001	2	-	0.034	0.06
Cadmium	mg/L	0.0001	0.002	0.01	<0.0001	<0.0001
Chromium	mg/L	0.001	0.05	1	<0.001	0.001
Copper	mg/L	0.001	2	1	<0.001	0.002
Lead	mg/L	0.001	0.01	0.1	<0.001	<0.001
Lithium	mg/L	0.001	-	-	<0.001	0.002
Manganese	mg/L	0.001	0.5	-	0.082	0.003
Selenium	mg/L	0.01	0.01	1	<0.01	<0.01
Silver	mg/L	0.001	0.1	-	<0.001	<0.001
Strontium	mg/L	0.001	-	-	0.145	0.247
Zinc	mg/L	0.005	3^	20	<0.005	0.033
Boron	mg/L	0.05	4	5	0.14	0.21

Analyte	Unit	Limit of Reporting	Drinking Water Guideline[1]	Stock Water Guideline[2]	RN018955	RN017657
Iron	mg/L	0.05	0.3^	-	0.1	<0.05
Mercury	mg/L	0.0001	0.001	0.002	<0.0001	<0.0001
Arsenic	mg/L	0.001	0.01	0.5	<0.001	<0.001
Barium	mg/L	0.001	2	-	0.035	0.065
Cadmium	mg/L	0.0001	0.002	0.01	<0.0001	<0.0001
Chromium	mg/L	0.001	0.05	1	0.003	0.003
Copper	mg/L	0.001	2	1	<0.001	0.004
Lead	mg/L	0.001	0.01	0.1	<0.001	<0.001
Lithium	mg/L	0.001	-	-	<0.001	0.002
Manganese	mg/L	0.001	0.5	-	0.086	0.004
Selenium	mg/L	0.01	0.01	1	<0.01	<0.01
Silver	mg/L	0.001	0.1	-	<0.001	<0.001
Strontium	mg/L	0.001	-	-	0.153	0.259
Zinc	mg/L	0.005	3^	20	<0.005	0.042
Boron	mg/L	0.05	4	5	0.12	0.15
Iron	mg/L	0.05	0.3^	-	1.09	0.46
Mercury	mg/L	0.0001	0.001	0.002	<0.0001	<0.0001
C6 - C9 Fraction	µg/L	20	-	-	<20	<20
C10 - C14 Fraction	µg/L	50	-	-	<50	<50
C15 - C28 Fraction	µg/L	100	-	-	<100	<100
C29 - C36 Fraction	µg/L	50	-	-	<50	<50
C10 - C36 Fraction (sum)	µg/L	50	-	-	<50	<50
C6 - C10 Fraction						
C6 - C10 Fraction minus BTEX (F1)						
>C10 - C16 Fraction						
>C16 - C34 Fraction						
>C34 - C40 Fraction						
>C10 - C40 Fraction (sum)						
>C10 - C16 Fraction minus Naphthalene (F2)						

Appendix 3 EPBC Protected Matters Search Report

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

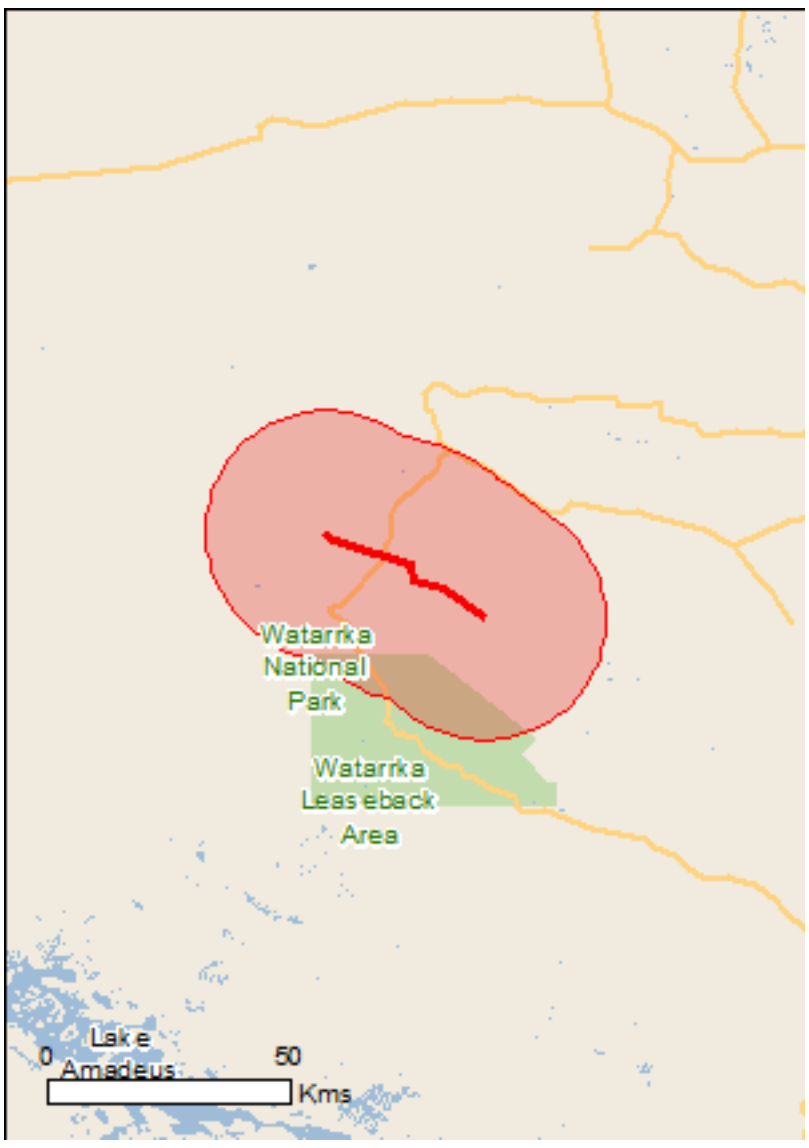
This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 09/03/20 11:54:06

Summary
Details
Matters of NES
Other Matters Protected by the EPBC Act
Extra Information
Caveat
Acknowledgements



Coordinates

Buffer: 25.0Km

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	11
Listed Migratory Species:	9

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	14
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	9
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Mammals		
Lagorchestes hirsutus Central Australian subspecies Mala, Rufous Hare-Wallaby (Central Australia) [88019]	Endangered	Species or species habitat likely to occur within area
Petrogale lateralis MacDonnell Ranges race Warru, Black-footed Rock-wallaby (MacDonnell Ranges race) [66649]	Vulnerable	Species or species habitat known to occur within area
Zyzomys pedunculatus Central Rock-rat, Antina [68]	Critically Endangered	Species or species habitat may occur within area
Plants		
Macrozamia macdonnellii MacDonnell Ranges Cycad [11843]	Vulnerable	Species or species habitat known to occur within area
Reptiles		
Liopholis kintorei Great Desert Skink, Tjakura, Warrarna, Mulyamiji [83160]	Vulnerable	Species or species habitat may occur within area
Liopholis slateri slateri Slater's Skink, Floodplain Skink [83163]	Endangered	Species or species habitat may occur within area

Listed Migratory Species	[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.	

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus		
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum		
Oriental Pratincole [840]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Katiti Petermann	NT
Watarrka	NT

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Camelus dromedarius Dromedary, Camel [7]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-23.92882 131.39798,-23.94392 131.41248,-23.9829 131.55148,-24.01001 131.5572,-24.0246 131.61447,-24.07668 131.68962

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix 4 Weed Management Plan

MEREENIE WEED MANAGEMENT PLAN

LOW ECOLOGICAL SERVICES P/L

July 2019

Prepared By:
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DISCLAIMER

This document has been prepared by Low Ecological Services (LES) for Mereenie Oil and Gas Field (MRN) in accordance with an agreement with Central Petroleum Limited (CP). LES has prepared this document using the skill and care expected from professional scientists to provide factual and technical information and reasonable solutions to identified risks. It does not constitute legal advice.

DOCUMENT DETAILS

Name of Document:	**Mereenie Oil and Gas Field Management Plan 201**
Authors:	**redacted**
Client:	Central Petroleum Limited

REVISION DETAILS

Approvals	Name	Signature	Date
Originator	Low Ecological Services		22/07/2019
Reviewer	**redacted** Central Petroleum Ltd.		
Final version			

ABBREVIATIONS

Abbreviations	
CP	Central Petroleum Limited
CTP	Central treatment plant
DLRM	Department of Land Resource Management
h	Hour
km	Kilometres
LES	Low Ecological Services
MRN	Mereenie Oil and Gas Field
SDS	Safety Data Sheet
NT	Northern Territory
OL	Operations License
WM Act	Weeds Management Act 2001
WMP	Weed Management Plan
WoNS	Weeds of National Significance

1. EXECUTIVE SUMMARY

Weed control at Mereenie Oil and Gas Field (MRN) is an ongoing part of Central Petroleum's (CP) operations. The invasion by Buffel Grass in disturbed areas over the past 20 years has increased the need for weed management.

Weed surveys have been conducted at Central Petroleum's MRN by Low Ecological Services (LES) during annual environmental audits. An additional weed survey was conducted on the 12th March 2019 during which time locations geographical information of weed species, densities and locations was recorded.

In Central Petroleum's Mereenie lease area, no Northern Territory (NT) Declared weeds or Weeds of National Significance (WoNS) have been found. However, introduced species were present, including Buffel Grass (*Cenchrus ciliaris)*, Feathertop Rhodes Grass *(Chloris virgata*), Paddy Melon *(Cucumis myriocarpus)* and Spiked Malvastrum (*Malvastrum americanum*). Elimination of non-declared weed species from the MRN leases is not practicable. Therefore, effort should be focused on controlling these environmental weeds around infrastructure and access tracks and preventing their introduction into new areas.

Weed control in MRN will involve the use of manual and chemical treatments, including residual herbicides, applied at the optimum growth period of target weeds. Residual herbicides can be used in the CTP to provide pre-emergent control of weed species in areas where potential run-off transport of granules is expected to be minimal.

It is intended that this Weed Management Plan and its associated files will fulfil the Weed Management Plan (WMP) component of the *Petroleum (Environmental) Regulations*. In addition, this document will be used by Central Petroleum (CP) as an on-ground resource to manage weeds at the Mereenie Oil and Gas Field.

Carefully timed weed management using physical or chemical treatments outlined in this report should ensure that weeds are controlled to a level that reduces on-site risks. A file containing the directions for use for each of the chemicals listed in this report has been provided separately to CP

2. INTRODUCTION

The Mereenie Oil and Gas Field (MRN) is located approximately 260km from Alice Springs, with access along the sealed and unsealed Mereenie loop road. The MRN is covered by Operations License (OL) 4 and OL5 as shown in Figure 1. This weed management plan (WMP) provides advice and guidance on the prevention and control of new and existing weeds within OL4 and OL5. The WMP outlines current best practice control methods recommended by the NT Weeds Branch. This WMP will be updated annually to ensure the latest best practice techniques are used. Particularly, requirements of WoNS and NT declared weeds under the *Weeds Management Act* 2001 (WM Act) must be managed in accordance with the Act.

Weeds are defined in this report as any flora species that may cause environmental degradation or nuisance to the safe operation of the MRN facilities. This includes NT declared weeds, Weeds of National Significance (WoNS), invasive species, environmental weeds and flora that is present in a location that may impact on the safe operation of the MRN facilities.

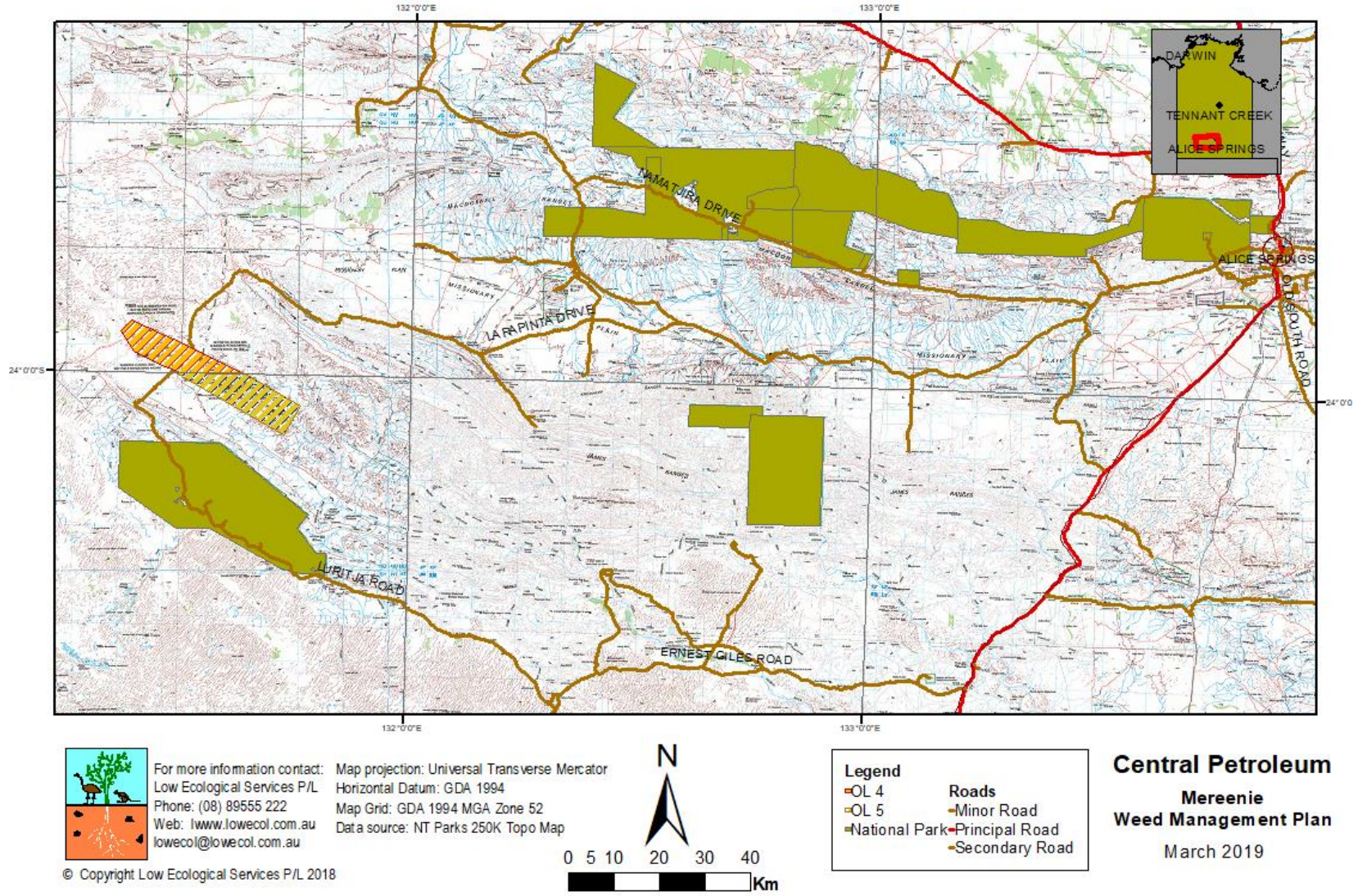

Figure 1: Map detailing the location of Mereenie Oil and Gas Field (OL4 and OL5) in relation to Alice Springs and National Parks.

3. RELEVANT LEGISLATION

Northern Territory of Australia Weeds Management Act (2001)

The control of weeds is regulated by the NT government through the NT Weeds Management Act (WM Act). Under this legislation, weed control is the responsibility of the land manager/owner. If a weed is declared, all land holders, land managers and land users must comply with the declaration classification. The Northern Territory Weed Management Handbook provides detailed information about weed control in the Northern Territory.

There are three classes of weeds under the WM Act:

- **Class A:** **Eradicate**.
- **Class B**: **Control**
- **Class C:** **Prevent entry**

Weeds of National Significance (WoNS)

WoNS are nationally agreed priority plant species for control and management. Weed species are determined based on rankings for invasiveness, potential to spread, and impact on socio-economic and environmental assets (Australian Weeds Committee, 2007). A list of 20 WoNS was endorsed in 1999 and a further 12 were added in 2012. There is a strategic plan for each WoNS outlining tactics and actions for control (Australian Government Department of Environment and Energy, 2017). All WoNS are also NT declared weeds.

No NT declared weeds or WoNS occur at the MRN and management practices in this report aim to limit the risk of these weeds developing on site due to MRN operations.

Other relevant legislation:

Commonwealth

- *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act)
- Revised National Weeds Strategy 1999
- *Agricultural and Veterinary Chemicals Code Act* 1994

Northern Territory

- *Weeds Management Act* 2001 (WM Act) – amended
- Petroleum (Environment) Regulations

4. DEDICATED WEEDS OFFICER

As part of the *Scientific Inquiry into Hydraulic Fracturing*, each gas field is required to have a dedicated weed officer.

The weeds officer is responsible and accountable for weed related requirements including baseline weed assessments, ongoing monitoring, training of workers and contractors, and oversight of weed control mechanisms.

Dedicated weed officer for MRN:

- Bill Low, Low Ecological Services

The dedicated weed officer for MRN is not located on-site and will act in this role as a consultant. As such, CP will contact the weed officer as required to ensure weed related activities are undertaken.

5. EXISTING WEEDS ON SITE

5.1. Existing weeds on site

Situational or environmental weeds at the MRN have the potential to increase risk through:

- Ground vision impairment – being unable to spot hazards or spills;
- Increased risk of fire due to increased fuel loads;
- Increased risk of fauna interactions snakes etc.

Weed infestations can also harbour feral animals and hinder their control. They pose a risk to flora though out-competing native species and replacement of native plant communities.

Weeds have been identified through the environmental audits conducted by LES in previous years and a dedicated weed survey conducted on 11th March 2019. No WoNS or NT Declared Weeds were found in OL4 or OL5. However, Buffel grass (*Cenchrus ciliaris*) and Paddy melon (*Citrullus lanatus*) were identified throughout MRN (Figures 2-4 and Table 1). Feathertop rhodes grass (*Chloris virgata*) and Spiked Malvastrum (*Malvastrum americanum*) were observed in previous audits.

Weeds predominantly occurred in areas of disturbed soils such as road sides, buildings and around operational infrastructure such as the CTP and Mereenie Camp area. At some well pads, weeds were absent. Higher densities of weeds occurred at OL5 compared to OL4. Buffel grass was widespread throughout the area and total elimination of this species from the MRN leases is not practicable. Therefore, effort should be focused on controlling these environmental weeds around infrastructure and access tracks and preventing their introduction into new areas.

Native plants can also become weedy and for this report the use of the term weeds includes plants which are growing where they are not wanted and in some cases are deleterious to safe management of the gas and oil facility, i.e. situational weeds. Refer to the Alice Springs Regional Weed Management Plan for Alert Weeds and Priority Weed Species.

The Alice Springs Regional Weed Management Plan (2013-2018) provides information on priority weeds for the region and alert weeds – those which have the potential to naturalise in the area but have not done so yet. Staff at MRN should familiarise themselves with weeds in this plan such as Athel pine, rubber bus and Parkinsonia and report any sightings.

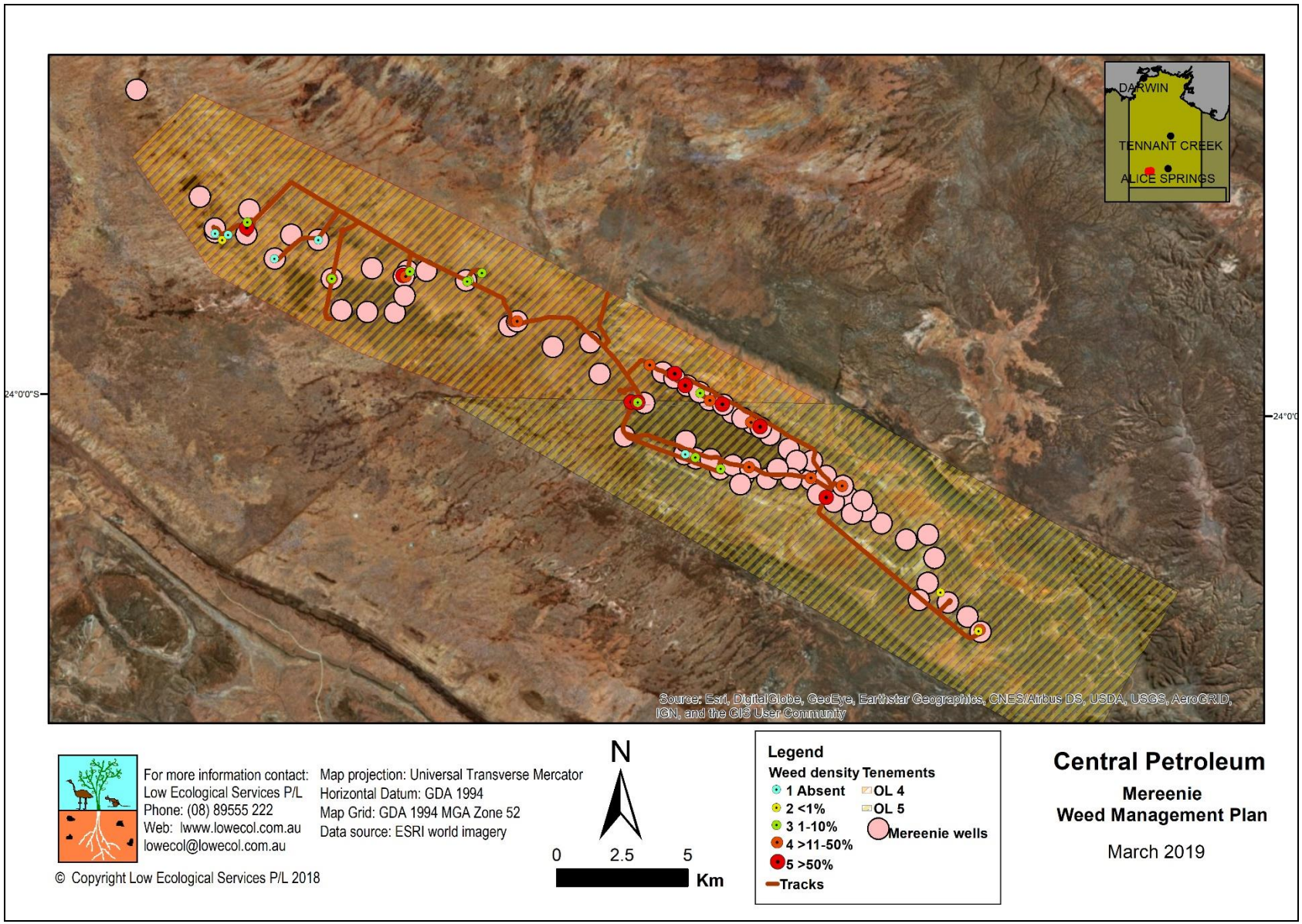

Figure 2: Mereenie Oil and Gas Field weed survey March 2019

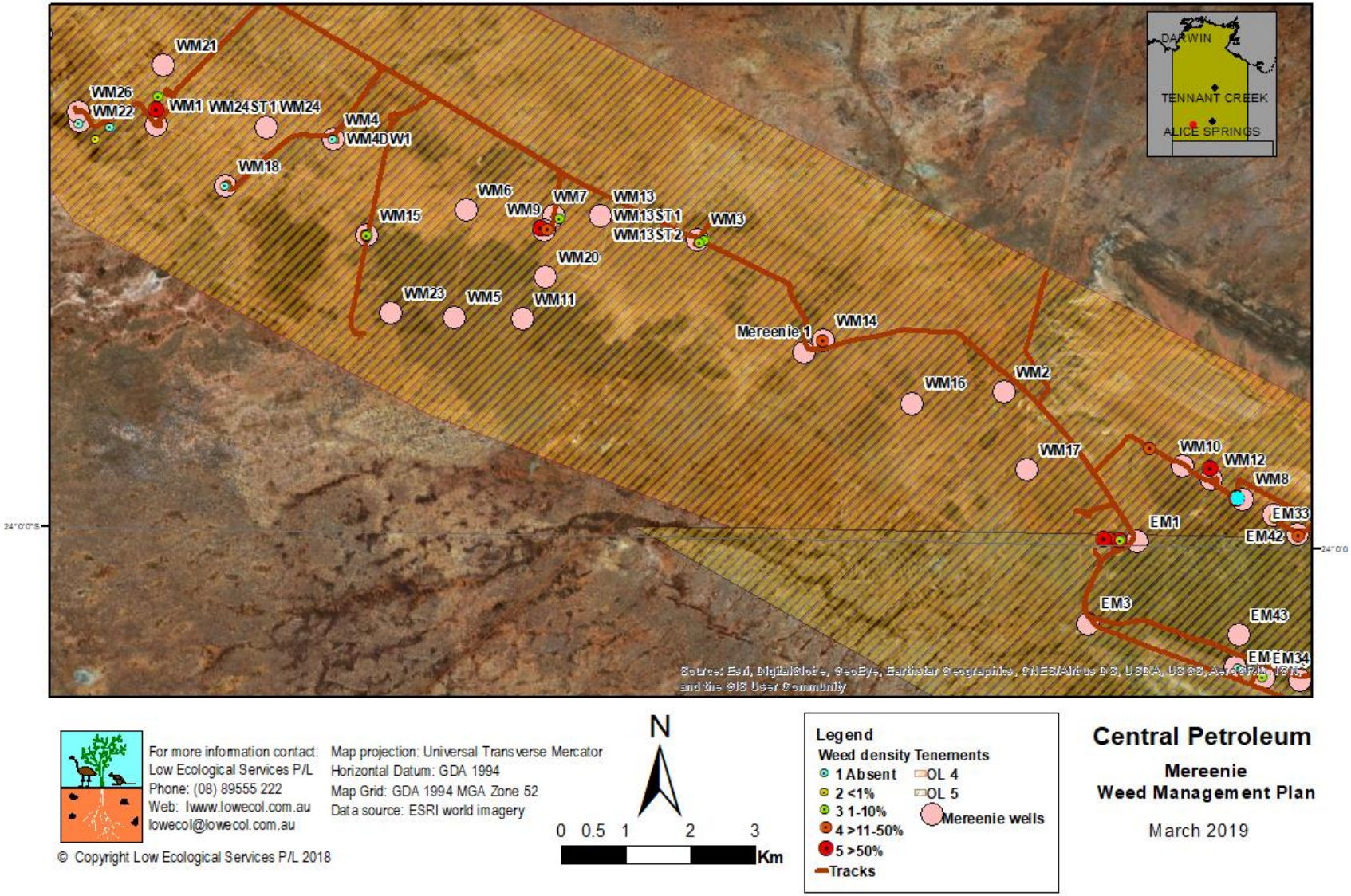

Figure 3: Weed densities at West Mereenie wells.

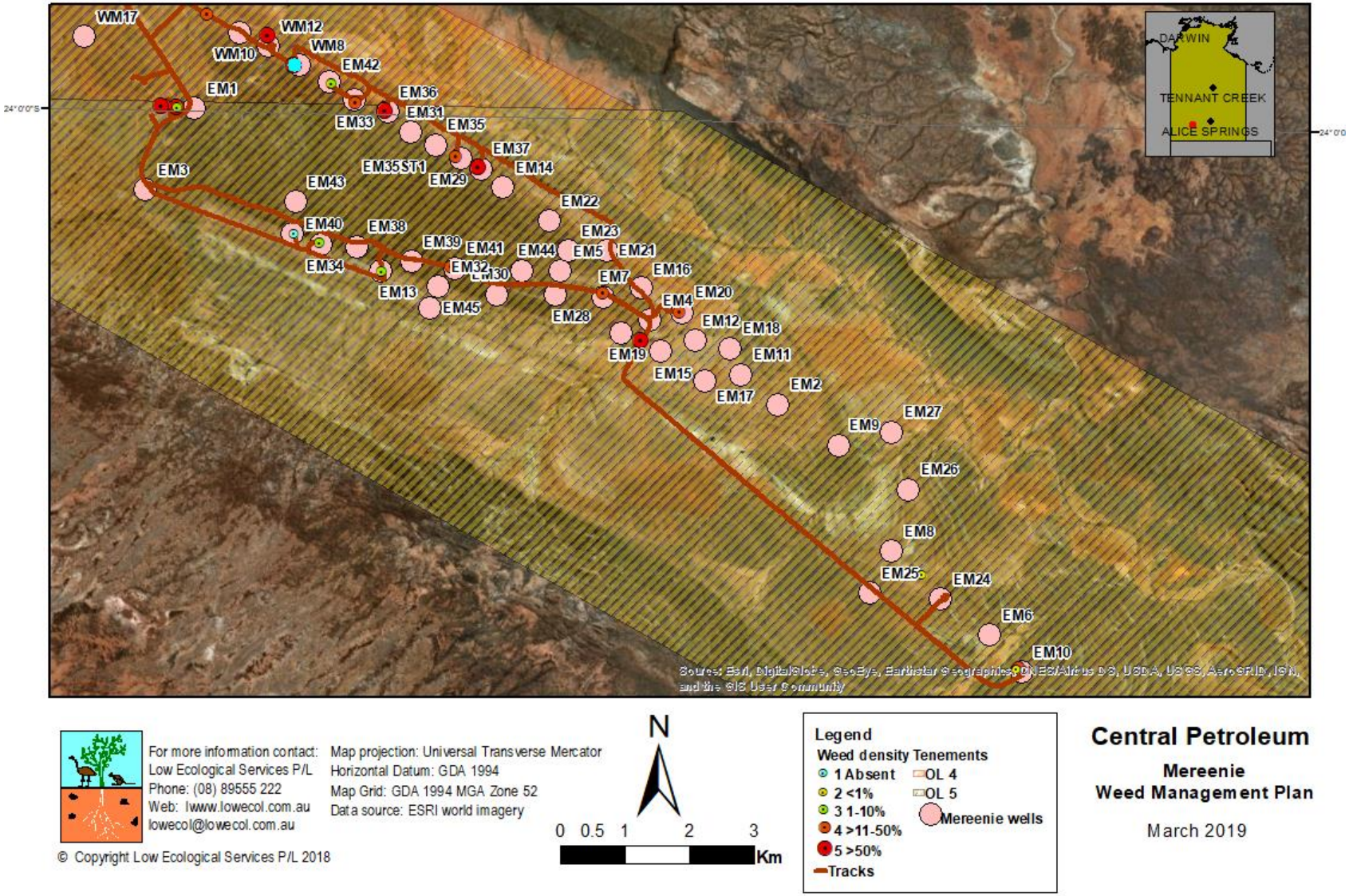

Figure 4: Weed densities at East Mereenie.

Table 1: Known weed species from Mereenie.

Weed name	Status	Description	Photograph
Buffel Grass (***Cenchrus ciliaris)***	Not declared	Long lived dense tussock grass with deep tap-root system up to 1m tall. Flower- varies in colour from straw to purple. Long cylindrical, dense, spike-like, 2.5–15 cm long. Leaves- blueish-green, hairy with pointed tips, flat or folded. Seed heads- Dense, hairy, cylindrical spike up to 15 cm long and 2 cm wide. Seeds enclosed in a cluster of bristles, giving 'fluffy' appearance. Stalks are tough and branched with swollen bases. Leaves are produced at the basal and higher nodes. Rhizomes up to 0.5 m long.	
Paddy melon (***Cucumis myriocarpus***)	Not declared	Annual with prostrate or climbing habit Slender rough stems Leaves 60 to 200 mm long and 40 to 150 mm wide Leaves large, coarse, hairy, pinnately-lobed and alternate Fruit golf ball size, striped, soft prickly melons Summer flowers 5 lobed and yellow.	
Feathertop rhodes grass (***Chloris virgata)***	Not declared	Tufted annual grass up to 1m tall Leaf blades are bluish green, 5 to 25cm long and 3 to 6mm wide Seed heads or panicles have 7 to 19 feathery, white-silver spikes that are 3 to 9mm long Leaf blades have tufts of hairs along the margins and where the blade joins the sheath Stem joints are hairless and sometimes very dark.	
Spiked Malvastrum (***Malvastrum americanum***)	Not declared	Erect, annual or short-lived perennial herb to 1m tall Most parts with short, scattered, stellate hairs, dense on young growth Leaves ovate to lanceolate Flowers in a dense terminal spike, yellow to orangish yellow Can produce root suckers	

5.2. Weeds to watch

The potential for additional weed species to enter a disturbed site through a number of means and once there establish quickly is extremely high. On-shore petroleum activities; infrastructure corridors (gas pipeline, rail corridors, power lines, roads and tracks); commercial activities; and river corridors are all pathways for weed spread that require priority management attention. provides a number of actions to prevent the introduction of weeds.

The Alice Springs Regional Weed Management Plan (2013-2018) provides information on priority weeds and alert weeds – those which have the potential to naturalise in the area but have not done so yet. Staff at MRN should familiarise themselves with weeds in this plan such as Athel pine, rubber bush, cacti, and Parkinsonia, which are all Declared weeds that have been found in central Australia. Any sighting should be referred to the Weeds Management Branch prior to attempting to remove them. Identification sheets for these species can be found in Appendices 1-5.

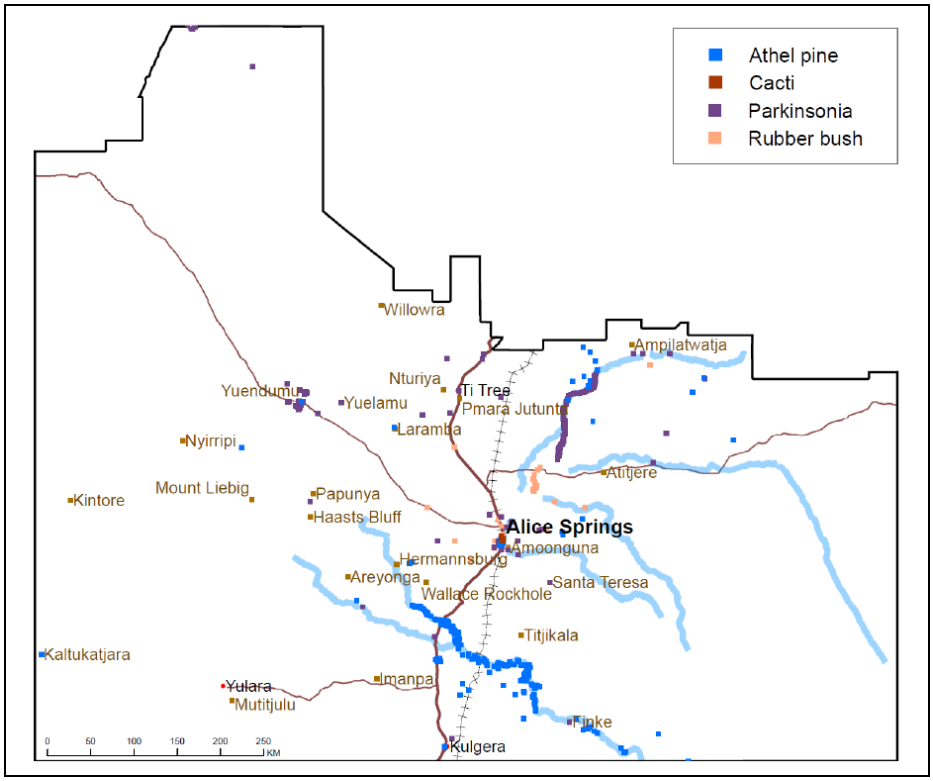

Figure 5: Indicative distribution of priority weed species. Image from: Alice Springs Weed Management Plan 2013-2018.

6. WEED INTRODUCTION AND SPREAD RISKS

Risks of weeds being introduced from various project stages are listed below, along with mitigation measures.

Table 2: Risks and mitigation measures for project stages.

Project stage	Risk	Mitigation measures
Exploration	• Machinery and equipment sourced from weed-infested locations – potential for introduction and spread of weeds not currently existing on-site.	• Machinery wash down plans agreed with manager prior to entering site. • If coming from known weed-infested areas or interstate, vehicles should have a weed-free certificate, issued by appropriately qualified personnel before entering the site. • Compulsory site inductions provided to all personnel, contractors and visitors prior to entering the site.
Ongoing activities on-site	• Spread of weeds due to driving on tracks or well-pads. • Spread of weeds from areas of high-infestation (e.g. WM8 to low infestation (e.g. WM4)	• Wash-down bay to be installed. • If coming from known weed-infested areas or interstate, vehicles should have a weed-free certificate, issued by appropriately qualified personnel before entering the site. • Photos and/or GPS locations of Declared Weeds reported to Weeds Officer when observed by on-site staff. • Avoid driving between areas of high infestation to areas of low infestation whenever possible. • If sand, soil or gravel is brought on site such as for hardstand areas and pipe bedding, it will be sourced from material that does not contain declared weed seeds or plants
Well abandonment	• Well pads not frequented by CP staff allowing existing weeds to spread without being noticed.	• Staff to be made aware of risks of weed spread. • Abandoned/suspended wells to be included in weed surveys and annual audits. • Progressively rehabilitate areas when no longer required and monitor rehabilitation to prevent weed establishment
Weed control	• Weeds not adequately controlled/insufficient effort or poor timing of weed control. • Weeds not removed/stacked during weed control efforts, resulting in further spread.	• Annual monitoring of areas that have been treated, as many seeds remain viable for more than five years. Remove weed seedlings before they flower and produce seed. Use weed attribute table created during 2019 weed survey to record activities, progress and observations.
Weed survey	• Insufficient survey effort. • Weeds present on site not identified during survey.	• WMP submitted to DENR annually. • Use of NTG spatial data sets to find areas of weed infestations within close proximity to the site.

7. WEED CONTROL METHODS

Weed management at MRN involves: preventing weeds from entering the site; mechanical or chemical control; and planning for the most effective timing (see Table 3 and Table 4).

Table 3: Key objectives and actions for weed control

Step	Objective	Actions	Timeframe
Weed Identification	Weed species and area of infestation are identified and monitored	– Weed surveys to be undertaken during annual environmental audits by dedicated weeds officer. – Weed species identified to be photographed (and/or areas of infestation recorded with GIS and mapped), report to be provided to CP Environment Coordinator and included within WMP. – Review of actions – Weed survey findings used to determine control programs in consultation with CP or suitable contractors – CP site staff to be trained in identification of weeds, particularly Declared Weeds and WoNS. CP staff should familiarise themselves with declared weeds that have potential to enter the site (e.g. Athel pine)	– Annually external annual audit – As part of ongoing operations – e.g quarterly internal and annual external audits
Weed prevention	No new declared weeds, WoNS or environmental weed individuals or infestations.	– Wash-down bay to be installed. – Vehicles and/or equipment coming from an area with Declared Weeds should be cleaned and obtain a weed free certificate before entry – Vehicles entering from outside the MRN must be weed free. If coming from known weed-infested areas or interstate, vehicles should have a weed-free certificate, issued by appropriately qualified personnel before entering the site. – If areas containing weeds are accessed, all equipment and machinery will be cleaned. Vehicles will be washed or blown down to prevent transfer of weeds to uncontaminated areas – Any fill brought to site must be sourced from weed free area. – No unnecessary clearing to minimise ground disturbance – Road grading in areas of weeds should be from the outside of the infestation back into the centre of the infestation – No off-road driving – Continual monitoring of operational areas and 'hotspots' – Any weed sightings to be reported to the Weeds Officer	– Wash down bay to be installed by end Sept 2019. – Ongoing as part of operational procedures
Weed Control	– Existing weeds are controlled using effective	– Appropriate control and/or removal method selected by trained personnel/contractor based on species present and extent of infestation.	– Control/removal scheduled to occur prior to weed seeding where

	methods. – Personnel and infrastructure are protected from increased fire risk due to weed infestations – No spread of weeds already present at site – No new weed species present	– Maintain a 4m fire break around infrastructure – Plan a rapid response to seasonal changes to maximise the effectiveness of control activities. – Local traditional owners, Rangers or contractors should be engaged to assist with mechanical and chemical control of weed species at the site. – Central Petroleum staff will also undertake weed control when they are available during normal operations. – Shapefiles/maps from the 2019 weed survey inform the weed control activities and control activities are mapped using the same methods. This will enable the Weeds Officer to be more aware of the spread or containment of existing weeds and the effectiveness of weed control.	practicable - timing with seasons and predicted rainfall Usually Nov-March)
	– Weed control methods result in no environmental harm.	– Only suitably trained personnel will use chemicals and herbicides, in accordance with CP's chemical handling and storage procedures. – Relevant stakeholders will be consulted prior to chemical herbicide being used – Assess areas outside of operational areas prior to weed control to identify conservation-listed flora. – Ensure non-target conservation-listed species are not impacted by weed control. – Minimise drift by spraying on low-wind days. – No use of residual herbicide pellets within 2-3 canopy diameters of trees or shrubs – Follow-up surveys will refine the impacts of weed removal of the potential for future vegetation re-growth	– During weed control activities as part of operational procedures - Prior to weed control in areas outside of operational area.
Disposal of weeds and chemicals	– Weeds disposed of in environmentally friendly manner – No further weed spread from disposal – Correct disposal of chemical containers.	– Weed plant material (leaves, seeds, flowers, branches etc.) that are physically removed will be brunt in a burn pit or removed from site (e.g. via waste bins). – It is illegal to transport declared weeds. If declared weeds enter the site, these should be burnt and then buried on site at a depth sufficient to prevent emergence of seeds or seedlings – Chemical containers disposed of correctly e.g. through drumMUSTER	– On completion of weed control activities
Reporting	– Compliance with NTG requirements.	– Annual update provided to DENR to include weed control activities, updated locations of weed spread.	– Report provided to DENR on completion of annual survey.

7.1. Weed identification

Weeds have been identified as outlined in Section 5.

7.2. Prevention

Preventing the introduction of weeds into an area is the most effective method of control.

Avenues for spread and introduction of weeds species at MRN include but are not limited to:

- Movement of contaminated machinery, vehicles and equipment;
- Spreading of contaminated gravel, road fill, topsoil;
- By attachment to and through ingestion by animals (both feral and native); and
- Discharge or pooling of water ie any areas where water can pool and weed seeds can collect

Weed invasion can be minimised by:

1. having knowledge of weeds in the region to enable early identification of new invaders;
2. maintaining wash-down procedures to and from the MRN;
3. disposing of weeds and seed material correctly;
4. controlling the spread of existing weed infestations

Taking note of rainfall conditions and timing weed control accordingly can be important in preventing and limiting weed growth (see Table 3 and Table 4). Weeds are opportunistic and often germinate quickly on disturbed ground. Once established, weeds can be difficult to remove permanently and can require ongoing and expensive maintenance programs. Many plants capitalise on events of high rainfall, experiencing periods of fast growth and mass germination and reproduction. Ensuring weed control is ready to be deployed following large rain events will go a long way in preventing major outbreaks.

7.3. Weed control

While it is unpracticable to control non-declared weeds such as buffel grass across the entire site, the 2019 weed survey found there was need for ongoing control around the Central Treatment Plant and Infrastructure. The key focus for non-declared weeds is maintaining a 4m fire-break around infrastructure. Monitoring should also continue at abandoned or suspended wells to ensure weeds don't encroach on infrastructure when not in use. Weeds can be controlled by mechanical means, chemical means, or a combination of both. These methods are detailed below and in Table 4.

7.3.1. Physical control

Physical control refers to hand-pulling or the use of tools and equipment such as shovels, brushcutters, and axes to physically remove the species. Hand-pulling can be labour intensive for large outbreaks but is an effective method for controlling weed seedlings prior to seed set. Hand-pulling can also be useful for controlling weeds in and around infrastructure e.g. around the pipes at CP- Fresh water tank.

To ensure physical control does not inadvertently result in further infestations, physical control of weeds should not be undertaken when weeds are seeding. After manual removal, weeds of some species need to be buried, burnt or stacked in a pile ensure seed material does not result in reinfestation. An alternative is to transport weeds off-site via a waste contractor. For any Declared Weeds that may occur in the future, transport restrictions may apply. In addition, after physical control, the site should be monitored as soil disturbance following manual removal can provide optimal conditions for a new infestation of weeds.

7.3.2. Chemical Control

There are several types of chemical control agents, each designed for a specific purpose and species. The recommended groups have been explained below. Details on species specific use is provided in Table 4. A file containing the directions for use for each of the chemicals listed in Table 4 has been provided separately to CP.

Foliar spraying

Foliar spraying refers to diluted herbicide being sprayed over the foliage of the plant until it is covered (but not dripping). The use of spray dye is recommended as a visual cue to ensure evenness of coverage. Foliar spraying should only be used when plants are actively growing so the chemical is circulated through the plant down to the roots. It is most effective on new growth a few days to weeks after a rain event. Foliar spraying is usually best undertaken in the early morning and late evening when the Delta T (the relationship between

temperature and humidity) is within the range of 2-10. Ideal conditions are mild temperatures, little to no wind and moderate to high humidity. Evaporation during hot and/or windy conditions reduces absorption of the chemical. It is essential that the operational instructions for each chemical are followed stringently to maximise the effectiveness of the spraying in control the weed. Foliar spraying is an effective and widely used application method but care should be taken to avoid spray drift and off-target damage.

Foliar spraying with Glyphosate

Glyphosate is a common broad-spectrum herbicide that can be sprayed on both broad leaf plants and grasses. Glyphosate must be applied to a plant while it is actively growing to be effective. As plants are commonly water stressed in the arid zone the time frames during which Glyphosate can be used are restricted (see Table 4). An effective way to control invasive grasses with Glyphosate is to first slash then spray the regrowth. This method can be combined with the use of Flupropanate, a residual herbicide, which will control both mature tussocks and the germination of residual seed banks for up to two years.

The Australian Pesticides and Veterinary Medicines Authority (APVMA) reviewed the safety of glyphosate in 2016 and found no grounds to place it under formal reconsideration. The product labels contain relevant poisons scheduling, first aid, and safety directions detailing personal protective equipment when handling and using products containing glyphosate and this information should always be followed.

Adjusting Water quality

The water quality of water used in spraying applications needs to be considered to maximise the effectiveness of foliar spraying control methods. If Alice Springs potable water is used, with a known high water quality then no additives are required. However, if local bores are used, then the water quality needs to be tested to determine what additives might be needed. For example. ‘hard water’ (water with 150-300 mg/L $CaCO^3$) that is slightly alkaline is common in central Australia and alters the effectiveness of herbicides such as glyphosate, 2,4-D amine, MPA amine and dicamba (McDougall, 2012). The solubility of these herbicides is reduced leading to less absorption by the weeds. In addition, ‘hard water’ can cause some chemicals to precipitate, blocking nozzles, pre-filters and causing additional wear of spray rigs (McDougall, 2012). To “soften” hard water it is recommended to add softening agents and adjust the pH of the water in spray applicators.

Residual Herbicides

Residual (long-acting) herbicide pellets can be effective in the ground for a period of up to two years but are only active after rainfall. Residual herbicides can be used in the CTP to provide pre-emergent control of weed species in areas where potential run-off transport of granules is expected to be minimal.

When using residual herbicides, it is important to ensure all pellets are raked just into the surface to prohibit off site migration. Residual herbicides should not be used within three canopies distance from any tree or shrub or within 100m of any waterways.

- **Flupropanate** is a grass-selective residual herbicide found to be effective in the control of Buffel grass. Flupropanate stays residual in the soil for approximately two years and can thus also prevent new germinations. Flupropanate is selective for Buffel grass when applied at recommended rates which can allow for the retention of native grasses and forbs, increasing competition and reducing the chance of Buffel grass recolonising an area. Flupropanate can be applied when invasive grasses are not actively growing, expanding time periods for control programs. Flupropanate and Glyphosate can also be used as a mixture to quickly kill Buffel grass infestations and minimise the likelihood of new germinations.

- **Graslan** is a residual herbicide that is selective for woody weeds and is useful for long term control in hard to access areas.

7.3.3. Records of Chemical Use

In the NT, detailed records of agricultural chemical use are required to be kept for a minimum of two years by businesses registered as professional ground sprayers. Required records include:

- Name and address of person who used the product
- Product name
- Amount of product and dosage used
- Application method
- Product expiry date
- Date and time the product was used
- Exact location of where the product was used
- Type of crops, pastures or plants in the area
- Temperature and wind speed/direction
- Target pest or disease

Table 4: Weed Control Methods Used to Prevent and Mitigate Weeds at MRN

Name	Germination	Flowering	Seed life span	Control Method	Timing for weed control											
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WoNS or Declared Weeds (if observed on site) **Woody situational weeds**	Species dependent			**Chemical:** -Graslan* pellets 1gm/m^2 -Access™ 1:60 Diesel formula -Velpar® 2mL/ spot, 1 spot for each tree. **Mechanical**: Larger plants can be bulldozed, stick raked, blade ploughed, or chain pulled. Effort must be taken to remove roots and seed pods. Chemical control can be undertaken to follow on in controlling regeneration from root suckers or new seedlings.													
Buffel Grass *Cenchrus ciliaris*	Following ~20-25mm rain event	Winter – Spring For best control, apply during periods of active growth. Immediately following a rainfall event in summer months.	~4 years (but plants long-lived)	**Chemical:** Foliar spraying with Glyphosate (360g/L) Roundup Biactive® or other aquatic-sensitive Glyphosate product. Chemical control of Buffel grass will require at least two treatments within a growing season. The initial treatment should occur following rain, when there is active growth. A follow up treatment should be undertaken in two to four weeks' time if regrowth is evident. Large bulky plants can be slashed and when 1/3 regrowth, sprayed to conserve chemicals													
				Residual Chemical: Foliar spraying Flupropanate at an application rate of 1000L/Ha or 1L/10m². Spray dye is recommended as a visual cue to ensure evenness of coverage. It may take 6-8 weeks before there are signs that the plants are being affected. Flupropanate can also be used in a granular form.													
Feathertop rhodes grass *Chloris virgata*	All year but usually spring-autumn >25°C.	September-February	7-12 months	**Physical:** Shallow rooted plant which is easily removed by hand-pulling or chipping in localised areas.												
				Chemical: Glyphosate (360g/L) e.g. Roundup Biactive® Seed set must be stopped or minimised to break the life cycle. Spraying small seedlings as soon as possible after rain is likely to provide best control. *C. virgata* is naturally tolerant of glyphosate herbicide. A double-knock tactic of using two different means of control within a short amount of time has													

				been found to be most effective. The knock interval should be from 7 to 10 days for maximum effectiveness. During periods of active growth.													
Paddy melon *Cucumis myriocarpus*	Spring or early summer after rainfall. Can germinate over an extended period particularly if soil disturbance occurs.		2-4 years	**Physical:** Hand pull seedlings or small infestations. Manually pulling small plants will reduce the chance of seed set.													
				Chemical: Garlon + Antievap spray adjuvant 1% Or A mixture of triclopyr, 2,4-D and metsulfuron Paddy melons have hairy and waxy leaf surfaces that are hard to wet and penetrate when applying herbicide. For this reason, the use of a phenoxy herbicide such as 2,4-D or a spray adjuvant such as Antievap is required to be mixed with an active herbicide to penetrate the plant tissue. Refer to detailed instructions on the use of Garlon Herbicide. Paddy Melon is relatively tolerant to glyphosate													
Spiked Malvastrum *Malvastrum americanum*	*Limited information available on this species	April-July	1-5 years	Foliar spraying with Glyphosate (360g/L), hand pulling or grubbing.													

8. REFERENCES

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9. APPENDICIES

Appendix 1: Weed identification poster: Mexican Poppy, *Argemone ochroleuca*.
Source: Department of Environment and Natural Resources, NTG

DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

Mexican poppy
Argemone ochroleuca

Mexican poppy is declared a Class A (to be eradicated) and Class C (not to be introduced) weed in the Northern Territory.

Mexican poppy is a declared weed in accordance with the *Weeds Management Act*.

HABIT

Robust, erect annual herb grows to 1m tall.

Found in seasonal creeks, streambeds, drainage lines and disturbed areas.

STEMS & BRANCHES

Stems release a yellow sap when cut and are covered with stiff yellow prickles.

LEAVES

Leaves are a distinctive pale blue-green colour.

All parts of the plant are toxic to humans and animals.

FLOWERS

Single flowers at the end of branchlets with 4 - 6 cream-pale yellow coloured petals about 6cm across.

REPRODUCTION

Fruit are shiny blue-green capsules, covered in rigid spines, opening at the top to expose seeds. Each capsule contains up to 400 seeds. Seeds are brown or black, globular in shape and 1.5mm in diameter.

Weed Management Officers from the Weed Management Branch can provide advice on all aspects of weed management including control techniques, biological control, legislative responsibilities, policy advice, monitoring and reporting and regional planning. For further information on weed management planning, integrated control, herbicide application techniques and monitoring please refer to the NT Weed Management Handbook.

T: 08 8999 4567 E: weedinfo@nt.gov.au W: www.nt.gov.au/weeds

NORTHERN TERRITORY GOVERNMENT

Appendix 2: Weed identification poster: Rubber bush, *Calotropis procera.*
Source: Department of Environment and Natural Resources,

DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

Rubber bush

Calotropis procera

Rubber bush is declared a Class B - South of 16°30' S latitude (growth and spread to be controlled) and C (not to be introduced) weed in the Northern Territory.

Rubber bush is a declared weed in accordance with the *Weeds Management Act*.

HABIT	STEMS & BRANCHES	LEAVES	FLOWERS	FRUIT & SEED
				
Small tree or spreading shrub, generally up to 4m. Branches may shoot from the base of the plant.	Stems are smooth, grey-green when young; mature stems have deeply grooved 'corky' grey bark.	Large, opposite, rubbery grey-green leaves. Each pair of opposite leaves is at right angles to adjacent pairs. Leaves do not have stalks, so appear attached to the stem.	The flowers are purple/ pink and white. The five petals have a waxy feel and appearance. The flowers grow in groups in the upper leaf forks.	The fruit is green in colour and 7 - 12cm long. They are rounded at the base and pointed at the tip, like a mango. The fruit contains small seeds which have long silky hairs to aid dispersal.

Weed Management Officers from the Weed Management Branch can provide advice on all aspects of weed management including control techniques, biological control, legislative responsibilities, policy advice, monitoring and reporting and regional planning. For further information on weed management planning, integrated control, herbicide application techniques and monitoring please refer to the NT Weed Management Handbook.

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NORTHERN TERRITORY GOVERNMENT

NTG

Appendix 3: Weed identification poster: Parkinsonia, *Parkinsonia aculeate*
Source: Department of Environment and Natural Resources,

DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

Parkinsonia

Parkinsonia aculeata

Parkinsonia is declared a Class B (growth and spread to be controlled) and Class C (not to be introduced) weed in the Northern Territory and is a Weed of National Significance in Australia.

Parkinsonia is a declared weed in accordance with the *Weeds Management Act*.

HABIT	STEMS & ROOTS	LEAVES	FLOWERS	FRUIT & SEED
				
A branched spreading tree to 6m high.	The bright green branchlets have a thin zig zag pattern, with sharp, woody spines along the stems.	Green, drooping compound leaves with numerous oval leaflets, 1 - 3mm long.	Flowers are small and yellow with five petals, found along the stalk.	Pods are green to pale brown, 5 - 10cm long with small constrictions between hard, oval seeds.

Weed Management Officers from the Weed Management Branch can provide advice on all aspects of weed management including control techniques, biological control, legislative responsibilities, policy advice, monitoring and reporting and regional planning. For further information on weed management planning, integrated control, herbicide application techniques and monitoring please refer to the NT Weed Management Handbook .

T: 08 8999 4567 E: weedinfo@nt.gov.au W: www.nt.gov.au/weeds

NORTHERN TERRITORY GOVERNMENT

Appendix 4: Weed identification poster: Athel pine, *Tamarix aphylla*
Source: Department of Environment and Natural Resources,

DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

Athel pine

Tamarix aphylla

Athel pine is a declared weed in accordance with the *Weeds Management Act* and is also a Weed of National Significance in Australia.

Athel pine has a split declaration of Class A (to be eradicated) and Class B (growth and spread to be controlled). The Athel Pine Weed Management Plan describes management requirements for each of these management zones.

The delineation of management zones between Class A and Class B areas represents a balance between the prioritised requirement to eradicate high risk outlying populations, where feasibility of control remains high (Class A) and the lower feasibility of control associated with large established infestations (Class B). It also aims to protect previous eradication efforts in the Finke River and associated tributaries.

HABIT

A large, spreading tree up to 18m tall. Looks similar to a conifer or pine tree because of its leaves.

STEMS & BRANCHES

Bark is rough and dark brown in colour. Stems are grey-brown.

Leaves and branches are pendulous and hang downwards.

The branches and leaves have salt secreting glands.

LEAVES

Foliage has the appearance of pine-needles. The tiny leaves attached to the needles are between 1 - 2mm long.

FLOWERS

Flowers are tiny white or pink and are arranged spirally in dense clusters.

The first flowers appear when the plant is around three years old and every summer thereafter.

FRUIT & SEED

Fruit are tiny bell-shaped capsules around 3mm long.

These capsules contain cylindrical seeds that are covered with tufts of fine hairs.

Weed Management Officers from the Weed Management Branch can provide advice on all aspects of weed management including control techniques, biological control, legislative responsibilities, policy advice, monitoring and reporting and regional planning. For further information on weed management planning, integrated control, herbicide application techniques and monitoring please refer to the NT Weed Management Handbook. The Athel pine Weed Management Plan can be found at www.nt.gov.au/environment/weeds/weed-management-planning.

T: 08 8999 4567 E: weedinfo@nt.gov.au W: www.nt.gov.au/weeds

NORTHERN TERRITORY GOVERNMENT

Appendix 5: Weed identification poster: Opuntiod cacti.
Source: Department of Environment and Natural Resources, NTG

Appendix 5 Bushfire Management Plan

The following Bushfire Management Plan has been developed in accordance with the requirements of the Code of Practice: Onshore Petroleum Activities in the Northern Territory (Department of Environment and Natural Resources (DENR), 2019), Clause A.3.7, and the Bushfire Management Planning Guide: Onshore Petroleum Projects (Bushfires NT, DENR 2020) for the Mereenie Oil and Gas Field (MRN) workover and wellhead equipment, safety systems and gathering line activities. The day-to-day bushfire management for the operation of the MRN is managed under the approved MRN Field Environmental Management Plan (FEMP).

A5-1 Scope

The following Bushfire Management Plan has been developed in accordance with the requirements of the Code of Practice: Onshore Petroleum Activities in the Northern Territory, Clause A.3.7, and the Bushfire Management Planning Guide: Onshore Petroleum Projects for the Mereenie Oil and Gas Field (MRN) workover and wellhead equipment, safety systems and gathering line activities.

Note that the EMP activities are being conducted within the well lease (and using existing operational infrastructure) at the same time that normal production operations are occurring at the MRN. Site-wide fire management at the MRN is conducted by Operations under the MRN FEMP which was approved prior to the implementation of the Code. Any fire related activities or fires outside of the well lease while EMP activities are occurring revert to the MRN FEMP fire management. Bushfire management at well sites throughout the year when EMP activities are not occurring fall under the MRN FEMP management.

A5-2 Aims and Objectives

Property Land Use	CP operates the MRN under OL4 and OL5 issued under the *Petroleum Act 1984*
NT Fire Management Zone	Alice Springs
NT Fire Protection Zone	The MRN is not located within a NT Fire Protection Zone
Fire Management Aim	To minimise the potential and impact of fires from CPs activities to people, environment, culturally significant sites, public infrastructure and community lands.
Fire Management Objectives	▪ Minimise the risk of causing bushfires from CP's activities ▪ To prevent accidental fire risk and ensure safe storage of chemicals

A5-3 Fire History and Regime

A bushfire scar map has been developed for MRN which shows the history of bushfires in the MRN region (Figure 7A-1). Northern Australian Fire Information (NAFI) records show that the majority of OL 4 has been burnt extensively in 2002 and 2011 as per Figure 7A-1 . Both these fire seasons followed several years of above average rainfall in central Australia. The last fire at the MRN was a small section during 2019. No fires have since occurred.

Within the OL area, much of the vegetation which does pose a fire risk is poisoned or manually removed (predominantly buffel grass and other fast growing high fuel grasses). Because of this and due to the fluctuating growth density of the surrounding vegetation, any fire management plans will be conducted after advisement from professional services capable of ensuring a successful fire treatment while ensuring minimal risk to human and animal inhabitants.

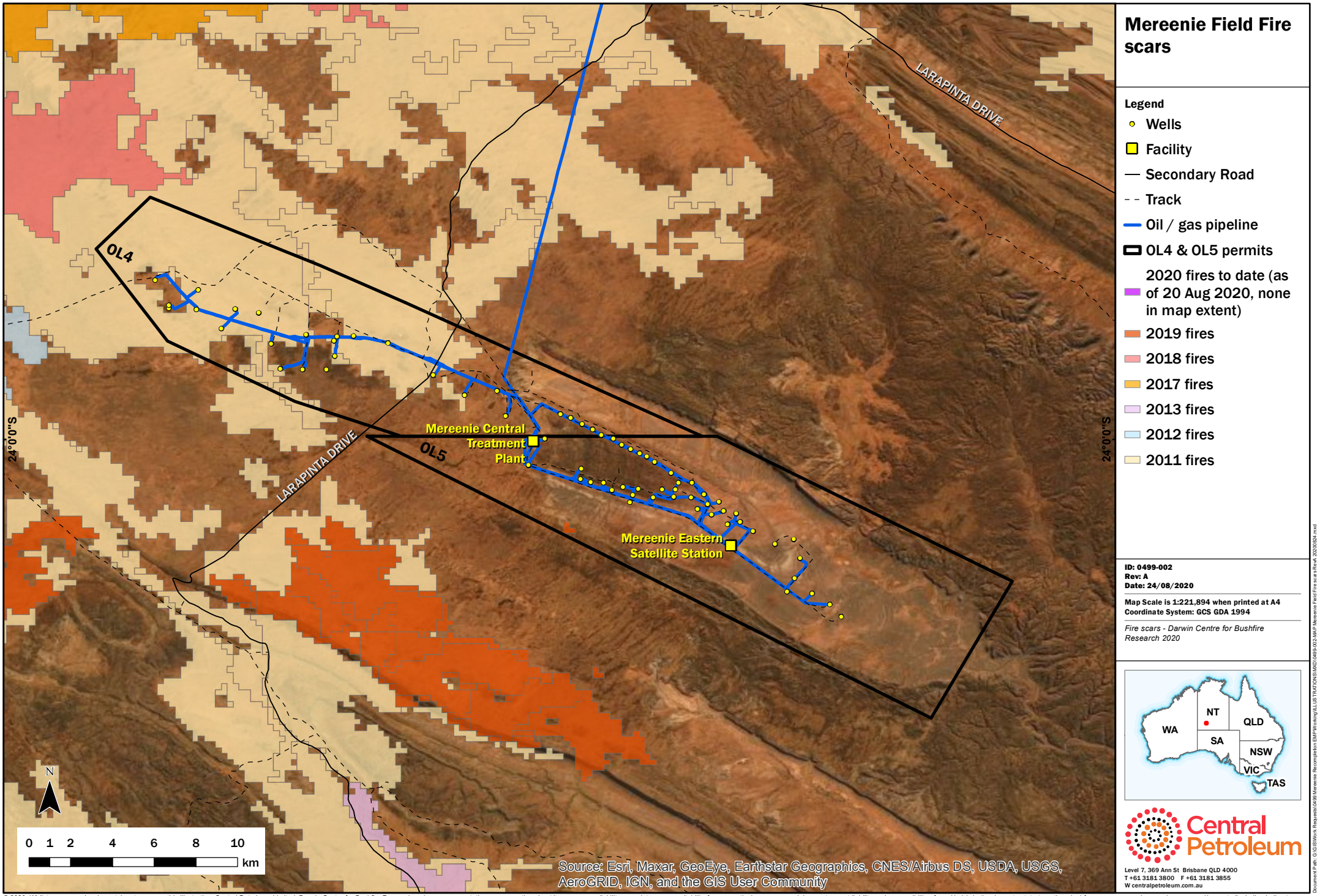

Figure A5-1 Mereenie Field fire scars

A5-4 Fire Risk

CP has undertaken an environmental risk assessment, based on the scope of activities to be conducted under this EMP. From this assessment, environmental objectives and outcomes were developed for bushfire management. The fire risks identified through the assessment process were:

- Site activities increase risk of ignition, resulting in potential harm to works, environment, equipment, production
- Vehicle and equipment movements as potential risk of starting a bushfire
- Personnel smoking on-site increasing risk of starting a bushfire
- Spread of high fuel loads (buffel grass) within well leases which may increase fire intensity

In addition to the fire risks from CP activities, the risk of wildfires (started by others or lightning) remains present in each of the well locations. Wildfire risk is generally low between May and September, medium in March to April and October to November, and high between December and March. Wildfire risk is strongly related to fuel loads. Fuel load accumulation in central Australia is often related to high rainfall La Nina years and associated tropical lows.

A5-5 Potential Impact of Existing Fire Management

The proposed activities will be located on a small, cleared area which ensures there will be no impacts on existing fire management. CP will be using existing access tracks and previously disturbed areas to minimise impacts at the site including potential changes to existing fire patterns and paths.

Activities under the EMP will be conducted under existing land access agreements with the Central Land Council (CLC). Through the process, CP will ensure that the project does not affect the landholders' fire management obligations and strategies. Where a watch and act or emergency warning is issued by the NT Government for the Mereenie Field region, CP will liaise with the CLC to ensure any control efforts/evacuations are coordinated.

A5-6 Management Actions

A5-6.1 Operational Risk Management

Table A5-12-1 Bushfire management controls

Site Activity	Management Controls
▪ Civil activities/earthworks ▪ Flaring ▪ Vehicle and equipment movement ▪ Personnel Smoking ▪ Land management ▪ Emergency Venting	▪ A permit to burn (including for open flares) is required in the Fire Danger Period (generally November to March for Southern NT). Permits may be obtained from Bushfires NT. ▪ Conduct bushfire related risk assessment prior to flaring and on each day during a flaring event. ▪ Even with a permit burns/flaring cannot be conducted on a Fire Ban Day, in which case venting would be required ▪ Store any flammable and combustible liquids in accordance with relevant Australian Standards ▪ All infrastructure, plant and equipment designed, constructed and operated and maintained to minimise risks of ignition ▪ Appropriate fire management and control equipment available in every vehicle and at each facility (e.g. fire extinguishers, water supply etc) ▪ Train onsite personnel in use of fire control equipment ▪ Conduct Job Hazard Analysis for any new task or new use of equipment to ensure appropriate control measures are identified and to take account of variation in fire danger ratings ▪ Prior to attending site, each day obtain information on current fire danger, presence of fire in the area and current weather condition from the North

Site Activity	Management Controls
	Australia & Rangelands Fire Information (NAFI) and bureau of meteorology websites ▪ No burning of waste ▪ Assess fire fuel load and local site conditions (e.g. seasonal rainfall, fuel load, grazing, high fuel exotic grasses (e.g. buffel)) at each wellsite nominated for EMP activities and remove fire fuel load if bushfire risk exists. ▪ Flammable material to be stored on the well lease according to SDS and Code requirements. 4m clearance area between flammable material storage and well lease boundary. ▪ Bare earth roads and laydown areas ▪ Only diesel vehicles to be used ▪ Designated smoking areas with appropriate waste receptacles ▪ No open flames or fires outside of designated areas ▪ Ensure stockpiles are stored away from ignition sources and in low profile mounds ▪ Maintenance of fire access trails ▪ Sufficient water to be available on site to enable CP to provide an initial response to an accidental fire at the well lease ▪ Inductions to include fire risks, hazardous zones, controls and emergency response procedures ▪ burns are not the preferred method of control at an oil and gas site. ▪ If fire detected, implement emergency response plan ▪ Follow directions given by Operations under the MRN FEMP ▪ Annual fire mapping to monitor changes to fire frequency in the MRN ▪ Fire breaks are maintained across the MRN field by Operations to prevent fire spread to other land and to protect key infrastructure. ▪ Roads and access tracks also act as fire breaks as most are more than 4m wide ▪ The well leases at MRN are large and will not be fully occupies by equipment. The well lease itself therefore forms a fire break.

Controlled burns are not part of the fire management scope for the EMP activities. Controlled burns at the MRN may be conducted by Operations personnel under the MRN FEMP only in conjunction with surrounding stakeholders and only if manual removal of fire fuel load cannot achieve fire breaks and only after a risk assessment has been conducted and risks reduced to ALARP and are accepted. Controlled burns are not the preferred method of control at an oil and gas site.

A5-7 Bushfire Management Zone Map

Figure A5-2 illustrates the bushfire management objects of the Bushfire Management Plan by the features as recommended in the Bushfire Management Planning Guide: Onshore Petroleum Projects. Using the WM20 well pad to represent the MRN wells upon which the EMP activities are to occur, the map shows:

- The large cleared well lease as is typically in the MRN. The lease is a is a fire exclusion zone.
- A 4m fire break around the perimeter of the well lease. All flammable materials will be stored within the well lease and not within or beyond the 4m fire break.
- The 4m fire break is surrounded by a low fuel zone as a secondary control. The low fuel zone also borders the cleared, graded access tracks and flare pit. CP will ensure the low fuel zone has a low fuel load.
- The access tracks are typically 4m or greater and act as a fire break and will remain clear at all time.

- Flare pit located adjacent to the well lease which is where flaring occurs (under a permit as required). Controls for preventing ignition include horizontal flare at depth within the pit which is surrounded by an earth mound and low fuel zone.
- Adjacent to the active fire management zones is the neighbouring land which is managed by CP under the MRN FEMP.

A5-7 Bushfire Alerts

The NT government has created a three-tier bushfire alert system. The three alerts are:

- Advice – areas which have either a small fire which is controllable, planned fuel reduction burning or an area likely to be affected by smoke
- Watch and act – an area that has a bushfire approaching a community, changing with conditions or will threaten property or life if not controlled
- Emergency warning – An area that is in immediate danger from the bushfire and you must act now to protect your life

The Supervisor is responsible for monitoring for bushfire alerts (primarily via the https://securent.nt.gov.au/alerts website) and notifying CP personnel who may be attending the site.

Communication of these alerts will generally be via the daily toolbox meetings. Where bushfire alert information becomes known after the toolbox meeting, the Supervisor is to communicate via telephone (CP personnel on site will have either a mobile phone or satellite phone).

The Supervisor will coordinate with the MRN Production Supervisor who holds fire management responsibilities under the MRN FEMP.

A5-8 Bushfire Response

- Supervisor to stay up to date with fire risk through local communication channels NAFI, weather reports, site inspections and community observations
- Project personnel to coordinate response through MRN Production Operations Supervisor and follow their instructions

A5-9 Annual Works Calendar

Not applicable to the workovers and wellhead equipment, safety systems and gathering line works as fire management on a site-wide level is conducted by Operations under the MRN FEMP.

A5-10 Recording and Reporting

All fire incidents, near misses and potential hazards will be logged through CPs incident reporting system for further investigation and initiating corrective actions.

A5-11 Stakeholder Management

CP will implement fire management obligations and strategies (including regional and property fire management plans under the *Bushfires Management Act 2016*) in coordination with the following stakeholders. CP (nominated site Fire Officer) will inform neighbouring landholders of fire events occurring in licence areas.

Stakeholder	Contact Details	Name
Emergency	000	N/A
Bushfires NT	08 8973 8876 (Katherine) 08 8952 3066 (Alice Springs)	N/A
NAFI	www.firenorth.org.au/nafi3/	N/A
Bureau of Meteorology	www.bom.gov.au	NA
NT Fire Incident Map	www.pfes.nt.gov.au/incidentmap/	N/A

Mereenie Field Wellsite Fire Management Zones

Legend

- Mereenie FEMP Fire Management Zone
- Lease boundary
- Low fuel zone
- Fire break zone
- Flare pit
- Earth mound
- Cleared access track

ID: 0534-021
Rev:
Date: 24/08/2020

Map Scale is 1:1,921 when printed at A4
Coordinate System: GDA 1994 MGA Zone 52

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Document Path: G:\GIS\Work Requests\0534 Mereenie recompilations EMP extra maps\Working\ILLUSTRATOR\MXD\0534-021-MAP Fire management zones.mxd

Figure A5-2 Mereenie field generic wellsite fire management zones

Secure NT	securent.nt.gov.au/alerts	N/A
Central Land Council	08 8951 6211	NA
Landholder	08 8955 0310	**redacted**

Appendix 6 Mereenie Field Workover and Wellhead equipment, safety systems and gathering line communication log

Date	Topic Discussed	Engagement Type	CP Representative	Stakeholders	Information Provided	Outcome	Objections/Claims from Stakeholder	CP Reponse/Actions to Objections/Claims
25 Nov 2019	- Update on CP's 2020 exploration program as well as the development and recompletion opportunities at Mereenie - Organise Local Community Meetings (LCM)	Face to face at CLC offices	**redacted** **redact	**redacted**	- See Note 1. The CP presentations and internal reports were general in nature[6]	- CP needs to submit all sacred site clearance certificate applications ASAP	None received	Not applicable
26 Nov 2019	- Update on CP's 2020 exploration program as well as the development and recompletion opportunities at Mereenie	Face to face in Alice Springs	**redacted**	**redacted**	- See Note 1. The CP presentations and internal reports were general in nature[7]	- CP to send further details to Anslem before the official LCM's are conducted by CLC	None received	Not applicable
17 Feb 2020	- Update on CP's 2020 exploration program as well as the development and recompletion opportunities at Mereenie. - Reviewed applications for the SSCC. Confirmed timings for the Liaison Committee meetings in the week commencing 23 March at Mereenie	Face to face at CLC offices	**redacted**	**redacted**	- See Note 1. The CP presentations and internal reports were general in nature[8]	- Confirmed the receipt and progress of the sacred site clearance certificates. - Booked timings for LCM's week commencing 23 March.	None received	Not applicable
19 Feb 2020	- Presentation update on the Mereenie development and recompletion program, timing, activities and impacts - Confirmed timings for the Liaison Committee meetings	Face to Face. At Papunya NT remote community	**redacted** **redacted** **redacted	**redacted**	- See Note 1. The CP presentations and internal reports were general in nature[9]	- 2nd visit with **redacte and representatives from the communities. Positive feedback with the dates locked for the final details to be presented at the LCM's in March	None received	Not applicable
March to June 2020	- Impact of Covid-19 on LCMs	Multiple calls and emails	**redacted**	**redacted**	Not applicable	- Discussing options for LCM's considering the travel restrictions and Biosecurity measures. - Agreed to be re-scheduled for late July / early August.	None received	Not applicable

[6] CoP compliant stakeholder engagements were planned for the LCMs planned for March 2020 which were delayed due to COVID restrictions.

[7] CoP compliant stakeholder engagements were planned for the LCMs planned for March 2020 which were delayed due to COVID restrictions.

[8] CoP compliant stakeholder engagements were planned for the LCMs planned for March 2020 which were delayed due to COVID restrictions.

[9] CoP compliant stakeholder engagements were planned for the LCMs planned for March 2020 which were delayed due to COVID restrictions.

See below excerpts from CP report documenting community engagement field trip across multiple sites on 25-29 November 2019 to brief stakeholders on CP wide 2020 program including activities beyond scope of wellhead equipment, safety systems and gathering line and workover works.

Note 1 - Central Land Council

Meeting Monday, 25 November 2019 @3:30pm held at CLC office

CLC: **redacted** (upcoming replacement for **redacted**

CTP: **redacted**

A meeting was held with the CLC to give an update on Centrals 2020 exploration program, development opportunities, current operations and to review our movements for the week of 25-29 November 2019.

A presentation was given outlining CP's exploration and development projects for next year and also indicated what remote communities and Traditional Owners we were going to give a high-level overview of our operations to community.

Discussions also included the current EMP processes, fugitive emissions, baseline water testing and baseline methane testing across fields and if it would be required for the new programs. It was suggested that this was for fracking only.

We then discussed timing of the application for the Sacred Site Clearance Certificates from CP followed by approvals required (also the timely manner of the turnover of approvals). It was indicated that the best approach would be through timely LCM's for each of the area's and that this could be done late January or early February. This would be impacted by the mining officers from the CLC going on holidays from 13 December through to mid-January.

We also discussed the formation of the CAC, CTP's Governance processes for donations, school visits and excursions and also the long-standing commitment within our field communities.

Finally, we received permission from the CLC to enter remote communities to discuss our upcoming programs with the general communities.

Additional feedback/comments/follow-up action from the Meeting:

CP needs to submit all sacred site clearance certificate applications ASAP.

Note 2 - Mereenie Development, Stairway Opportunities and workovers _Alice Springs

Tuesday, 26 November 2019_6:00pm

TO: **redacted**

CTP: **redacted**

**redacted had planned to meet at Mereenie with representatives from his community. However, the CLC meetings that he had in Alice Springs ran over and we were unable to catch up at Mereenie.

However, we were able to manage a meeting in Alice Springs for a general update on the CY2020 exploration program and the upcoming work.

**redacted was appreciative of the recent donation of 15x hay bales that CP had approved so that they were able to manage the brumbies at Mereenie. **redacted will use the hay to capture and muster them, from here he will sparingly divide the brumbies within the remote communities of Mereenie and relocate them. The Brumbies at Mereenie were causing an environmental issue therefore worked with **redacted to benefit both the company and his mob with the removal and relocation at a very low cost-effective strategy.

We informed **redacted to let his Mob know that we were submitting applications to the CLC and that formal LCM meetings would be organised by the CLC early in 2020 to review the program.

Additional feedback/comments/follow-up action from the Meeting:

JvR to send further details to **redacted before the official LCM's are conducted by CLC.

See below excerpts from CP report documenting community engagement field trip across multiple sites on 17-21 February 202 to brief stakeholders on CP wide 2020 program including activities beyond scope of wellhead equipment, safety systems and gathering line and workover works.

Note 3 – Central Land Council _Alice Springs

Monday 17 February 2020

CLC: **redacted**
CTP: **redacted**

A meeting was held with the CLC to give an update on Centrals 2020 exploration and development program SSCC approval processes and approvals.

General points:

- **redacted** has left CLC, but still consults to the CLC from Adelaide.
- **redacted** has been officially appointed, but is still on his probation

Specific to clearances:

- Mereenie – initial consultations have occurred and no pushback to date. The CLC are planning in the week of the LCM's to travel to Mereenie to review new wells WM 27 and 28, go through work over program and the conduct final clearances and the approvals should come within 2 weeks of this.

Anticipated clearances:

- Mereenie – all progressing well with T/O's consulted. Should expect final site inspection for 26/27 on the day of the LCM in March.

Note 4 – Traditional Owner Meeting

Wednesday, 19 February 2020 @ Papunya General Store

LANDOWNER: **redacted**
CTP: **redacted**

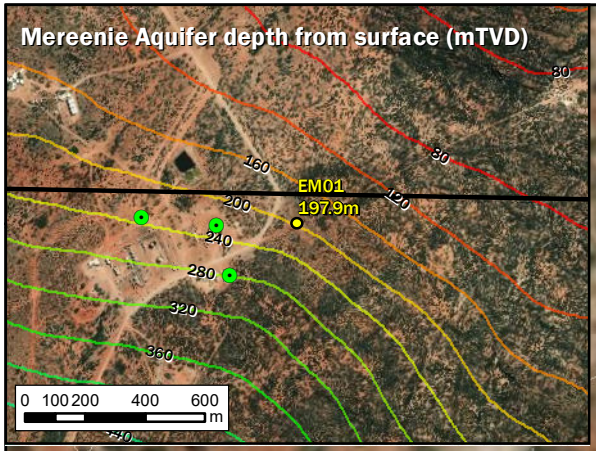
We caught up with **redacted** at Papunya after missing him in Mt Liebig. He was in Papunya for sorry business.

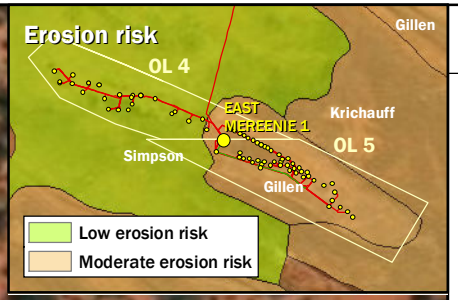
**redacted* is a TO for a wide area that covers Mereenie, Mamlambo/Surprise and any exploration around Papunya.

We talked with **redacted* about Central's operations in the region, including exploration, development and recompletions including timing for the upcoming CLC LCMS.

A request was made to assist with the sorry business and Central donated some food through the local store to the evening BBQ.

Appendix 7 Environmental Sensitivity Maps





131°33'40"E

EAST
MEREENIE 1

Central Treatment Plant Road
Mereenie Access Road
East Mereenie 1 Access Road
tment Plant Access Road

775m

780m

24°0'0"S

131°33'40"E

131°33'45"E

N

0 5 10 20 30 40 50
metres

EAST MEREENIE 1

- Well
- Water bore

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
Date: 26/06/2020

Map Scale is 1:1,500 when printed at A4
Coordinate System: GCS WGS 1984

Streams modified to match imagery and DEM by Central Petroleum after NT Drainage Lines: Australian Hydrological Geospatial Fabric (Geofabric) V2.1.1 Modified by: DENR. Significant Flora (TPWCA Status) - Department of Environment and Natural Resources, Parks and Wildlife Commission of the Northern Territory 2000. Central Petroleum Flora and Fauna Assessment. Significant Fauna (TPWCA Status). Land Systems from Department of Environment and Natural Resources - Copyright Northern Territory Government. Environmental Weeds from "Low Ecological Services Pty Ltd, 2019 - Central Petroleum Mereenie Weed Management Plan" and Department of Environment and Natural Resources. TPWCA Near Threatened Flora Populations - Parks and Wildlife Commission of the Northern Territory, 2000. Central Petroleum Flora and Fauna Assessment.

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EAST MEREENIE 2

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

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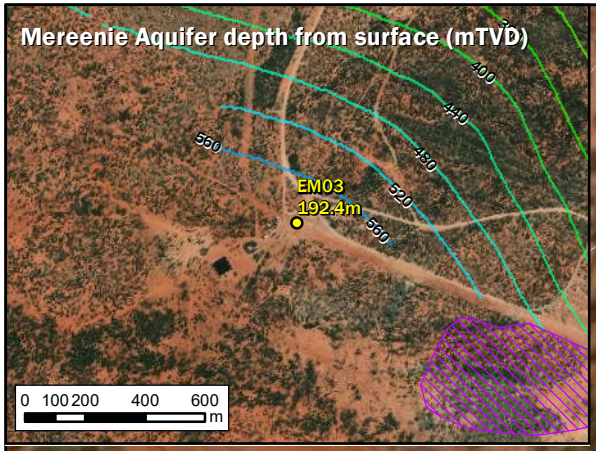

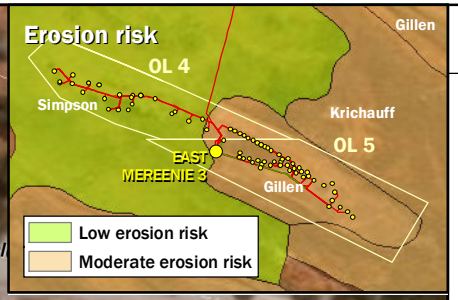

131°33'15"E

East Mereenie Fiel

Camp Bore Access Road

EAST
MEREENIE 3

24°0'40"S

East Mereenie Pipeline Access Road

765m

Camp Bore Access Road

Camp Bore
(RN013864)

N

0 5 10 20 30 40 50
metres

131°33'10"E

131°33'15"E

131°33'20"E

EAST MEREENIE 3

- Well
- Water bore

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
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TPWCA Near Threatened Flora Populations

- brilliant hopbush
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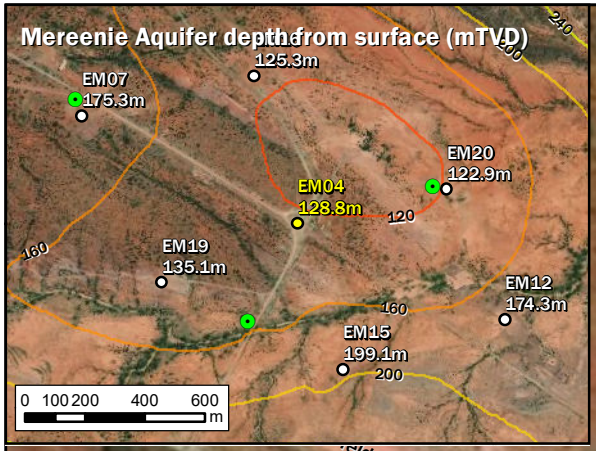

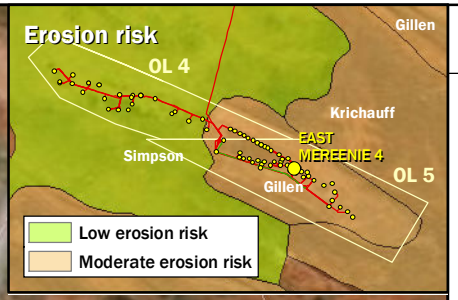

131°37'55"E

East Mereenie 20 Access Road

East Mereenie 10 Access Road

Field Access

720m

715m

710m

24°1'40"S

24°1'45"S

EAST
MEREENIE 4

131°37'50"E

131°37'55"E

N

0 5 10 20 30 40 50
metres

EAST MEREENIE 4

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
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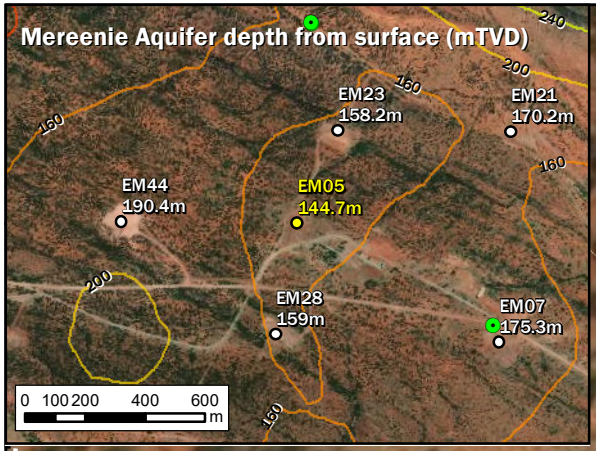

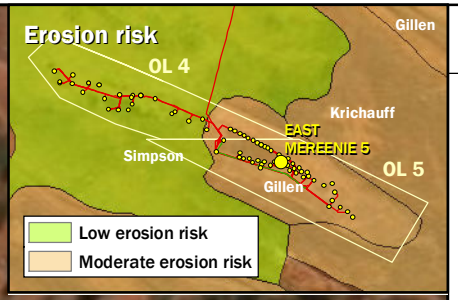

131°37'5"E

750m

East Mereenie 5 Access Road

755m

EAST
MEREENIE 5

Field Access

24°1'15"S

24°1'20"S

131°37'0"E

131°37'5"E

N

0 5 10 20 30 40 50
metres

EAST MEREENIE 5

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

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ID: 0534-010
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Map Scale is 1:1,500 when printed at A4
Coordinate System: GCS WGS 1984

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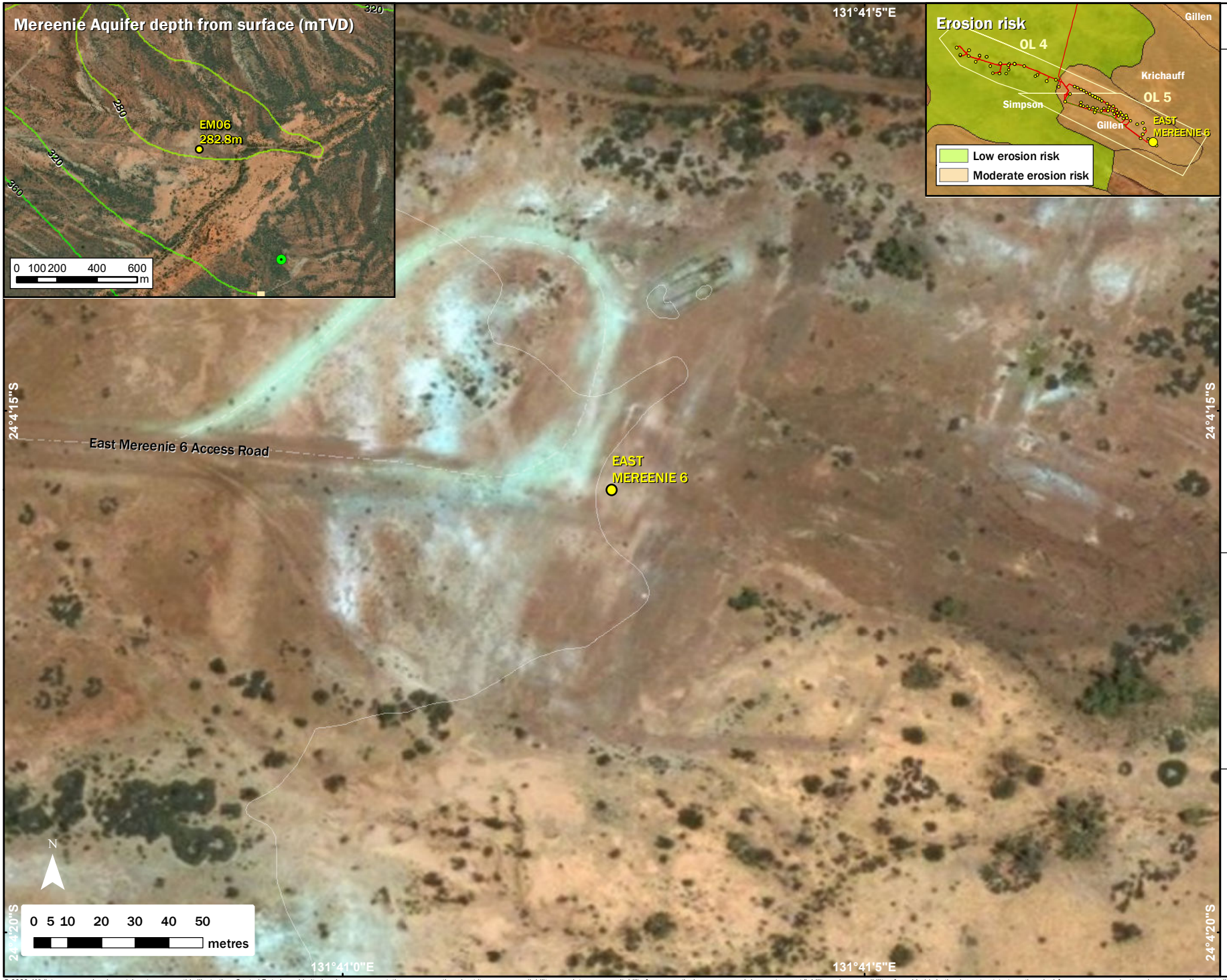

EAST MEREENIE 6

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
Date: 26/06/2020

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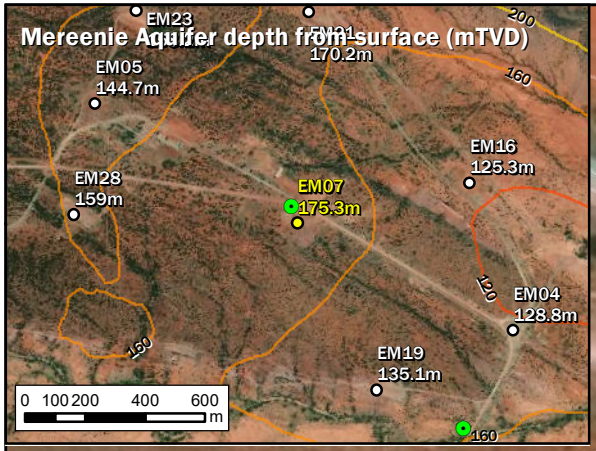

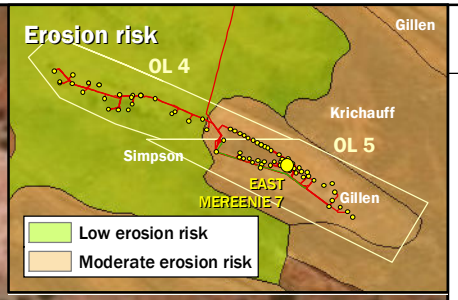

Drill Store Access Road

Field Access

Field Access

740m

East Mereenie 7 Access Road

EAST
MEREENIE 7

735m

730m

131°37'30"E

131°37'25"E

131°37'30"E

24°1'30"S

24°1'30"S

N

0 5 10 20 30 40 50
metres

EAST MEREENIE 7

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
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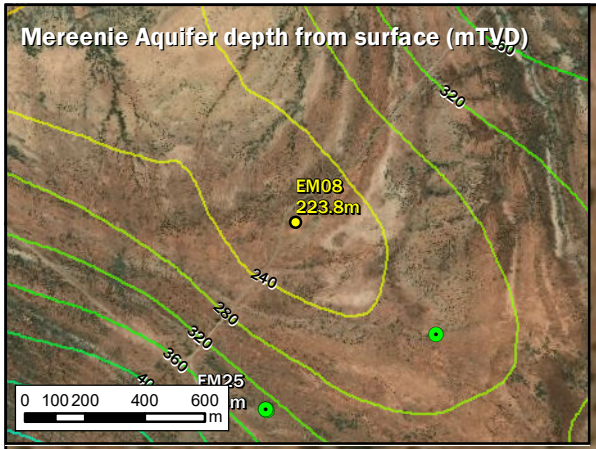

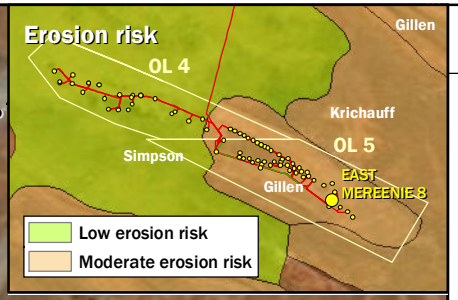

131°40'10"E

East Mereenie 8, 9, 26

EAST MEREENIE 8

24°3'35"S

715m

N

0 5 10 20 30 40 50 metres

131°40'5"E

131°40'10"E

EAST MEREENIE 8

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

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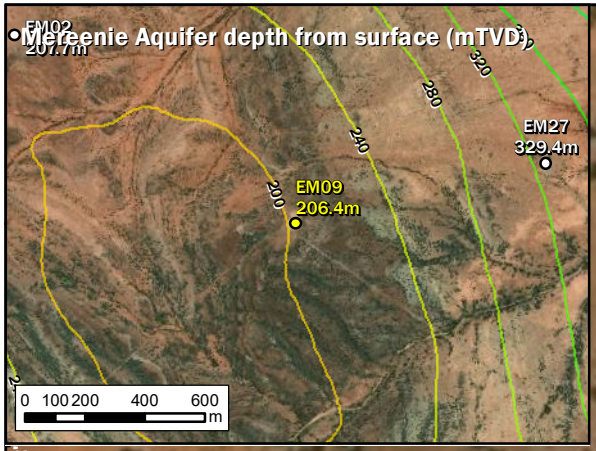

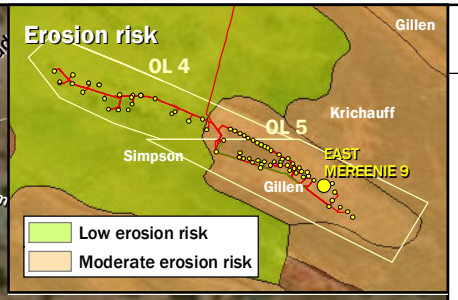

131°39'40"E

East Mereenie 8, 9, 26 and 27 Access Road

710m

EAST MEREENIE 9

715m

24°2'40"S

24°2'45"S

131°39'35"E

131°39'40"E

N

0 5 10 20 30 40 50
metres

EAST MEREENIE 9

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
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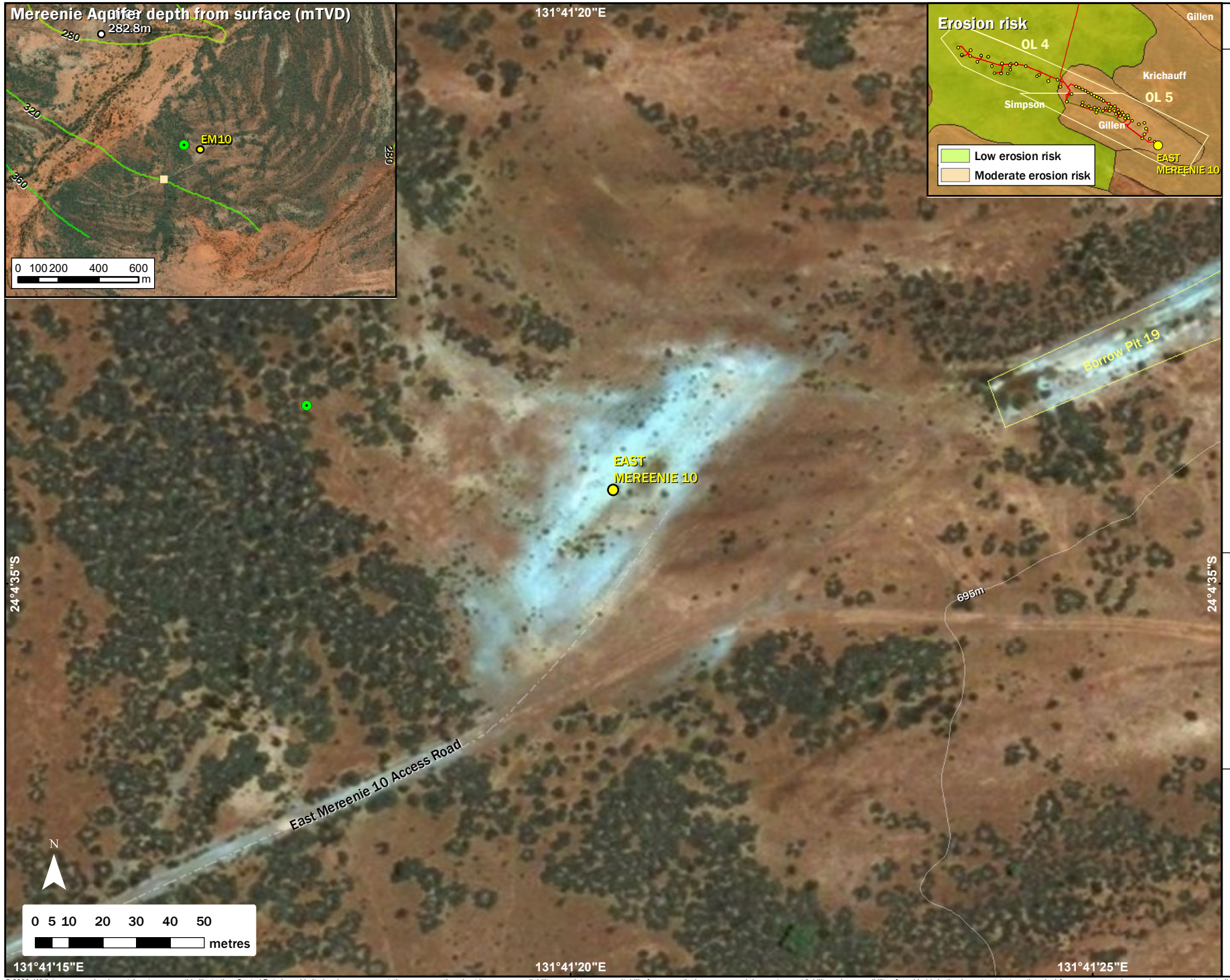

EAST MEREENIE 10

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Borrow pit

ID: 0534-010
Rev:
Date: 26/06/2020

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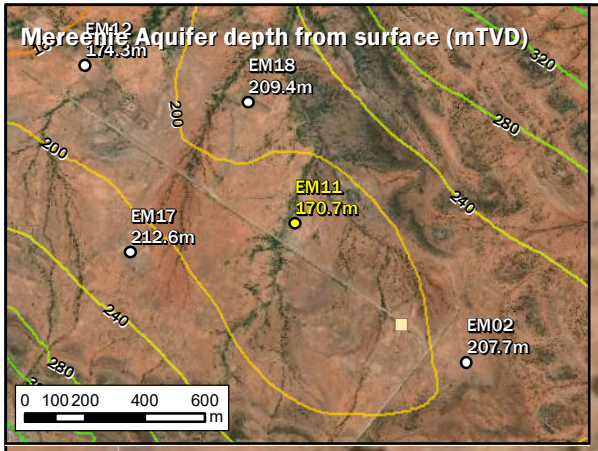

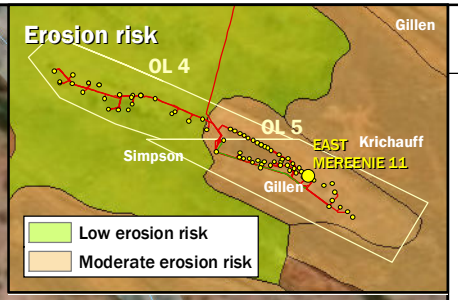

131°38'45"E

24°2'5"S

EAST MEREENIE 11

East Mereenie 11 Access Road

Field Access

710m

710m

710m

24°2'10"S

N

0 5 10 20 30 40 50
metres

131°38'40"E

131°38'45"E

EAST MEREENIE 11

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

ID: 0534-010
Rev:
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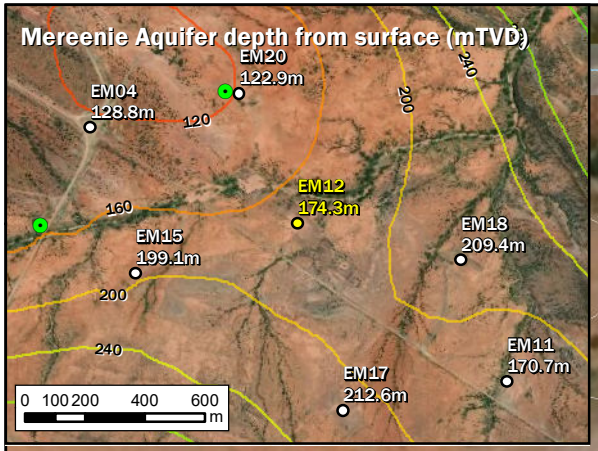

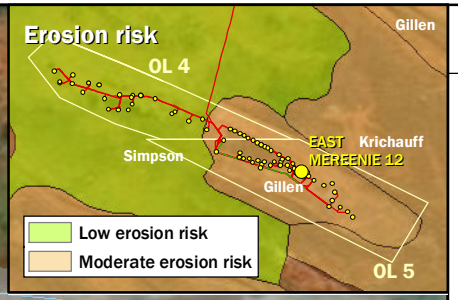

EAST MEREENIE 12

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

ID: 0534-010
Rev:
Date: 26/06/2020

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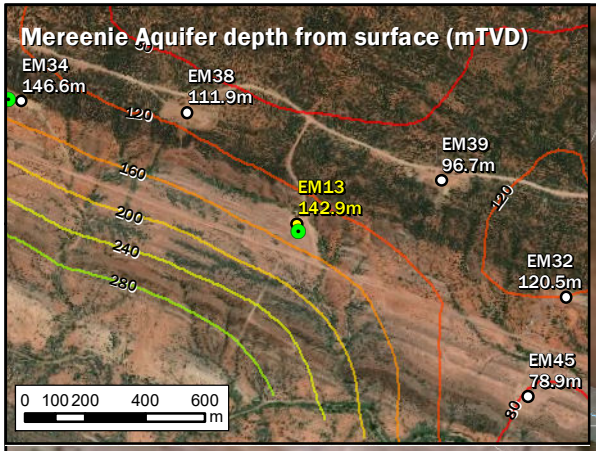

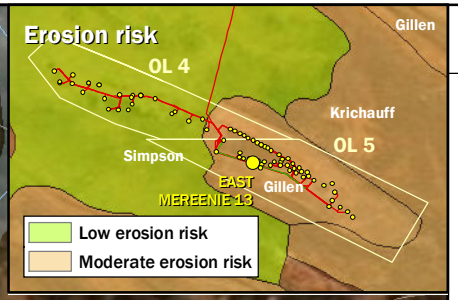

131°35'25"E

East Mereenie 13 Access Road

755m

750m

EAST
MEREENIE 13

East
Mereenie
13 Flare

Borrow Pit 8

745m

24°1'20"S

East Mereenie Pipeline Access Road

Borrow Pit Access Road

740m

N

0 5 10 20 30 40 50
metres

131°35'20"E

131°35'25"E

131°35'30"E

EAST MEREENIE 13

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone
- Borrow pit
- Flare Pit

ID: 0534-010
Rev:
Date: 26/06/2020

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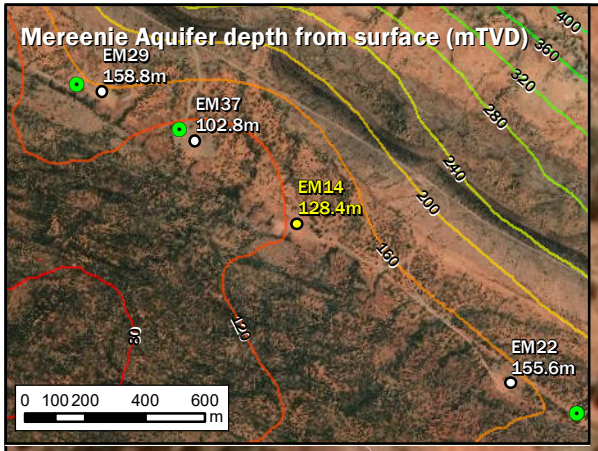

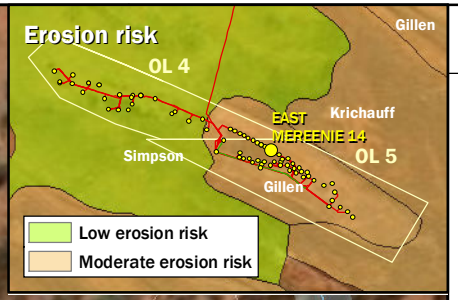

131°36'30"E

East Mereenie
14 Flare

EAST
MEREENIE 14

24°0'35"S

730m

735m

740m

745m

East Mereenie 14 Access Road

N

0 5 10 20 30 40 50
metres

131°36'30"E

131°36'35"E

EAST MEREENIE 14

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone
- Flare Pit

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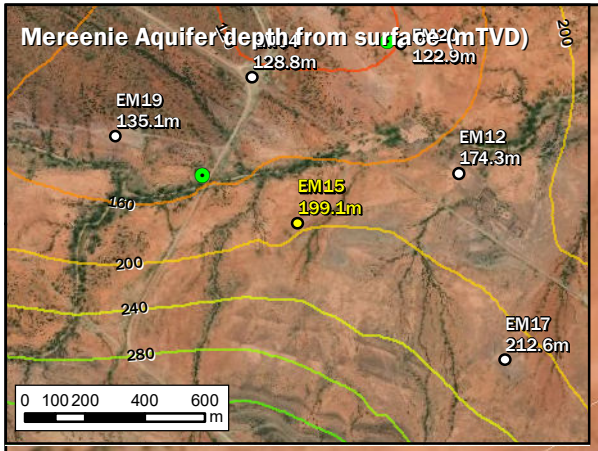

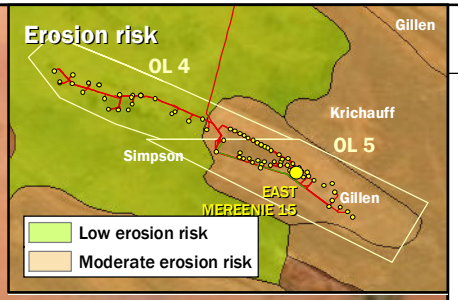

131°38'0"E

24°1'55"S

710m

East Mereenie 15 Access Road

EAST
MEREENIE 15

24°20"S

N

0 5 10 20 30 40 50
metres

131°37'55"E

131°38'0"E

EAST MEREENIE 15

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

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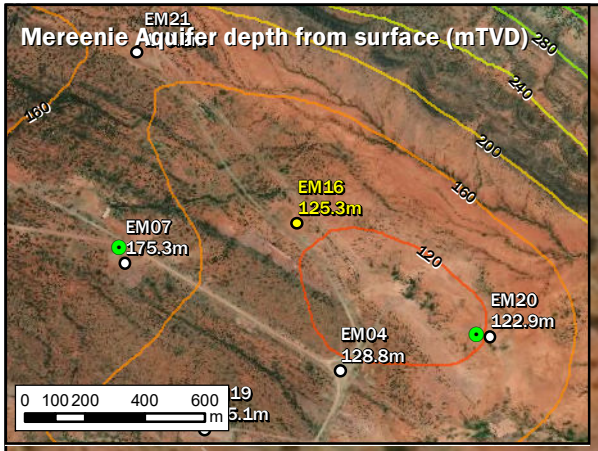

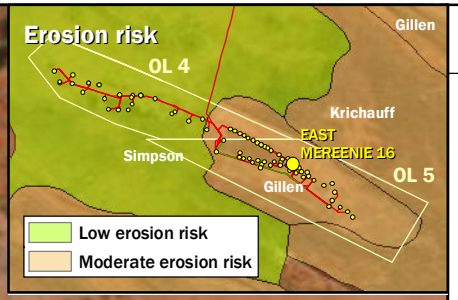

131°37'50"E

East Mereenie
16 Flare

EAST
MEREENIE 16

East Mereenie 10 Access Road

710m
715m
715m
720m

24°1'25"S

N

0 5 10 20 30 40 50
metres

131°37'45"E

131°37'50"E

EAST MEREENIE 16

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Flare Pit

ID: 0534-010
Rev:
Date: 26/06/2020

Map Scale is 1:1,500 when printed at A4
Coordinate System: GCS WGS 1984

Streams modified to match imagery and DEM by Central Petroleum after NT Drainage Lines: Australian Hydrological Geospatial Fabric (Geofabric) V2.1.1 Modified by: DENR. Significant Flora (TPWCA Status) - Department of Environment and Natural Resources, Parks and Wildlife Commission of the Northern Territory 2000. Central Petroleum Flora and Fauna Assessment. Significant Fauna (TPWCA Status). Land Systems from Department of Environment and Natural Resources - Copyright Northern Territory Government. Environmental Weeds from "Low Ecological Services Pty Ltd, 2019 - Central Petroleum Mereenie Weed Management Plan" and Department of Environment and Natural Resources. TPWCA Near Threatened Flora Populations - Parks and Wildlife Commission of the Northern Territory, 2000. Central Petroleum Flora and Fauna Assessment.

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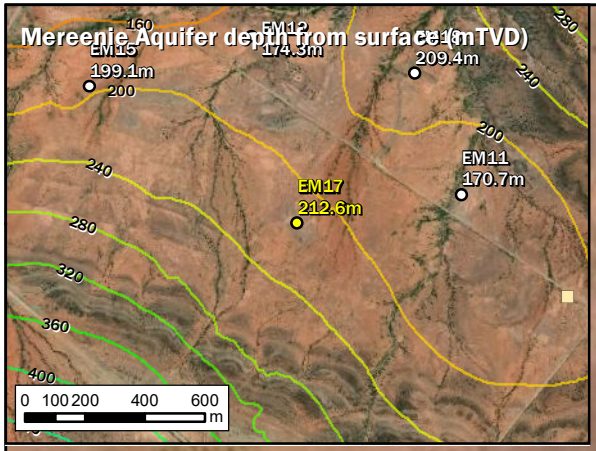

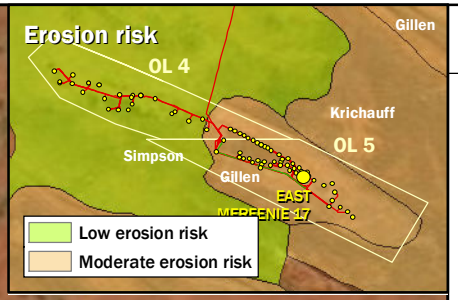

131°38'25"E

East Mereenie 17 Access Road

24°2'10"S

EAST MEREENIE 17

745m

N

0 5 10 20 30 40 50
metres

24°2'15"S

131°38'20"E

131°38'25"E

EAST MEREENIE 17

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- 5m riparian zone

ID: 0534-010
Rev:
Date: 26/06/2020

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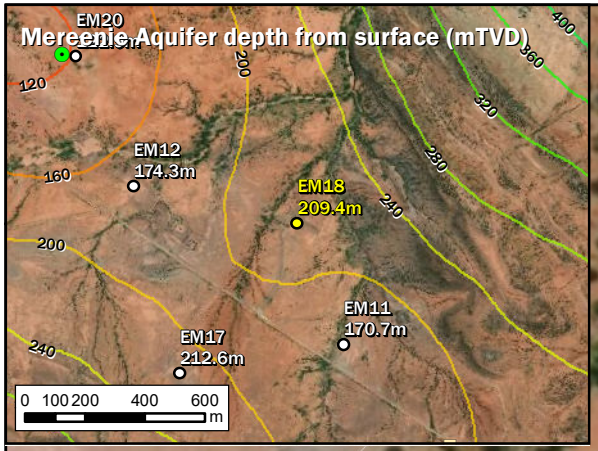

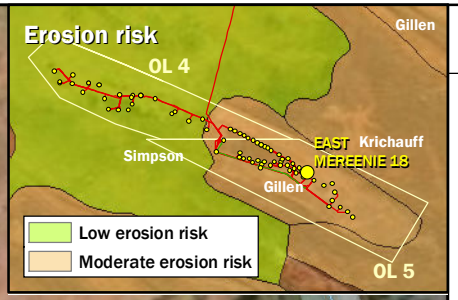

131°38'40"E

705m

EAST MEREENIE 18

East Mereenie 18 Access Road

24°1'55"S

131°38'35"E

131°38'40"E

N

0 5 10 20 30 40 50
metres

EAST MEREENIE 18

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

ID: 0534-010
Rev:
Date: 26/06/2020

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EAST MEREENIE 19

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone
- Flare

ID: 0534-010
Rev:
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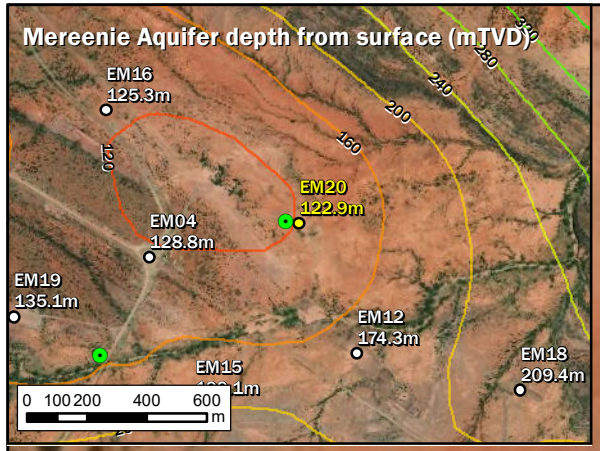

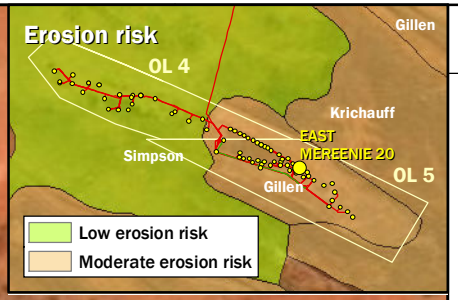

131°38'10"E

131°38'15"E

24°1'35"S

24°1'40"S

East Mereenie 20 Access Road

EAST
MEREENIE 20

N

0 5 10 20 30 40 50
metres

EAST MEREENIE 20

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
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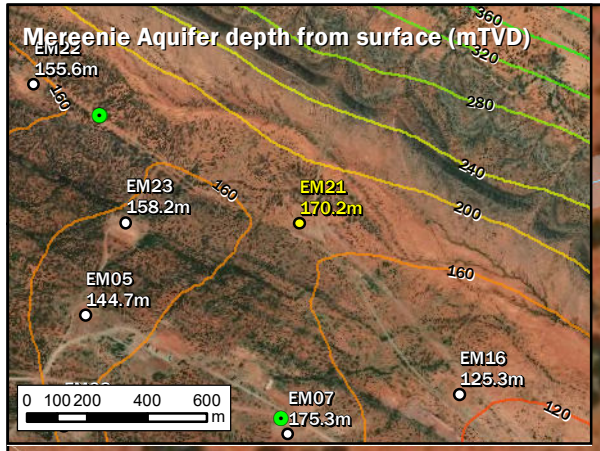

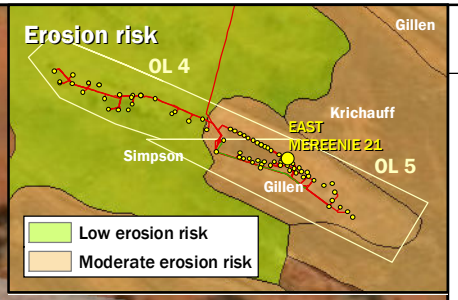

131°37'30"E

131°37'25"E

24°1'5"S

24°1'10"S

715m

720m

725m

730m

EAST
MEREENIE 21

East Mereenie 21 Access Road

East Mereenie 10 Access Road

N

0 5 10 20 30 40 50
metres

EAST MEREENIE 21

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

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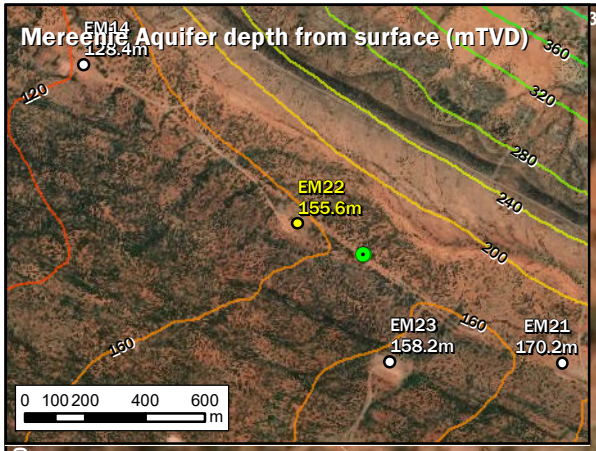

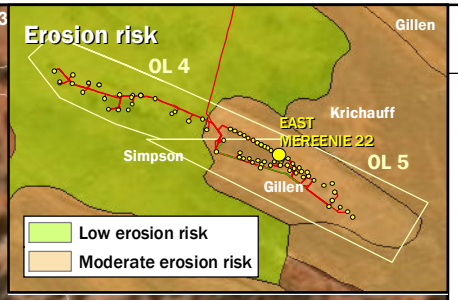

EAST MEREENIE 22

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
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EAST MEREENIE 23

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

ID: 0534-010
Rev:
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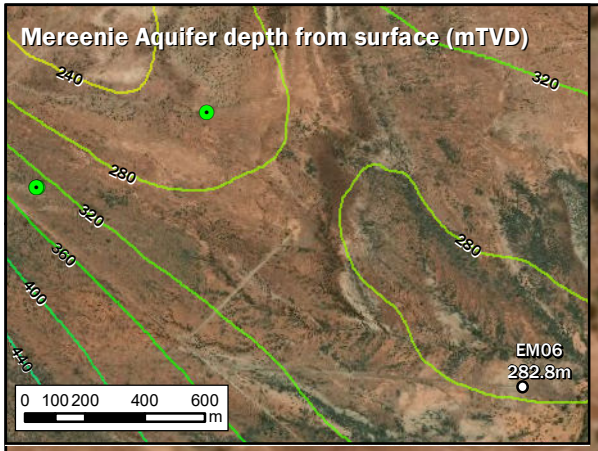

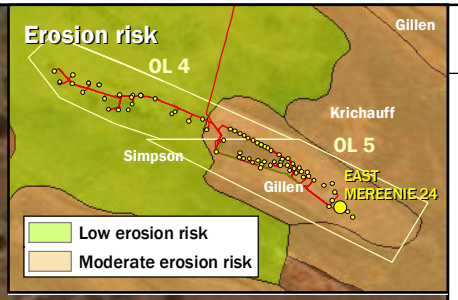

131°40'35"E

700m

700m

EAST
MEREENIE 24

East Mereenie 24 Access Road

24°4'0"S

24°4'0"S

N

0 5 10 20 30 40 50
metres

31°40'30"E

131°40'35"E

131°40'40"E

EAST MEREENIE 24

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
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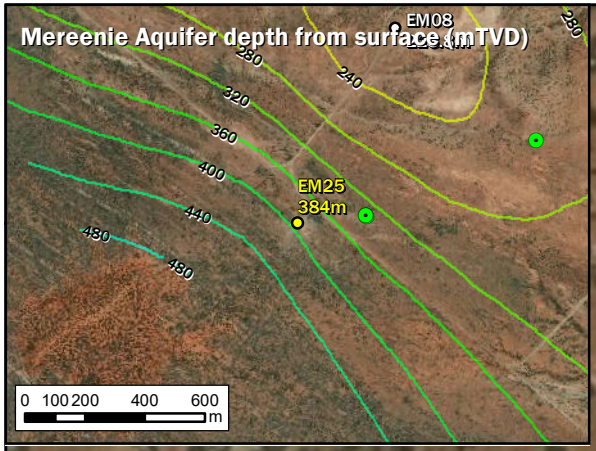

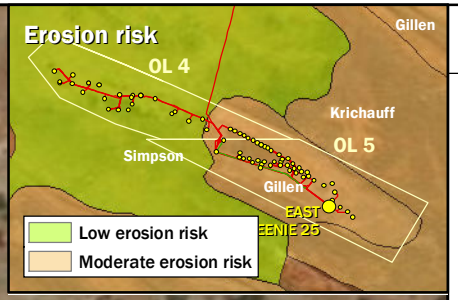

131°39'55"E

Mereenie 8, 9, 26 and 27 Access Road

East Mereenie 10 Access Road

East Mereenie 25 Access Road

EAST
MEREENIE 25

24°3'55"S

24°4'0"S

N

0 5 10 20 30 40 50
metres

131°40'0"E

EAST MEREENIE 25

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
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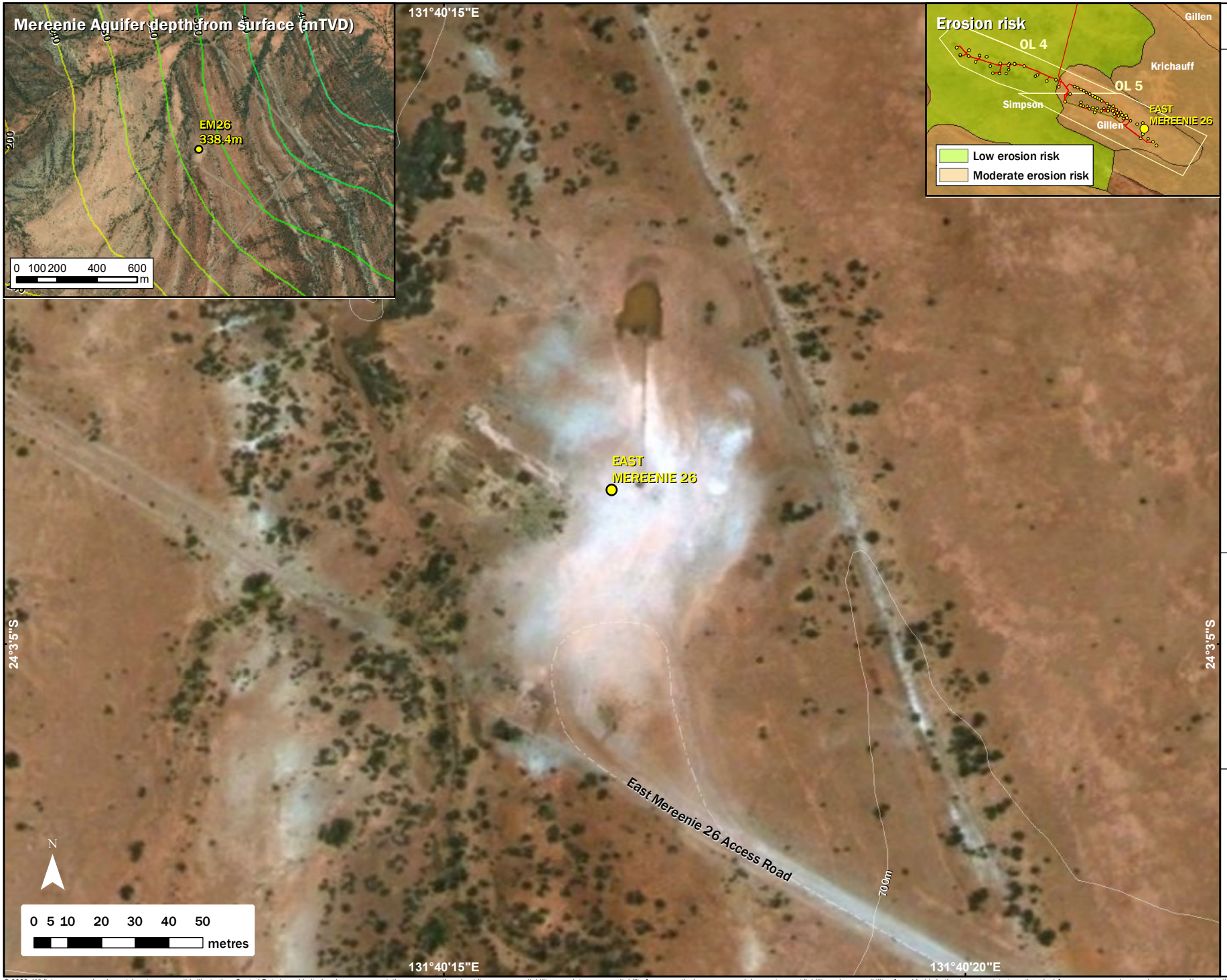

EAST MEREENIE 26

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
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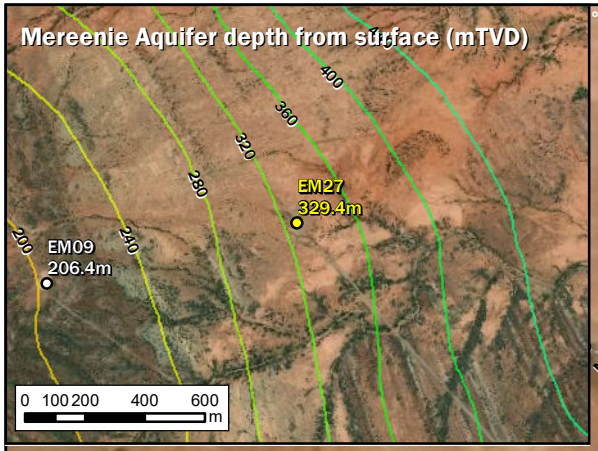

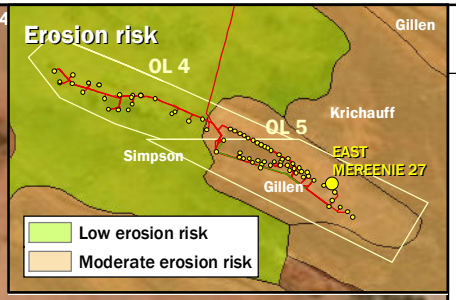

EAST MEREENIE 27

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

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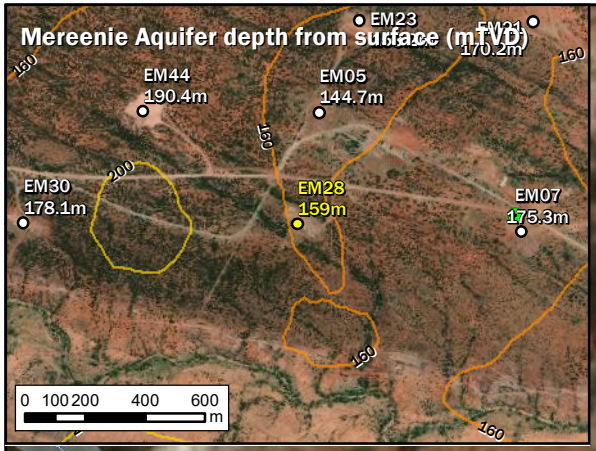

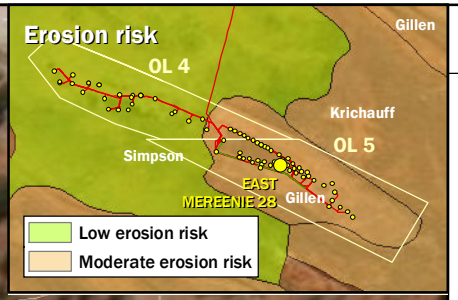

131°37'0"E

131°37'5"E

24°1'30"S

EAST
MEREENIE 28

East Mereenie 28 Access Road

750m

745m

740m

N

0 5 10 20 30 40 50
metres

EAST MEREENIE 28

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

ID: 0534-010
Rev:
Date: 26/06/2020

Map Scale is 1:1,500 when printed at A4
Coordinate System: GCS WGS 1984

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EAST MEREENIE 29

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
Date: 26/06/2020

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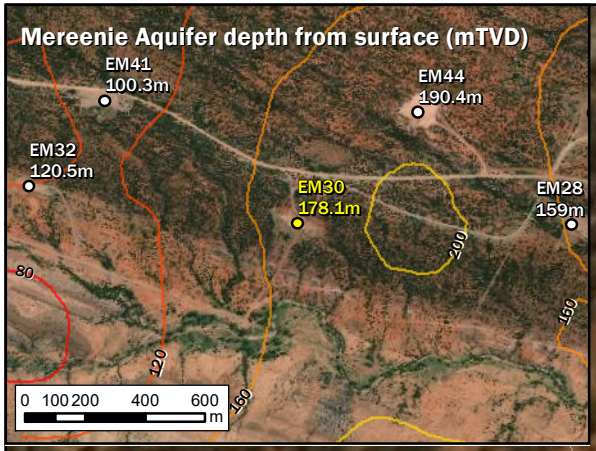

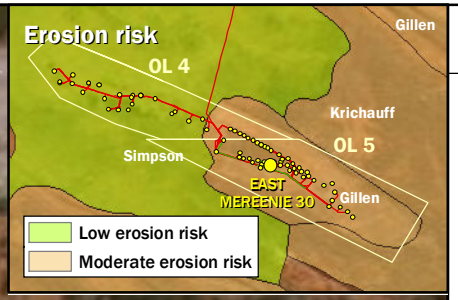

131°36'30"E

755m

East Mereenie 30 Access Road

East Mereenie 30 Access Road

745m

EAST
MEREENIE 30

24°1'30"S

740m

735m

730m

N

0 5 10 20 30 40 50
metres

131°36'25"E

131°36'30"E

EAST MEREENIE 30

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
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EAST MEREENIE 31

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

ID: 0534-010
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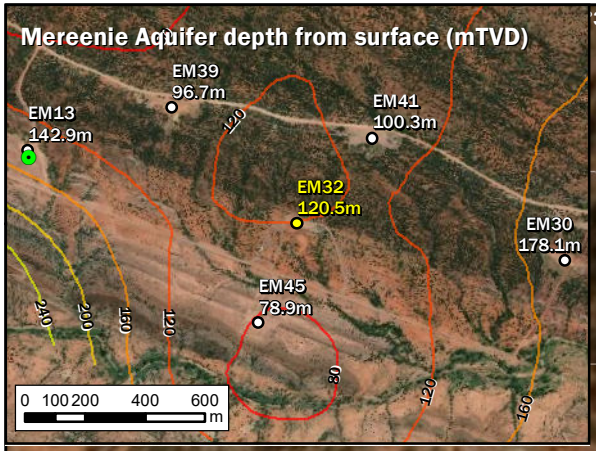

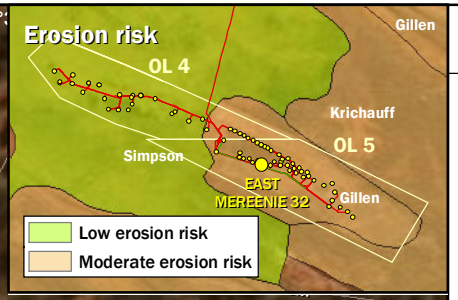

'35'55"E

131°

745m

740m

735m

24°1'25"S

EAST
MEREENIE 32

East Mereenie 32 Access Road

N

Pipeline Access Road

0 5 10 20 30 40 50
metres

24°1'30"S

131°35'55"E

131°36'0"E

EAST MEREENIE 32

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
Date: 26/06/2020

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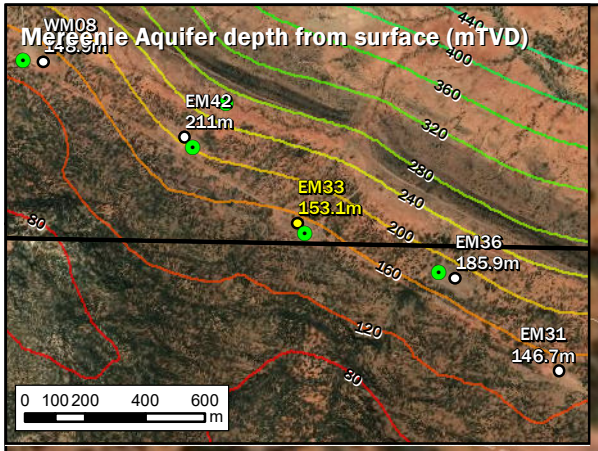

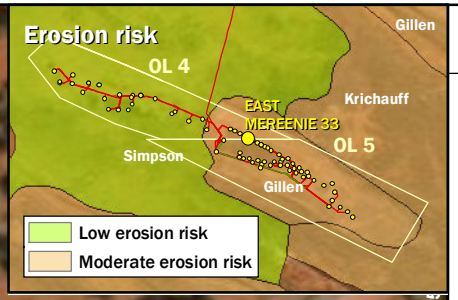

131°35'10"E

East Mereenie 42 Access Road

EAST MEREENIE 33

East Mereenie 33 and 42 Access Road

740m

745m

750m

755m

23°59'55"S

131°35'5"E

131°35'10"E

N

0 5 10 20 30 40 50
metres

EAST MEREENIE 33

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
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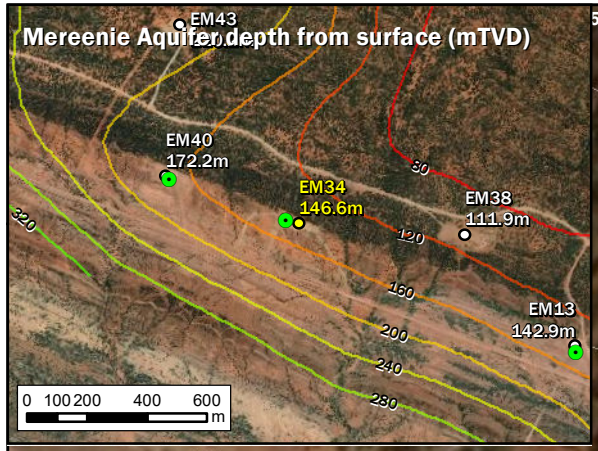

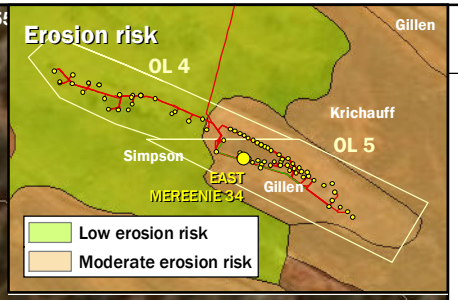

EAST MEREENIE 34

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

ID: 0534-010
Rev:
Date: 26/06/2020

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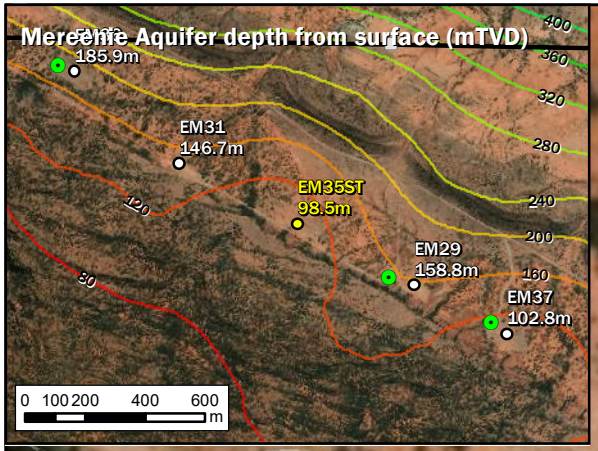

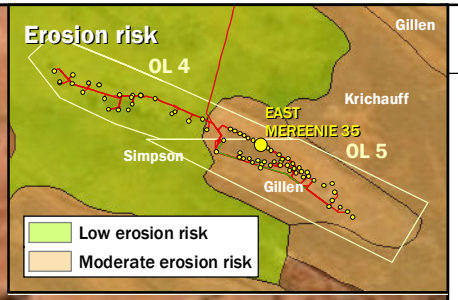

131°35'55"E

East Mereenie 35 Access Road

EAST
MEREENIE 35

East Mereenie 31, 35 Access Road

730m
735m
740m
745m
750m

24°0'15"S

N

0 5 10 20 30 40 50
metres

131°35'50"E

131°35'55"E

EAST MEREENIE 35

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

ID: 0534-010
Rev:
Date: 26/06/2020

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EAST MEREENIE 36

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

ID: 0534-010
Rev:
Date: 26/06/2020

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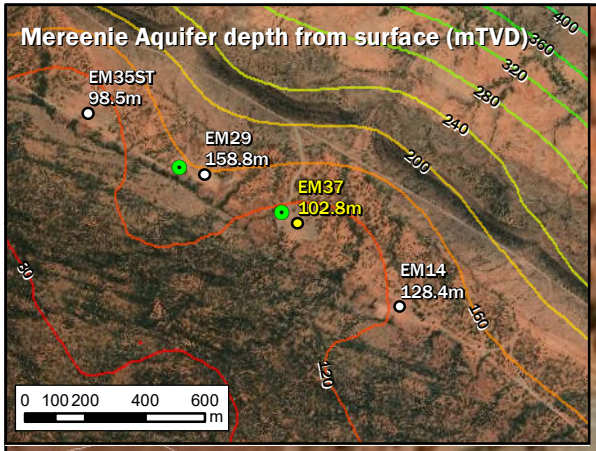

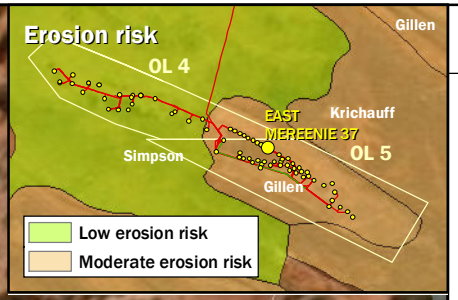

131°36'20"E

East Mereenie 37 Access Road

EAST
MEREENIE 37

725m

730m

735m

720m

24°0'25"S

24°0'30"S

131°36'15"E

131°36'20"E

N

0 5 10 20 30 40 50
metres

EAST MEREENIE 37

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

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EAST MEREENIE 38

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
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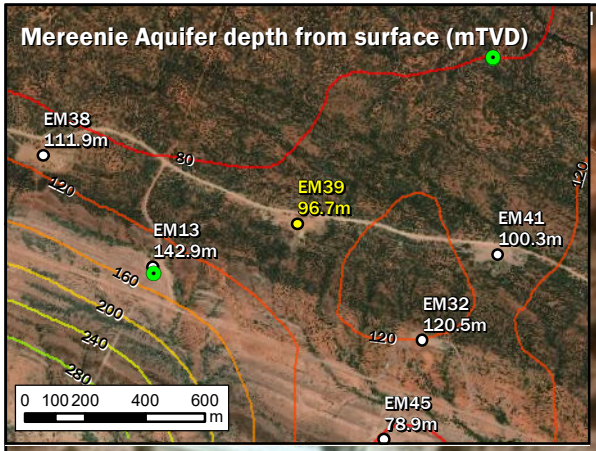

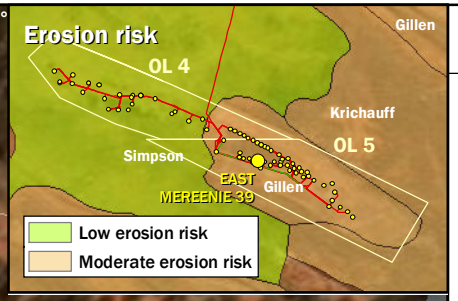

EAST MEREENIE 39

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

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EAST MEREENIE 40

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone
- Borrow pit

ID: 0534-010
Rev:
Date: 26/06/2020

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EAST MEREENIE 41

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
Date: 26/06/2020

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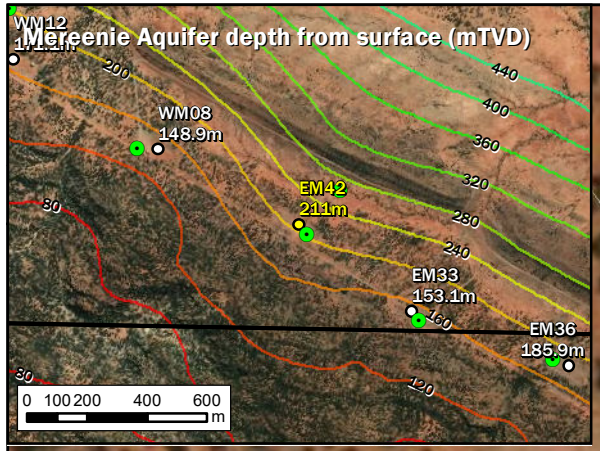

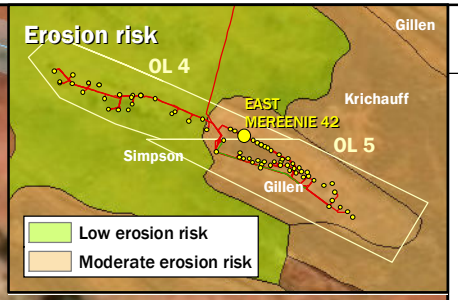

131°34'55"E

735m

EAST
MEREENIE 42

740m

745m

N

0 5 10 20 30 40 50
metres

East Mereenie 42 Access Road

23°59'45"S

131°34'50"E

131°34'55"E

131°35'0"E

EAST MEREENIE 42

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

ID: 0534-010
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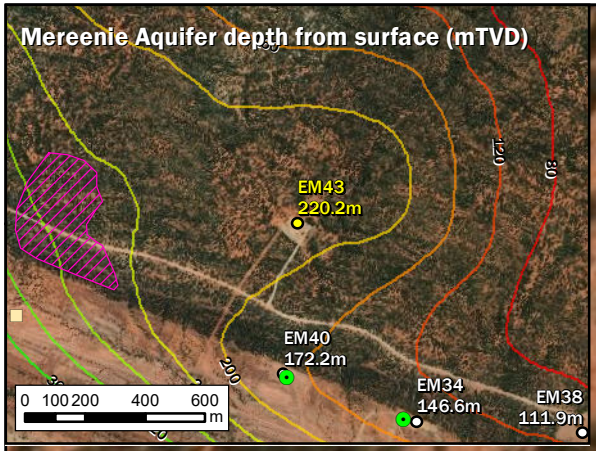

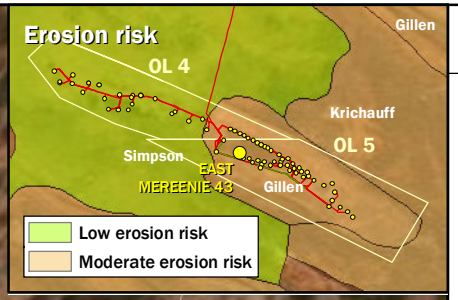

131°34'40"E

EAST
MEREENIE 43

795m
790m
790m
785m

24°0'45"S

East Mereenie 40 Access Road

N

0 5 10 20 30 40 50
metres

131°34'35"E

131°34'40"E

EAST MEREENIE 43

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

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EAST MEREENIE 44

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone
- Flare Pit
- Sump

ID: 0534-010
Rev:
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EAST MEREENIE 45

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone
- Flare Pit
- Sump

ID: 0534-010
Rev:
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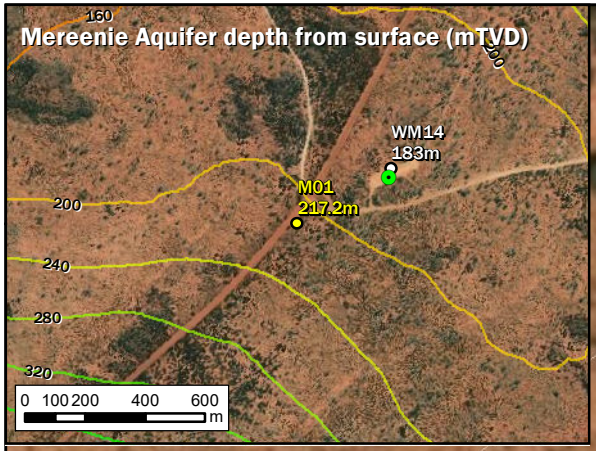

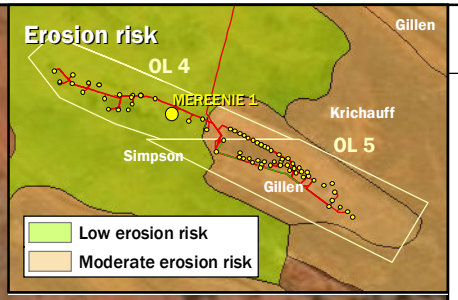

131°30'35"E

st Mereenie Field Access Road

West Mereenie 2 to West Mereenie 1

23°58'25"S

785m

MEREENIE 1

Old Water Bore
(RN004167)

N

0 5 10 20 30 40 50
metres

131°30'35"E

131°30'40"E

23°58'30"S

MEREENIE 1

- Well
- Water bore

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
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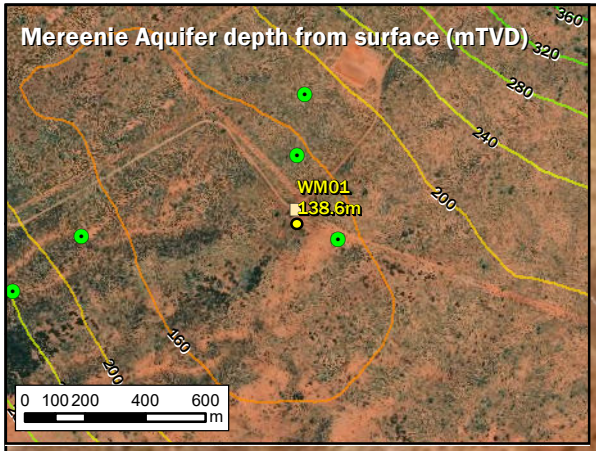
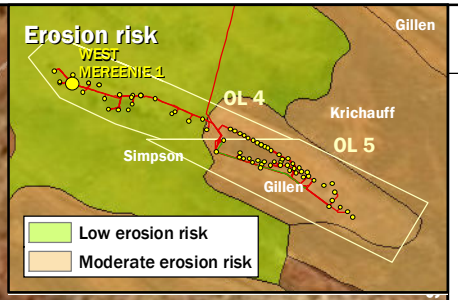


131°24'40"E



West Mereenie 1 Access Road

West Mereenie 22 Access Road

23°56'35"S

WEST MEREENIE 1

West Mereenie 1 Flare

755m

750m

750m

23°56'40"S

23°56'40"S

N

0 5 10 20 30 40 50
metres

131°24'35"E

131°24'40"E

131°24'45"E

WEST MEREENIE 1

- Well

(TPWCA Status)

- Data Deficient
- Near Threatened

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Flare Pit

ID: 0534-010
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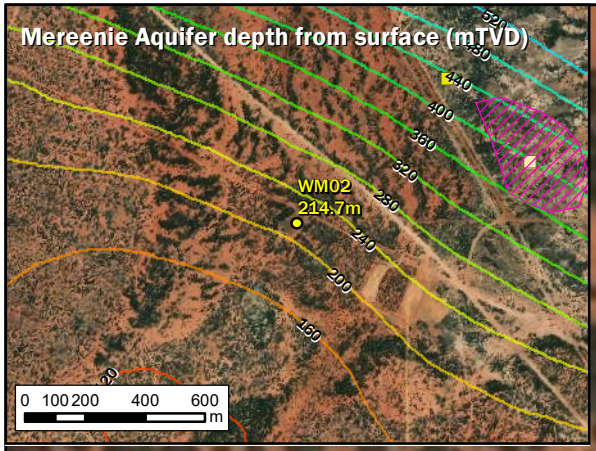

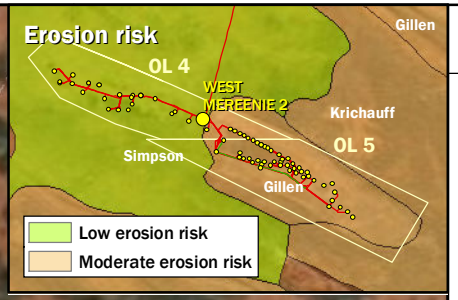

131°32'25"E

West Mereenie 2 Access Road

WEST MEREENIE 2

23°58'45"S

23°58'45"S

N

0 5 10 20 30 40 50
metres

131°32'25"E

131°32'30"E

WEST MEREENIE 2

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
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Date: 26/06/2020

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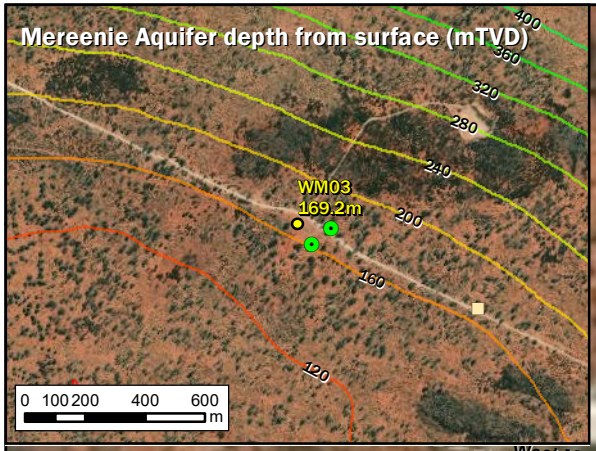

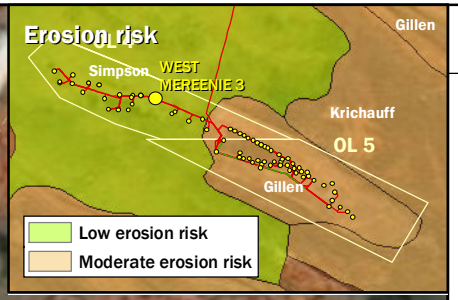

131°29'40"E

West Mereenie Field Access Road

Track

WEST
MEREENIE 3

23°57'30"S

23°57'30"S

N

0 5 10 20 30 40 50
metres

131°29'35"E

131°29'40"E

WEST MEREENIE 3

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

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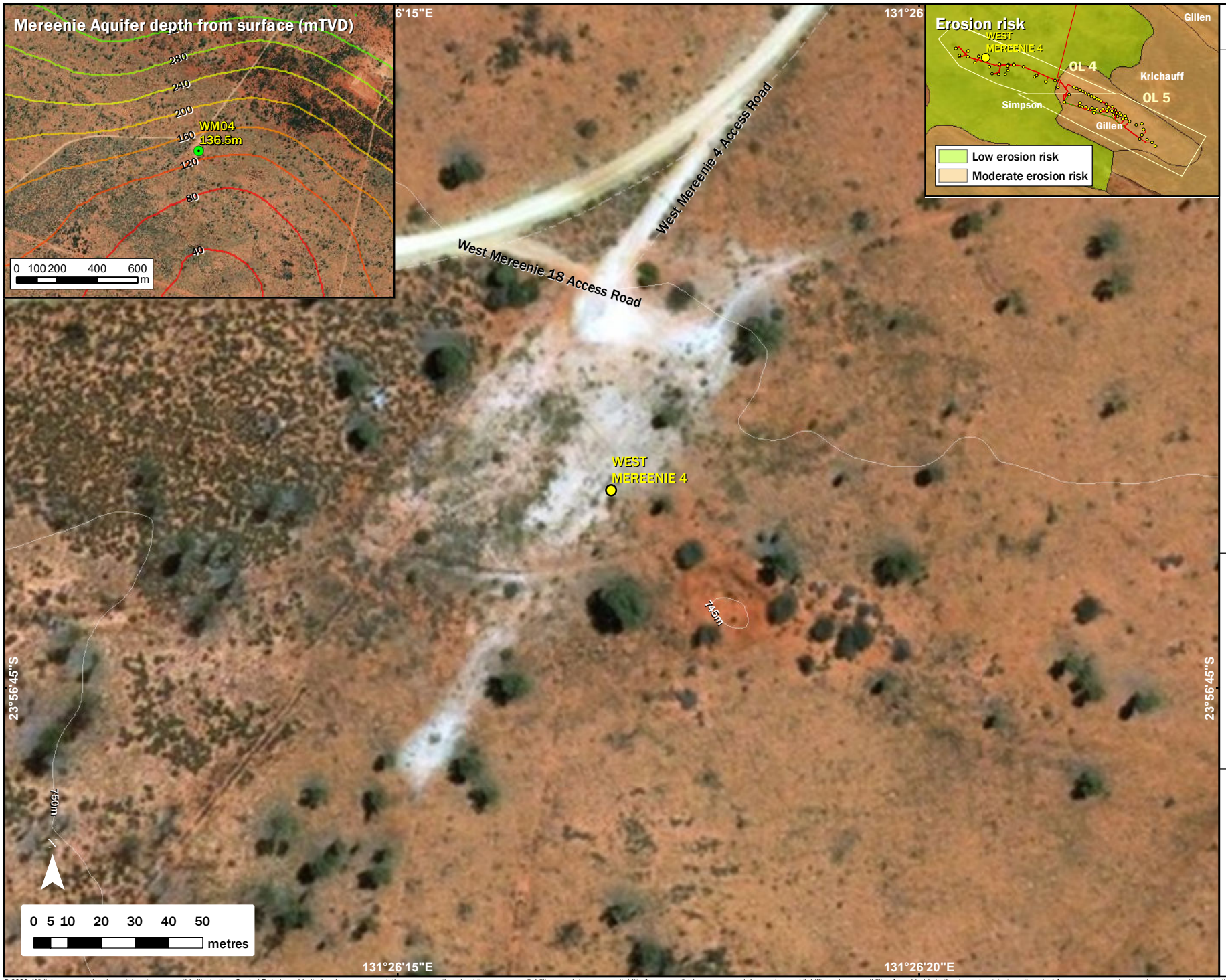

WEST MEREENIE 4

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

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WEST MEREENIE 5

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Flare Pit

ID: 0534-010
Rev:
Date: 26/06/2020

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WEST MEREENIE 6

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Flare Pit

ID: 0534-010
Rev:
Date: 26/06/2020

Map Scale is 1:1,500 when printed at A4
Coordinate System: GCS WGS 1984

Streams modified to match imagery and DEM by Central Petroleum after NT Drainage Lines: Australian Hydrological Geospatial Fabric (Geofabric) V2.1.1 Modified by: DENR. Significant Flora (TPWCA Status) - Department of Environment and Natural Resources, Parks and Wildlife Commission of the Northern Territory 2000. Central Petroleum Flora and Fauna Assessment. Significant Fauna (TPWCA Status). Land Systems from Department of Environment and Natural Resources - Copyright Northern Territory Government. Environmental Weeds from "Low Ecological Services Pty Ltd, 2019 - Central Petroleum Mereenie Weed Management Plan" and Department of Environment and Natural Resources. TPWCA Near Threatened Flora Populations - Parks and Wildlife Commission of the Northern Territory, 2000. Central Petroleum Flora and Fauna Assessment.

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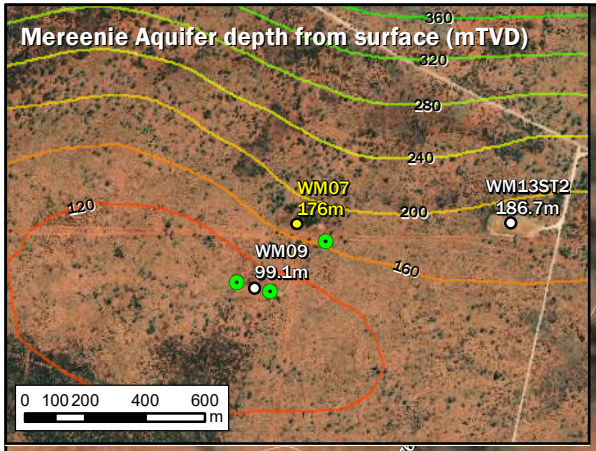

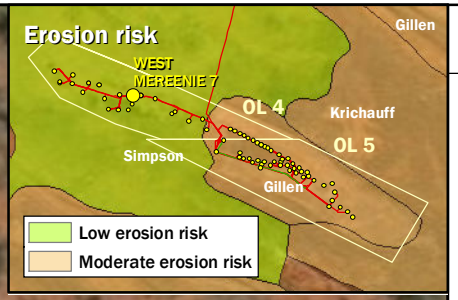

131°28'20"E

West Mereenie 7 Access Road

765m

WEST
MEREENIE 7

West Mereenie 9 Access Road

770m

23°57'20"S

131°28'15"E

131°28'20"E

N

0 5 10 20 30 40 50
metres

WEST MEREENIE 7

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
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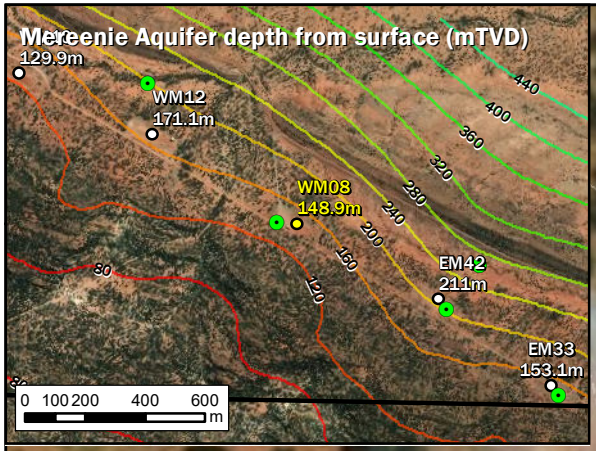

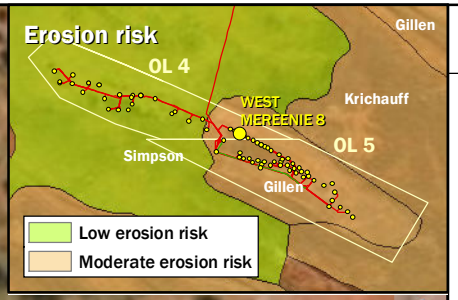

131°34'40"E

West Mereenie 8 Access Road

740m

WEST
MEREENIE 8

23°59'35"S

745m

750m

755m

23°59'40"S

N

0 5 10 20 30 40 50
metres

131°34'35"E

131°34'40"E

WEST MEREENIE 8

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

ID: 0534-010
Rev:
Date: 26/06/2020

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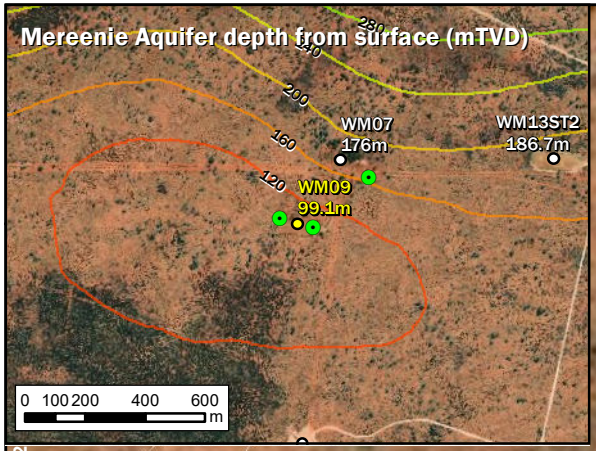

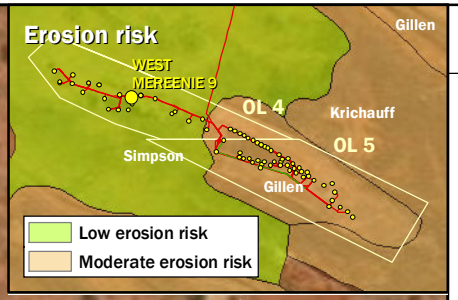

131°28'15"E

131°28'10"E

131°28'15"E

23°57'25"S

23°57'30"S

770m

770m

775m

WEST
MEREENIE 9

West Mereenie 9 Access Road

N

0 5 10 20 30 40 50
metres

WEST MEREENIE 9

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
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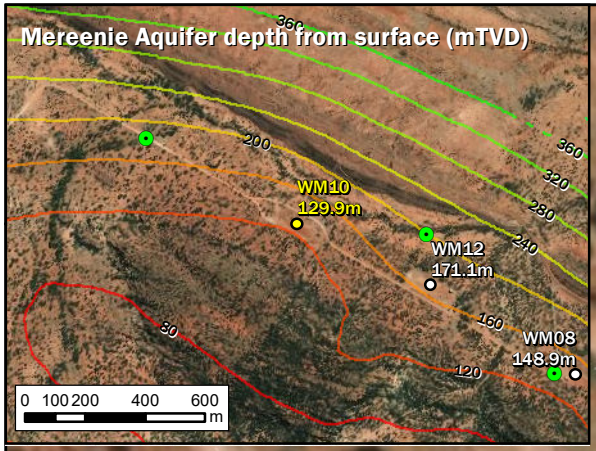

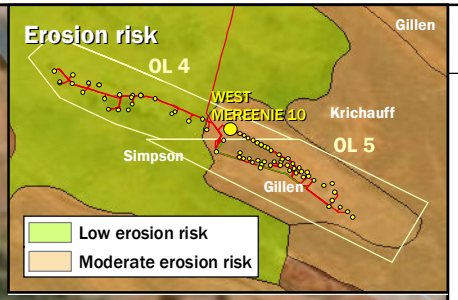

131°34'5"E

West Mereenie 10 Access Road

WEST
MEREENIE 10

740m

745m

750m

23°59'20"S

131°34'0"E

131°34'5"E

131°34'10"E

N

0 5 10 20 30 40 50
metres

WEST MEREENIE 10

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Streams (modified CTP after NT Drainage Lines)
- 5m riparian zone

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WEST MEREENIE 11

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
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WEST MEREENIE 12

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Flare
- Fence

ID: 0534-010
Rev:
Date: 26/06/2020

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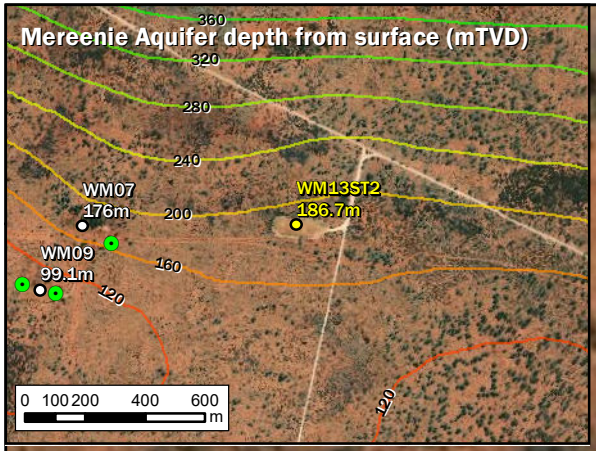

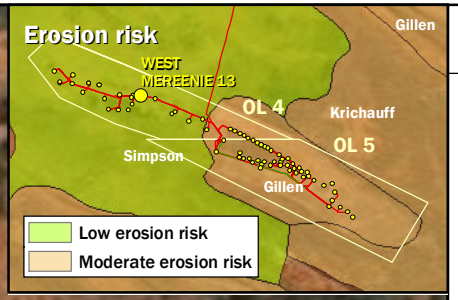

131°28'45"E

765m

WEST
MEREENIE 13

West Mereenie 13 Access Road

West Mereenie 20 Access Road

23°57'20"S

765m

765m

770m

N

0 5 10 20 30 40 50
metres

131°28'40"E

131°28'45"E

WEST MEREENIE 13

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
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WEST MEREENIE 14

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
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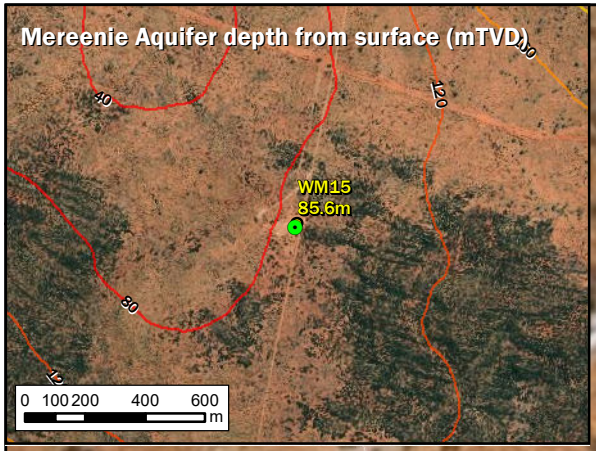

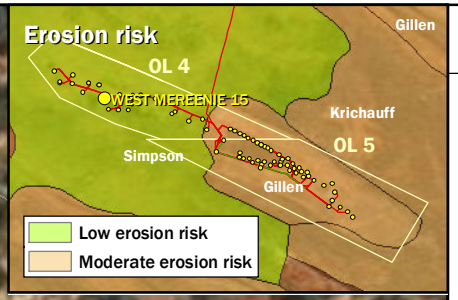

WEST MEREENIE 15

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
Rev:
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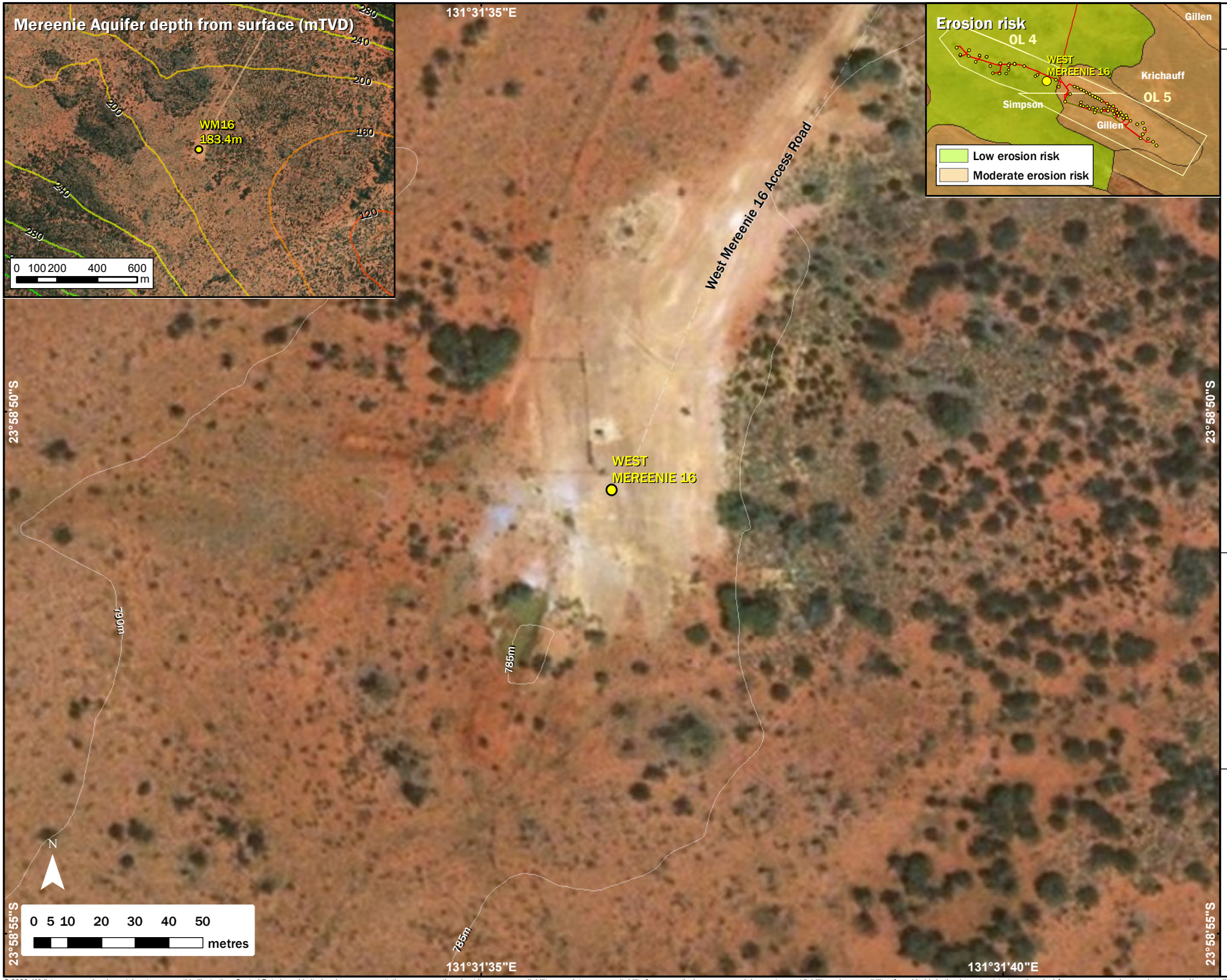

WEST MEREENIE 16

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

ID: 0534-010
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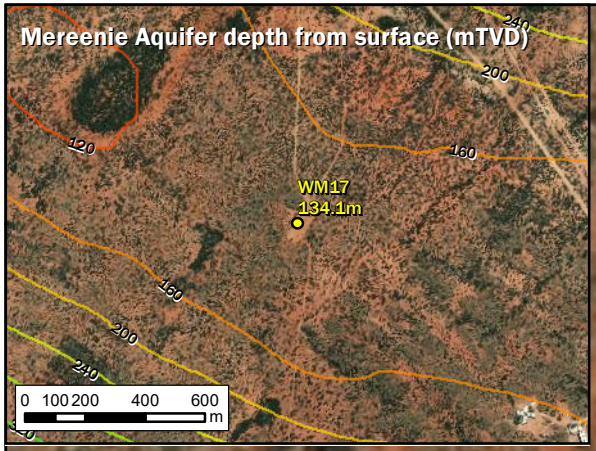

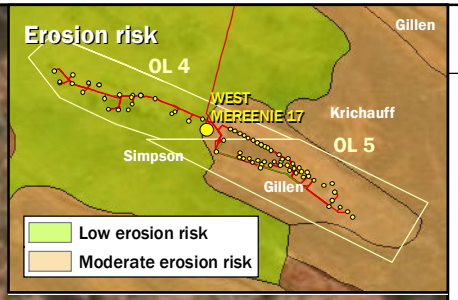

131°32'40"E

West Mereenie 17 Access Road

WEST MEREENIE 17

780m

780m

23°59'25"S

23°59'25"S

N

0 5 10 20 30 40 50
metres

131°32'35"E

131°32'40"E

131°32'45"E

WEST MEREENIE 17

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

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WEST MEREENIE 18

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Flare Pit

ID: 0534-010
Rev:
Date: 26/06/2020

Map Scale is 1:1,500 when printed at A4
Coordinate System: GCS WGS 1984

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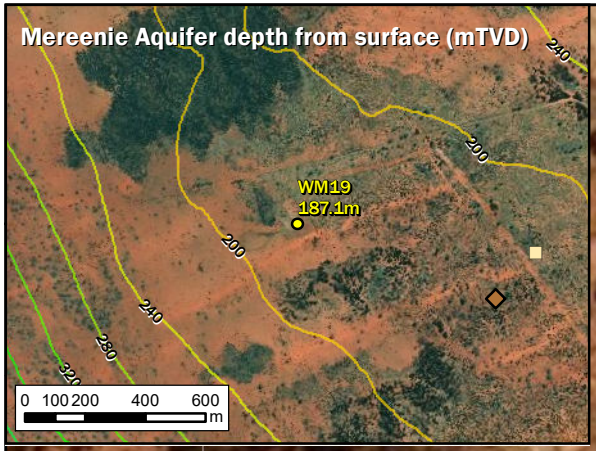

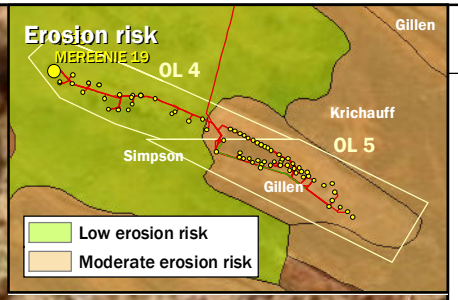

131°23'35"E

131°23'40"E

23°55'50"S

23°55'55"S

WEST
MEREENIE 19

730m

735m

West Mereenie 19 Access Road

West Mereenie 19 Access Road

730m

N

0 5 10 20 30 40 50
metres

WEST MEREENIE 19

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush

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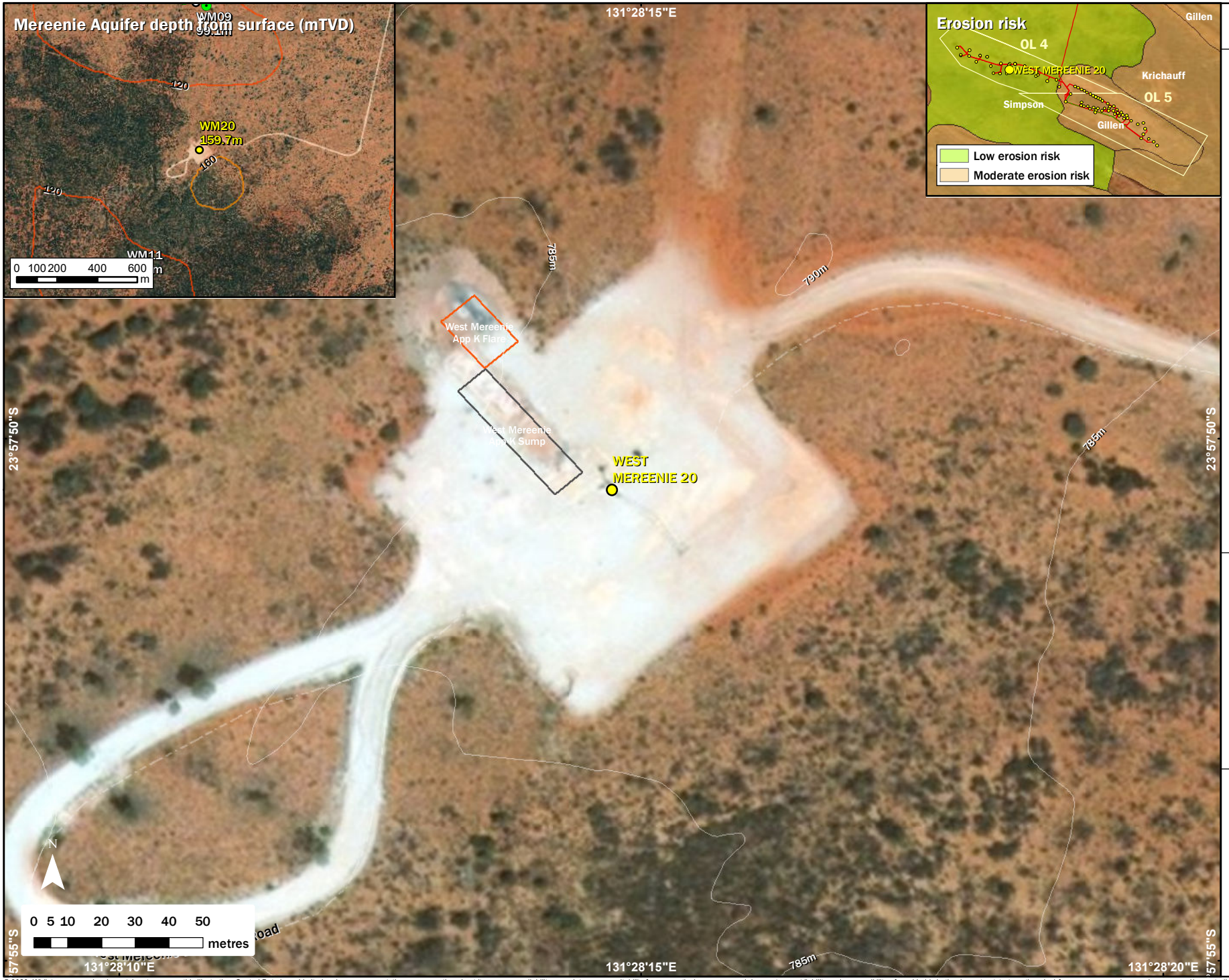

WEST MEREENIE 20

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Flare Pit
- Sump

ID: 0534-010
Rev:
Date: 26/06/2020

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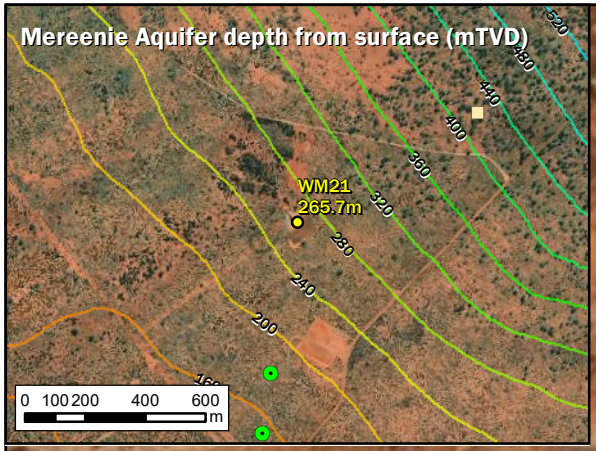

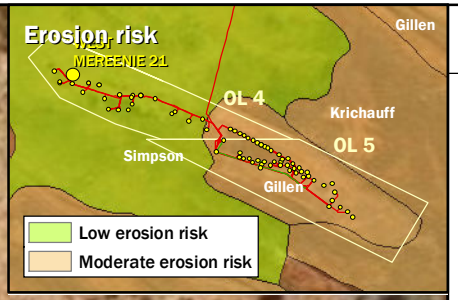

131°24'45"E

West Mereenie App B Flare

West Mereenie App B Sump

WEST MEREENIE 21

West Mereenie 21 Access Road

West Mereenie 21 Access Road

West Mereenie 21 Access Road

760m

745m

23°56'5"S

23°56'10"S

23°56'10"S

N

0 5 10 20 30 40 50
metres

131°24'40"E

131°24'45"E

WEST MEREENIE 21

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Flare Pit
- Sump

ID: 0534-010
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WEST MEREENIE 22

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Flare Pit
- Sump

ID: 0534-010
Rev:
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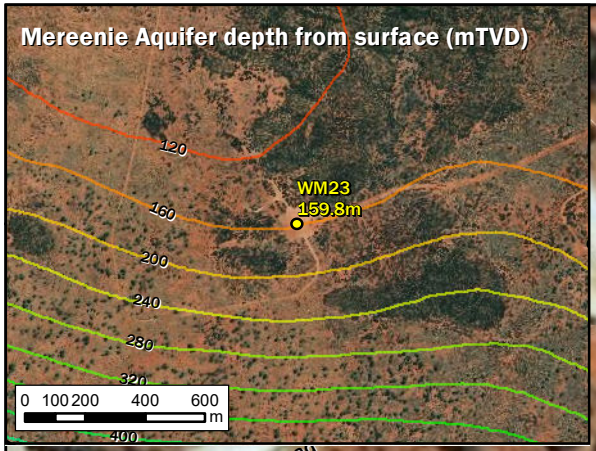

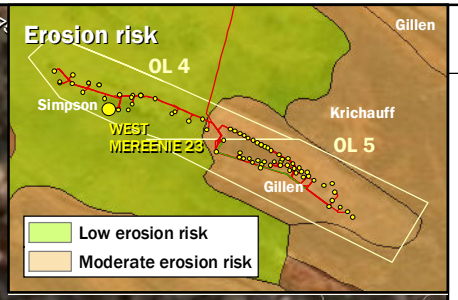

131°26'50"E

West Mereenie 23 Access Road

745m

West Mereenie App D Sump

West Mereenie App C Sump

WEST MEREENIE 23

23°58'10"S

N

0 5 10 20 30 40 50
metres

745m

131°26'45"E

131°26'50"E

131°26'55"E

WEST MEREENIE 23

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Flare Pit
- Sump

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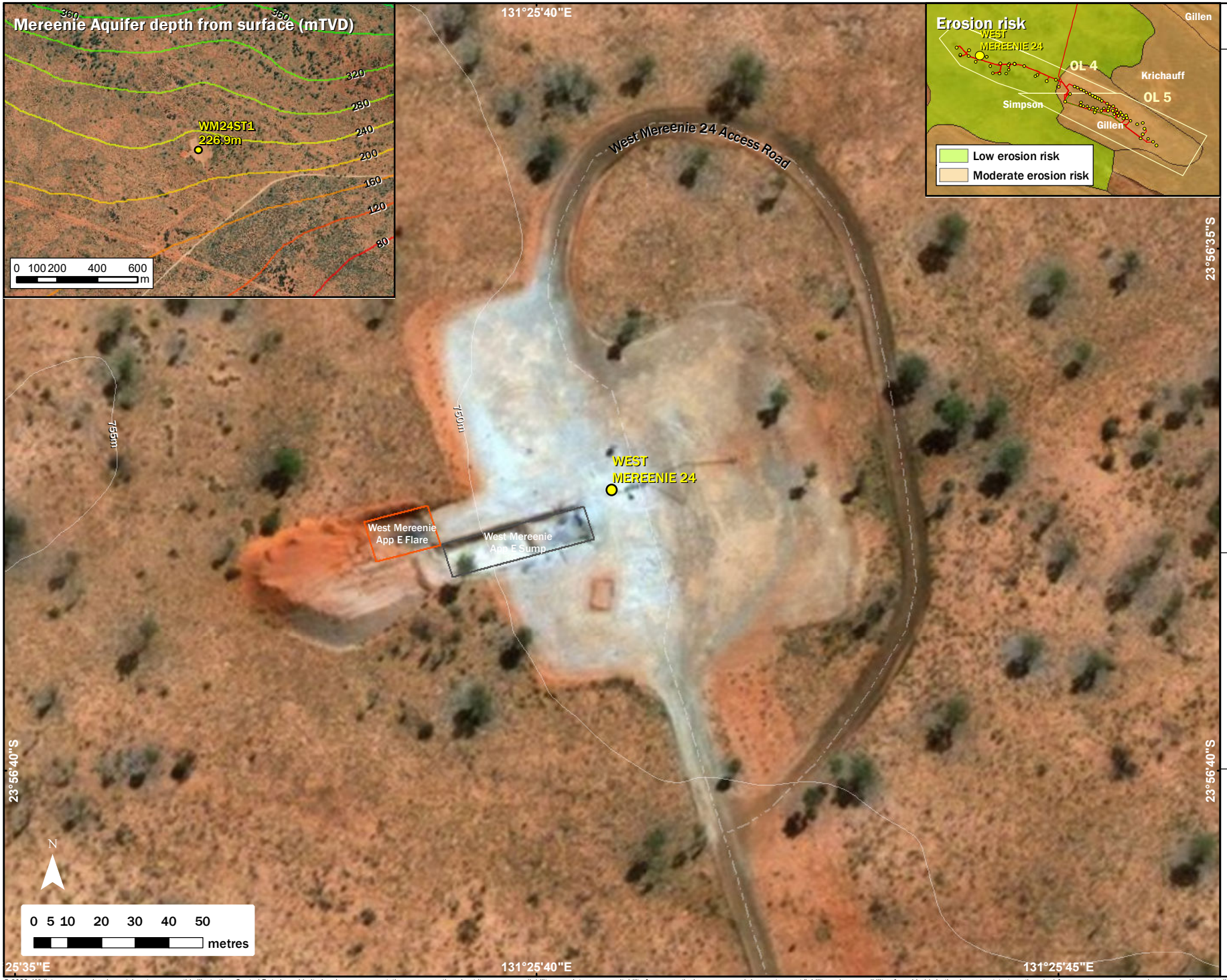

WEST MEREENIE 24

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Flare Pit
- Sump

ID: 0534-010
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WEST MEREENIE 26

- Well

Conservation Significant Flora

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable

Conservation Significant Fauna

(TPWCA Status)

- Critically Endangered
- Data Deficient
- Endangered
- Near Threatened
- Vulnerable
- Environmental Weeds

TPWCA Near Threatened Flora Populations

- brilliant hopbush
- false caustic bush
- Sump

ID: 0534-010
Rev:
Date: 26/06/2020

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Appendix 8 Example Emergency Response Plan

Ensign International Energy Services Australian Division

Emergency Response Plan 2018

Rig 932

Document overview
This plan describes the processes for the Management of Environmental Health and Safety on Rig 932, in accordance with relevant legislation and Ensigns Risk Management System.

Document Title:	Emergency Response Plan
Rig No:	932
Version:	3.0
Issued:	Mar 2018
Review and Approved by:	Area Manager – **redacted**
Document Owner:	Rig Manager
Next Review Date:	Mar 2019

ENSIGN INTERNATIONAL ENERGY SERVICES

To all Employees

ENSIGN RIG 932 EMERGENCY RESPONSE PLAN - NT

The Rig 932 Emergency Response Plan provides a guideline for the individual responsibilities of key personnel in the event of an emergency that may threaten the safety of personnel, the well, equipment, or the environment.

This Plan complements procedures as described in the ENSIGN Global Risk Management System (GRMS), the Northern Territory Petroleum Act 2009, Northern Territory Petroleum Regulations 2013, Northern Territory Petroleum (Environment) Regulations 2016 and provides a supplement to Emergency Response Plans of respective Operators.

Please familiarise yourself with this manual and ensure that all personnel understand their actions, roles and responsibilities in the event of an Emergency situation.

This plan should be made available to all personnel involved in the operation for their reference.All personnel are encouraged to report on any omissions or improvements to the plan should they be noted.

redacted

Area Manager-South Australia

redacted

Health, Safety, Environment & Training Superintendent

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No.	Name	Title	Company	Number of Copies Distributed
1	**redacted**	Country Manager, Australia	Ensign	1
2	**redacted**	SA Area Manager	Ensign	1
3	**redacted**	Drilling Superintendent	Ensign	1
4	**redacted**	Rig Manager 932	Ensign	1
5	**redacted**	HSE Advisor	Ensign	1
6	**redacted**	HSE Manager, International East	Ensign	1
7	**redacted**	Human Resources	Ensign	1
8	**redacted**	Alice Springs Area Manager	Central Petroleum	1
9	**redacted**	Operations Manager	Central Petroleum	1
10	**redacted**	Chief Operating Officer	Central Petroleum	1
11	**redacted**	HSE Manager	Central Petroleum	1

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1.0 Version Control

Version	Date	Owner	Reviewers	Remarks
Version 1.0	Mar 2018	Rig Manager	• Area Manager • Drilling Superintendents • HSE Regional Superintendents • Rig HSEA's	This new plan was drafted and provided for review between Jul 2018 and Aug 2018, amendments to this plan were recorded.

Revision History

Revision	Date	Owner	Reviewers	Description
2.0 2.1	Mar 2018 Mar 2018	Rig Manager	• Area Manager • Drilling Superintendents • HSE Regional Superintendents • Rig HSEA's	Updated Search Plans added Updated – purpose statement, new contacts

1.1 Project Information

Client	Date	Contract title	Project Managers	Contact
Central Petroleum	Mar 2018	Ensign/Central Petroleum Drilling Services agreement Feb 2018	• Ensign Area Manager South Australia- **redacted** • Ensign Drill Superintendents **redacted* **redacted** • Ensign HSE Superintendent **redacted** • Central Petroleum Alice Springs Area Manager **redacted • Central Petroleum Operations Manager **redacted** • Central Petroleum Chief Operating Officer **redact • Central Petroleum HSSE Manager – **redacted** • Petroleum Duty Officer 24/7 • Central Field Superintendents **redacted**	**redacted** **redacted** **redacted** **redacted** **redacted** **redacted** **redacted** **redacted** **1300 935 250** **redacted** **redacted** *

2.0 Purpose

The purpose of this Emergency Response Plan (ERP) is to establish guidelines and structure for effective handling of unforeseeable emergencies and to ensure that all employees are aware of their duties and responsibilities in an emergency throughout Rig 932 operation in the Ensign/Central Petroleum West Mereenie 26, Palm Valley 13 and Ooraminna drilling campaign located in the Mereenie, Palm Valley and Ooraminna Fields Northern Territory.

Emergency is defined as an occurrence or series of occurrences that involve the health and safety of the workers or public through uncontrolled release of well fluids, gas, or serious injury, health failure or threat to the environment.

This emergency response plan defines the chain of command and the responsibility for key people. The plan also contains a description of the response/decision making process in the form of flow chart and a list of the telephone numbers of the potential support and various resources, which may be needed.

All personnel upon arrival will be given a site induction and orientation covering Ensign Safety policy and procedures. The new arriving personnel will familiarize themselves with the locations of emergency muster points, equipment as per the Rig site safety orientation.

This ERP also complies with the legislative requirements of the NT Petroleum Act 2009 & NT Petroleum Regulations 2016.

Reference:	EN-AUS-HSE-P-5.09	Emergency Planning Procedure
	EN-AUS-HSE-P-4.01	Risk Management Procedure
	Rig 932	Well Control Procedures

3.0 Ensign Rig 932 - Work Scope

Ensign Rig 932 and associated camp facilities are being engaged to provide drilling services to Central Petroleum in the West Mereenie 26, Palm Valley 13 and Ooraminna Region, Northern Territory. Rig 932 is a conventional Drilling Rig 1000. Its operation is managed by Ensign Australia Pty Ltd (EAPL), part of Ensign International Energy Services (EIES) and wholly owned subsidiary of Ensign Energy Services Inc. of Canada. See appendix 5 Rig Layout and ESD

The Services shall, without limitation include the provision of Personnel (estimated daily POB of 35 persons) and Equipment to perform the Scope of Work for the work in Section 3 of the contract. Ensign will undertake a three well drilling program to drill West Mereenie 26, Palm Valley 13 and Ooraminna wells commencing approximately April 2018. The program is for three wells and Central Petroleum reserves the right to change the well sequence, well names, and Permit area to suit operational requirements.

4.0 Potential Emergencies

Personnel must be aware of the potential hazards that exist at or around the well site and Camp that may cause an emergency. Examples of some potential emergency situations may include (but are not limited to):

- Medical emergency due to personal injury, personal medical condition or allergy.
- Fire or explosion at the well site or in the immediate area of the site.
- Well control emergencies - uncontrolled escape of water liquid hydrocarbon or natural gas, toxic or corrosive gases.
- Discharge / spill of oil, hazardous or toxic chemical.

- Major malfunction, structural or mechanical failure of equipment.
- Severe weather (lightning, flood, extreme wind, bushfires, etc.)
- Vehicle Incident (Rollover, collision, breakdown or lost)

IF THERE IS ANY DOUBT AS TO WHETHER THERE IS AN EMERGENCY, THEN INITIATE THE EMERGENCY RESPONSE PROCEDURE:

Reference: Ensign Australian Division HSES Management System Manual 2018

5.0 Communication

The following general rules should be adhered to in an emergency:

General

Keep communications system manned throughout the duration of emergency. All communications should be by telephone or e-mail.

All verbal instructions and messages should be confirmed by e-mail where available. All messages should be kept as brief and accurate as possible.

All messages/instructions should be accurately logged including times and names of persons making and receiving the calls.

Well Site

Rig Manager, Drilling Superintendent or designate

Immediately contact and coordinate with the Operator Drilling Supervisor.

Make initial contact with Base Management according to duty roster and notification sequence until a member is successfully contacted.

Keep messages as brief and accurate as possible.

Keep a log of all calls related to the emergency to and from the site. Where possible all verbal messages should be confirmed by e-mail.

Operations Centre

Keep log of all calls related to the emergency. All verbal instructions and messages should be confirmed by facsimile or e-mail.

Area Manager

Contact and activate Emergency Response Group, including client representative

Notify any Government Authorities of the emergency as required and as directed in consultation with client. Keep messages/instructions as brief and accurate as possible.

Keep log of all calls related to the emergency. All verbal instructions and messages should be confirmed by facsimile or e-mail.

Emergency Reporting Format

The following Emergency reporting format is included for reference as the requirements for each emergency situation may vary. In addition to its use in assisting the formatting of reports, the following outline can be used as a quick checklist.

All verbal reports should be confirmed by e-mail.

All emergency reports sent or instructions received should be logged and the names of the caller and receiver noted.

Incident:

1. Name of well location
2. Name of Rig
3. Description and severity of incident
4. Time incident occurred
5. Cause of incident if known
6. Status report of well security, equipment, personnel and environment as appropriate
7. Details of any injured, deceased and missing personnel including:
   - Number of personnel involved
   - Name, company, position of personnel
   - Cause of injury or death
   - Details of injuries
   - Details of any treatment given
   - Location and time person last seen (if missing person)

   Note: Medical Evacuation Form should be completed as per Sections 2.6 and 2.7. (Copies are attached in Enclosure.)
8. Weather conditions (including wind strength and direction, etc.).
9. Actions taken on site and emergency services activated.
10. Details of assistance requested from outside emergency.
11. Assistance required from Ensign's Emergency Response Group (ERG).
12. Any other points that may be relevant to the emergency.

6.0 Responsibilities

6.1 Country Manager

The Country Manager is responsible for ensuring:

- this plan is established and implemented by the Business Unit
- adequate resources are available to enable the effective implementation of this plan
- Safety standards and procedures meet the legislative requirements

6.2 Divisional / Area Managers

Managers are responsible for:

- the effective communication of the requirements of this plan to their personnel
- compliance with this plan at operational sites and facilities
- compliance with this plan is monitored by way of audits and inspections incorporating reviews of records, processes and systems
- Provide access to applicable training

6.3 Drilling Superintendents, Rig Managers and Supervisors

Are responsible for

- all personnel under their supervision understand the requirements of this plan
- processes and practices aimed at facilitating compliance with this plan are established, and
- compliance records are maintained and accessible
- conducting regular reviews of the Emergency Response Plan

6.4 Operator Company Representative (OCR)

- Coordination with Rig manager regarding site situation
- Communication with external emergency services
- Communication to Company Management

6.5 Site Communications Officer

- Responsible for all communications during an emergency

7.0 Emergency Response Group (ERG)

The ERG will comprise of a core group of the following Ensign & client personnel:

ENSIGN Corporate:

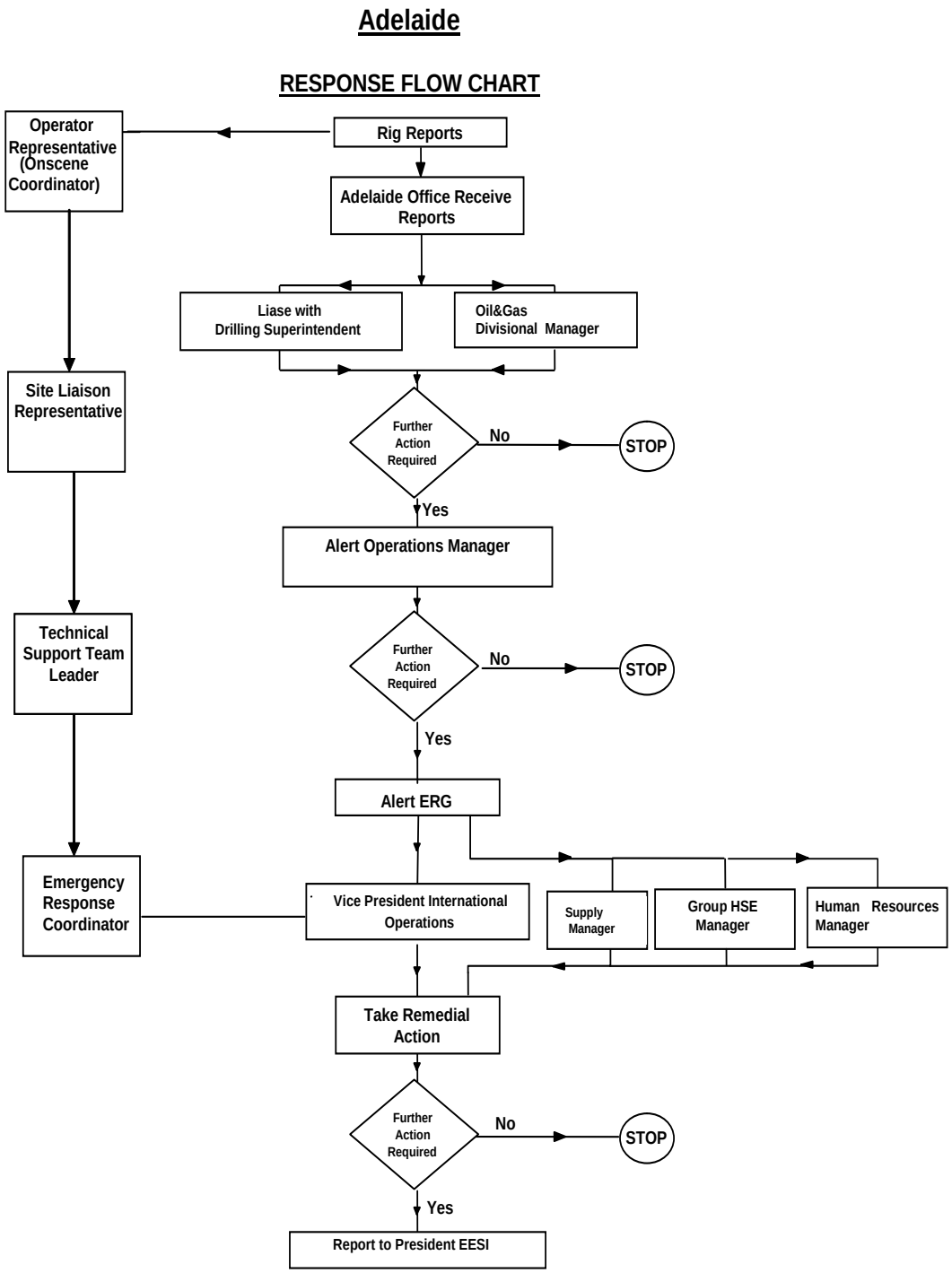
redacted	Country Manager-Australia	**redacted**
redacted	HR Manager	**redacted**
redacted	Group HSE Manager	**redacted**
redacted	Area Manager-South Australia (Aust)	**redacted**

Client: Central Petroleum Response group (contacts)

NAME	POSITION	CONTACT DETAILS
Mark Hensel Paul McClelland	Central Field Superintendents	Mobile: 0475 949 487 Sat Phone: 0420 368 086 Site Phone: 08 8954 3700
Rolf Schulte	Alice Springs Area Manager	Phone: (08) 8968 5800 Mob: 0418 750 736
James van Rooyen	Operations Manager	Phone: (07) 3181 3842 Mob: 0447 477 063
Mike Herrington	Chief Operating Officer	Mobile: 0427 758 593
Alan Johnson	HSSE Coordinator	Mobile: 0488 512 401
EMERGENCY ALERT NUMBER	ISS First Response (24hr Monitoring)	**1300 134 406** advise issue to operator
BRISBANE EMERGENCY HOTLINE	Dedicated phone line to be used whilst emergencies are under way	**(07) 3181 3860**
MEREENIE (multi area call) NUMBER	Calls various numbers on site	**08 8954 3822**
EMERGENCY SERVICES		
Medical Emergency Contact Numbers	**Police** **Fire** **Ambulance** **NTES** (NT Emergency Services)	**000** Non-Emergency 131444
Central Aust. Remote Health & RFDS: District Medical Officer (DMO) Doctor on call For all Medical Evacuations via Alice Springs.		24 hours: (08) 89517840 / (08) 8951 7777
RFDS Port Augusta Communications centre		1800 630 784 re plane ETA's
Health Direct Medical Operative (24/7)		Phone: 1800 022 222
Alice Springs Hospital (24/7)		Phone: (08) 8951 7777
Kings Canyon Medical Clinic		Phone: (08) 8956 7807 Note clinic can & will be dispatched by 000 if required
Mereenie Field Landing Strip	Latitude: 23° 58' 36 South Longitude: 131° 33' 42 East Elevation 2410 Ft AHD Magnetic bearing 106° making runway directions 12 & 30	
Mereenie Call Sign and Frequency	**VKD 606** on Frequency **126.70Hz** (Using operational site radio with field and emergency channels Infield)	
OTHER GOVERNMENT & EXTERNAL AGENCIES		
NT Safe Work Australia (ntworksafe@nt.gov.au)		Phone: 1800 019 115
Department of Primary Industry & Resources (DPIR): Jop van Hattum (Senior Director of Petroleum Technology and Operations)		Phone: +61 8 8999 6567 Email: Jop.vanhattum@nt.gov.au
Petroleum Operations emergency contacts:		Phone: 61 8 8999 6350 Fax: 61 8 8999 5191 petroleum.operations@nt.gov.au After hours: 1300 935 250
Department of Lands, Planning and the Environment		Phone: (08) 8951 9247 Email: heritage@nt.gov.au
Police	Alice Springs Station	Phone: (08) 8951 8822
St John Ambulance	Alice Springs Office	Phone: (08) 8959 6600
Mall Medical Clinic	Alice Springs	Phone: (08) 8952 2744
Low Ecological Services	Environmental Services Bill Low	Phone: (08) 8955 5222

Emergency response Flow Chart

The following Response Flow Chart illustrates the process for managing emergencies:



8.0 Emergency Response

GENERAL

Overall Authority on site during the emergency will be the person in charge (PIC) or Site Controller and is normally the Operating Company Representative.

The Rig Manager is to coordinate on-site efforts to control the emergency in conjunction with the PIC (Site Controller) and will be the Ensign primary contact during an emergency.

The PIC will coordinate and assist the Ensign Rig Manager in responding to any incident and ensure that Client Management is kept informed of the status.

All communications off the site regarding the emergency incident are to be directed through the Rig Manager. Rig Manager is to be informed of any hazards that may affect the safety of the crew, equipment, environment or well.

Priority will be given to the safety of personnel at all times.

Ensign Area Manager and Country Manager-Australia are to be kept informed of the status of the emergency at all times.

The Client Management Team will have overall responsibility of the emergency, and work with the Ensign ERG in managing the emergency.

Muster points

In an Emergency:

All personnel will assemble at the designated PRIMARY MUSTER POINT (located outside Rig Managers office)

A SECONDARY MUSTER POINT will be nominated in an upwind location from the primary muster point to provide a safe location if the designated Muster Point is considered unsafe for personnel due to the direction of the prevailing winds or if access is impeded (this will be identified daily dependant on wind direction).

In an emergency where the drill site is considered dangerous to personnel, the site will be evacuated to a pre-determined location or as directed by the Rig Manager.

The location of the Muster Points will be identified and communicated to all personnel at the pre-spud meeting prior to commencement of operations and on induction to site.

On sounding the emergency siren (rig horn) all personnel on site will proceed to the Magna Board and remove their personal name plate and retain it until directed by RM to replace it on the Magana board.

All visitors to the site must report to the Rig Manager for site induction prior to commencement, and are expected to adhere to the above requirements in the case of an emergency.

9.0 Medical Emergency (Medivac)

Make immediate area safe if necessary. Check victim for vital signs. (DRSABCD)

Administer first aid treatments as necessary.

Move victim to safer or more comfortable position if necessary (see Note below). Arrange for external medical assistance if necessary.

Arrange for medical evacuation as necessary.

Medivac Patient Information Sheet (Appendix 1) should be completed and copies sent to the in-field medic, ambulance depot, receiving hospital and doctor, and Area Manager. The original should be kept on site for record.

Notify police in case of serious injury or death.

Notify Area Manager of emergency and keep updated of situation.

Notes:

- If injured person is in a location where further injury is likely, then the patient should be moved to a safer location. If an injured person is to be moved, adequate care must be taken to ensure that further injury is not inflicted.
- In the event of multiple injuries occurring the Occupational First Aider is to assess the injuries and treat those with life threatening injuries first.
- In the case of death, the deceased person should not be moved until the appropriate authorities arrive. The location where the injury occurred should not be disturbed other than to make it safe.
- If possible, photos of the injured person and general area should be taken for future reference. All communications, including instructions are to be accurately logged
- All actions relating to treatment of the injured are to be accurately documented.

See the form at Appendix 1.

10.0 Fire or Explosion

The follow action is to be taken:

- Rig Horn alarm to be sounded (continuous blast).
- Immediately confirm the location and extent of the fire.
- Ensure all personnel are accounted for.
- Activate emergency response teams to fight the fire or contain the damage caused by the explosion.
- Administer medical treatment to any injured personnel.
- Arrange for medical evacuation of any injured personnel.
- Activate local resources to assist in extinguishing or containing the fire.
- Evacuate non-essential personnel to designated Muster Station as necessary.
- If site becomes dangerous and poses a risk to personnel safety, all personnel to be evacuated and assemble at the designated Muster Station.
- Area Manager is to be notified of the emergency and kept updated of the situation.

11.0 Well Control

A Well Control situation may progress through three phases which are described as follows:

Phase I (Alert)

Well has kicked and is being killed using normal well control procedures.

Phase II (Alert)

Well Control may not be achieved due to equipment failure or operational problems. When a Phase II alert is declared, all non-essential personnel are to evacuate the well site and assemble at the Designated Muster Station.

All attempts are to be made to control the well, provided personnel safety is not jeopardised.

Phase III (Emergency)

Uncontrolled blow-out and control of the well can no longer be regained. The crew, equipment, well and environment is in imminent danger. Alarm is to be sounded. All personnel are to evacuate the site and assemble at the Designated Muster Station. All personnel are to be accounted for.

Note:

Phases will be declared by the Client Drilling Supervisor in consultation with the Rig Manager. Client has in place, provisions for callout of nominated Third Party Well Control Services, and it would be the responsibility of the ERG on advice from the Rig Manager to activate this plan should it be required.

11.1 Escape of Gases

In most cases, gases escaping from a well will be toxic, flammable and/or corrosive, therefore extreme care should be exercised when escape of gasses occur.

Procedures detailed under Well Control should be followed in the event of gases escaping from the well. The following type of gasses may escape during the well control situation:

Hydrocarbon gases - are extremely flammable and are easily ignited. Hydrocarbon gases can also cause death by asphyxiation.

Hydrogen Sulphide Gas (H_2S) is extremely toxic and corrosive. H_2S can quickly cause death if inhaled at relatively low concentrations. It also leads to the loss of smell at toxic concentrations making it even more dangerous.

Carbon Dioxide (CO_2) is toxic and corrosive. CO_2 can cause death due to asphyxiation.

Both CO_2 and H_2S are denser than air and will naturally flow to lower areas, therefore appropriate precautions to test the atmosphere must be taken before entering any suspect area when quantities of these gases are thought to be present.

If the presence of a toxic or corrosive gas release is anticipated or observed, the following procedure should be followed.

- Rig alarm is to be sounded (continuous blast on rig horn) and all personnel on site will report to the 'Up Wind' Secondary Muster point
- All personnel are to be notified.
- Well to be shut in and secured or take other necessary action to cut-off the gas flow. All hot work (e.g. welding) is to be suspended.
- Shut down all engines if possible.
- Ensure breathing apparatus are checked prior to use. Evacuate all hazardous areas e.g. rig floor, etc.
- All personnel are to be accounted for.
- All personnel entering the affected areas shall wear breathing apparatus.

11.2 Escape of Liquid Hydrocarbons or/and water

Procedures detailed under Well Control should be followed in the event of Liquid Hydrocarbons or/and water escapes from the well.

Escape of liquid hydrocarbon from a well is fire/explosion hazard and it is a major environment pollutant. All the procedures mentioned under item 2.2 as well as 2.3.1 should be put into place.

Measures should be taken to contain the spill of liquid hydrocarbon or formation water. Oil, hazardous/toxic chemical spill emergency procedures should be followed.

12.0 Discharge/Spill-Oil, Hazardous or Toxic Chemicals

A discharge may consist of either hydrocarbon during normal drilling operations or testing, of drilling fluid or associated chemicals during the same operations. Extensive precautions are taken during the design and drilling phases of the drilling operations to minimise the risk of a discharge by using fail safe systems and a variety of safety equipment.

Should any discharge occur however, Ensign defines in this plan how this discharge is to be confined to have the minimum environmental effect.

12.1 Discharge Control Guidelines

The Drilling Site

The drilling site should be constructed on solid, undisturbed ground and should generally be level. The site should be overlaid with compacted earth and material capable of supporting the drilling rig, equipment and vehicular traffic. The area on which the rig, mud tanks, pumps and rig machinery are to be prepared by the client to enable adequate drilling operation.

Every phase of operations should be conducted in such a manner as to prevent any discharge. In the event a discharge does occur, every effort should be made to minimise the quantity released.

Discharge Handling Practice

Should a discharge occur the handling technique will vary according to the location, probable discharge movement and prevailing weather conditions.

The discharge contingency plan must be capable of being activated immediately and be adequate to handle discharges under various anticipated conditions.

Where no approved steps of action apply in handling a discharge, the following steps should be adopted as good industry practice:

a. Stop the source of the discharge, if possible, by shutting valves, plugging holes or removing fluids to a safe container, etc.;

b. Use Spill Kit soaker pads and sausage bunding to contain and soak up liquid spills

c. Divert discharge into main sumps by digging drains or pumping;

d. Block perimeter drains with earth dams or wooden blocks to contain maximum amount of fluid in the drain; and

e. Start discharge containment procedures as soon as possible after notification of the discharge;

f. If the discharge is likely to get off site and enter any stream:

   1) Start notification procedures contained in this plan immediately;

   2) Attempt to contain the discharge and remove from the area as soon as possible; and

   3) Promptly attend to clean up and restorative work. Remove and dispose of contaminated soil, vegetation etc., in an environmentally sound manner.

Method to Control Discharges

For purposes of this plan, Ensign considers that there are three different degrees of discharge.

Type 1

A discharge where there is no possibility of material leaving the well site, and such material can readily be controlled or contained and removed, or cleaned up by site personnel under the supervision of Ensign personnel on site.

Type 2

A small to medium discharge, which either cannot be controlled or contained on the well site, or where there is a possibility that material cannot be contained on site, and the control of which requires the participation of Ensign personnel, together with local outside contractors.

Type 3

A major discharge which cannot be controlled at the site, (e.g. well or pipe blow out) which requires full Ensign Team effort together with outside assistance.

Approaches to be taken

The following outlined procedures are to be followed in the event of an accidental discharge:

Type 1

It is the responsibility of on-site personnel to cope with this type of discharge. This will be achieved by following these steps:

a. Close off source of discharge if possible;

b. Report incident to Rig Manager & Drilling Supervisor;

c. Check that all possible outlets from discharge area are closed or blocked. This will include perimeter drains around the site;

d. Mobilise discharge containment equipment and personnel; and

e. Proceed to clean up discharge.

Type 2

a. Proceed as with Type 1 discharge; and

b. Ensure discharge control points downstream of well site have been blocked or containment equipment deployed.

Ensign will ensure that discharge control points have been previously identified. The Site Supervisor will have a map on site showing their location and means of access to them.

Type 3

a. Proceed as with Type 1 and 2 discharges; and

b. Ensign will take whatever steps it can to control the discharge within its own capabilities, and will cooperate fully with a any regional or national discharge control team to prevent pollution, and aid in organisation of control of clean-up operations. It may be necessary to suspend all drilling operations so all personnel can assist with the clean-up operation.

In the event of the discharge reaching the sea, special equipment is required for containment. This equipment and operation personnel are available through local Harbours Board or the Ministry of Transport.

Reporting Procedure for Discharge

The following must be recorded and reported, in writing, to the Country Manager-Australia and then to Client Management Reporting of incidents in compliance with the Statement of Environmental Objectives ("SEO") will be the responsibility of Client:

a. Time discharge first observed.

b. Source and cause of discharge;

c. Quantity and extent of discharge;

d. Position of well site and relative location of discharge;

e. Characteristics and appearance, e.g., liquid crude, diesel, chemical etc.;

f. Weather and inland waterway conditions;

g. Movement of the discharge; and

h. Measures already taken to control the discharge.

Contingency Plan

All personnel shall be basically trained to understand that no person is to act in a manner which may result in any form of discharge. All equipment shall be adequately maintained to prevent accidental discharges of wastes.

12.2 Action to be taken in the Event of a Discharge

Rig Manager

Will:

a. Advise immediately the Client Drilling Supervisor;

b. Establish source of discharge, and if possible stop the flow at source;

c. Assess extent of discharge, prevailing inland waterway and weather conditions;

d. If discharge Type 1 and some minor outside assistance is required, contact the Drilling Superintendent;

e. If discharge Type 2 of 3, immediately report to the Area Manager. Attempt to contain any discharge on the site area;

f. Mobilise and control all equipment on Wellsite and supervise the construction of any containment dams in a Type 2 or 3 discharge: When outside equipment arrives, supervise the logistics; and

g. Take charge of any clean-up operation controlling and directing all site personnel and equipment as required.

Area Managers and Client Management

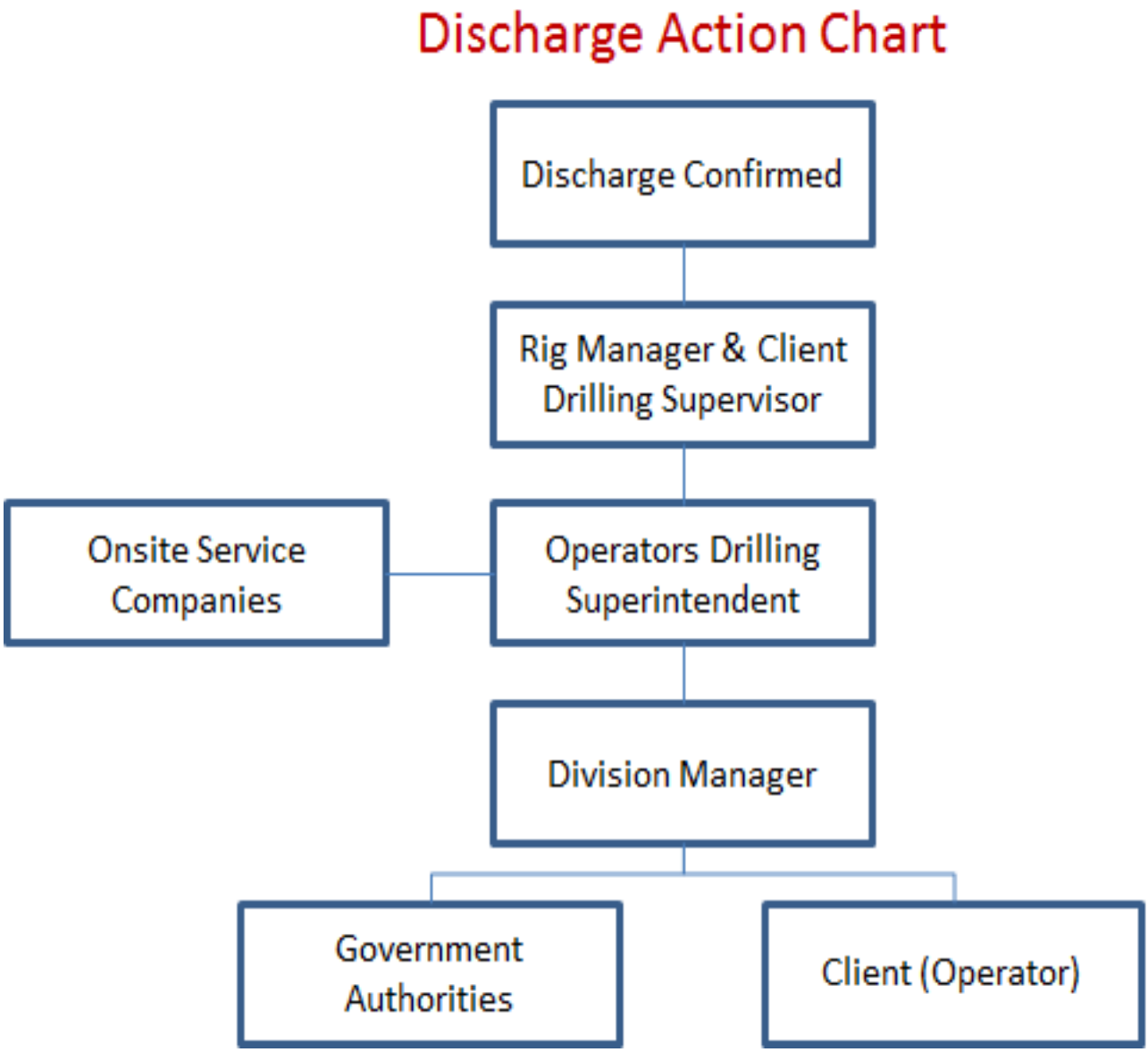
Will:

a. Notify (in order):

- Government Authorities (Client Responsibility)
- Operators Manager

b. Co-ordinate response activities.

Discharge Action Flow Chart



Bushfire

In the event of a bushfire emergency threatening the rig or camp site, management, in conjunction with emergency services, will decide whether to stay or leave. Crews will be advised to evacuate the site only if safe to do so and on the advice of emergency services. The two responses are then detailed below.

Response A: Bushfire Threatening and Unsafe to Leave Site

The following procedures are drawn up on the premise that it is ***safer to remain at the site*** than attempt to move in the face of a fire:

a. The Rig Manager, or in their absence the Driller from relevant crew, will sound the horn from either the doghouse or the RM's office, If the bushfire is first detected at the camp, then the person who detects the fire should sound the alarm on the wall outside the Dining room. This places all crew members on alert and they should respond normally to the alarm / horn blast and evacuate to the nearest SAFE Assembly Area. **(Note: Secure the well prior to assembly if emergency is actuated from the rig);**

b. A head count of personnel is to be conducted by the most senior person then they will advise what to do next;

c. Activate the rig's ERP by contacting the relevant emergency services, Adelaide head office and Central Petroleum officials **(numbers displayed in smoko shack, Permit board and site offices);**

d. Crews at the rig will be appropriately dressed, but those alerted at camp will need to obtain appropriate clothing for their personal protection. Everyone must dress in long sleeve clothes and pants, preferably cotton, and solid footwear. (Woollen Blankets can be made available from camp);

e. Once a head count of site / camp personnel has confirmed that all are present, then all personnel are to assemble in the smoko shack/dining room (in consultation with the emergency services) to avoid smoke inhalation and remain inside until advised otherwise by the emergency services. Communication is to be maintained throughout the whole process;

f. Generators should be left to run for power, lights and A/C unless directed otherwise by emergency services;

g. Buckets, hoses, mops and extinguishers should be filled and available/ready for use only before or after the main fire front has passed. These can be located on the Emergency Diagrams located in conspicuous places. It is best to keep them handy in a place where they will not be damaged by fire;

h. Personnel should drink plenty of water; and

i. ENSIGN Rig # 932 management and crews will (time permitting):

   1) Direct others to designated work areas;

   2) Prepare all fire equipment;

   3) Remove combustible material from walkways to allow clear access / egress (doormats, furniture and bags etc.);

   4) Once fire front has passed check for spot fires and extinguish; and

   5) Move to a safe area outdoors (on the lease or car park) if the buildings begin to burn.

Response B: Bushfire Threatening and Advised to Leave Site

The following procedures are drawn up on the premise that it is ***preferred to move crews well away*** to an area not threatened by fire but only if it is safe to do so:

a. The Rig Manager, or in their absence the Driller from relevant crew, will sound the horn from either the doghouse or the RM's office, If the bushfire is first detected at the camp, then the person who detects the fire should sound the alarm on the wall outside the Dining room. This places all crew members on alert and they should respond normally to the alarm/horn blast and evacuate to the nearest **SAFE** Assembly Area. **(Note: Secure the well prior to assembly if emergency is actuated from the rig.);**

b. A head count of personnel is to be conducted by the RM or most senior person on site;

c. Activate the rig's ERP by contacting the relevant emergency services, Adelaide head office and Central Petroleum officials **(numbers displayed in smoko shack, Permit board and site offices);**

d. All site vehicles are to be completely fuelled and ready for use during an evacuation;

e. Communications must be established with Adelaide head office to alert of an emergency requiring evacuation plus a Journey Management plan put in place. Maintain a copy of the site's ERP for reference later in this process;

f. The OICS Camp Manager is to be notified to alert and prepare all camp personnel for evacuation if the camp is not considered to be a safe refuge in the event of a bushfire;

g. Crews should be instructed to drink and gather plenty of water in preparation to evacuate;

h. Everyone must be dressed in long sleeve clothes and pants and solid footwear (i.e. work clothes will be best);

i. Belongings should only be collected if there is time and suitable vehicular arrangements will be made to transport all personnel to the nearest clearing as determined by the Rig Manager (or most senior person);

j. Personnel should once again be counted and immediately evacuated from site to an area deemed safe by emergency services or Central Petroleum Field Advisor (nearest Central Petroleum Field base, highway to the nearest town, local fire refuge, etc.). Use the site ERP for directions to the nearest town; and

k. Personnel should not attempt to return unless deemed safe and instructed to do so by emergency services or Rig Management.

13.0 Severe Weather/Lightning/Natural Event

Severe weather or a natural event may be torrential rain, dust storms, high winds, electrical storms earthquake or flooding.

In the event of severe weather or a natural event, personnel should make equipment safe move to a designated safe area such as the smoko shack or communication shack.

This ERP does not address the response to a cyclone threat. A separate plan will be put in place when wells are drilled in susceptible areas in the cyclone season.

Lightning Strike

Whilst Wellsite equipment such as rigs and cranes can act as very large lightning conductors, the various paths to earth all have points of resistance that may result in arcing and/or fire.

30/30 Lightning Rule

The most important principle of lightning safety is to remember that no place outside is safe when lightning storms are within ten (10) kilometres.

Storms are considered 'local' when they are within a ten (10) kilometre radius. Because lightning is able to strike many kilometres from the thunderstorm itself, long standoff distances are required to help in minimising the risk of personal injury.

One of the best rules of thumb for gauging the threat of lightning is the '30/30 Rule'.

If the time between seeing a flash of lightning and hearing thunder is less than 30 seconds, head for shelter immediately.

It is estimated that for every three (3) seconds of a delay between a lightning flash and thunder equates to a distance of approximately one (1) kilometre away, therefore, where there is 30 seconds between a flash of lightning and the sound of thunder the lightning activity is approximately ten (10) kilometres away.

Although the '30/30' rule can be useful, it cannot be used until after the first lightning strike, so is it important to be alert to changes in sky conditions in order to pre-empt any storm developing overhead.

After the last lightning, remember to stay safely inside for 30 minutes.

Lightning Strike

Normally weather likely to cause a lightning strike will be obvious.

In the event of such weather the Rig Manager will take appropriate action to minimise any damage from lightning strike.

No person is to be allowed near or on tanks or other steel structures.

All persons are to remain indoors until the threat of lightning is gone.

After the storm has passed co-opt with whatever staff is available and make an immediate inspection of the plant looking for any signs of leakage or other malfunctions.

Respond to any leakage as detailed in the Gas Leak section of this plan.

Check the integrity of the plant buildings.

Check computer systems to ensure that they are still functioning correctly.

Check the Well heads for any well head problems.

Check the well head supply and line delivery pressure for indications of leakage.

Any significant system failures are to be reported. There may be a need to engage a maintenance crew if there is damage that is not able to be fixed.

Flooding

General

The Operating Company Representative (OCR) shall ensure that flood indicators have been put in place at creek crossings that cross over rural gravel access roads to the well site.

The OCR shall monitor any creeks that have the potential to flow across any access road to the rig site, in times of rains in or around the surrounding area.

The OCR shall use the "Access road and creek crossing inspection form" to record any findings during creek and access road inspections.

In the event of a creek rising, the OCR will initiate a notification based on the severity of the situation.

LEVEL 1 (Brief of situation)

Once a creek starts to flow over any of the access roads to the well site, the OCR will initiate a level 1 notification to the Head Office following Central Petroleum Emergency Response protocols. This is

LEVEL 2 (Start of evacuation)

Should the creek continue to rise to the levels listed below; the OCR shall initiate a level 2 notification to the Head Office following Central Petroleum Emergency Response protocols.

1. Creek level reaches 100mm for unsealed roads, or
2. Creek level reaches 200mm for sealed roads.

The OCR shall continue to monitor the creek as required to see if conditions are changing. Non-essential personnel should be evacuated from the rig site to the rig site camp.

The OCR shall ensure the rig manager keeps an accurate POB list of who has been evacuated and who remains behind as essential personnel. Essential personnel shall remain on the rig site and get preparations ready for equipment shut-down, should it be necessary if conditions worsen. Consideration should be given to move items like fuel, oil and hazardous chemicals, where possible, to higher ground to help eliminate an environmental incident.

Communications shall be established and maintained between the rig camp and rig site, with a communications test done as required. Should any personnel movement be necessary from the rig camp to rig site, this will be communicated to the rig site prior to personnel moving.

A risk assessment shall be conducted prior to crossing the flooded creek by the driver and occupants. A minimum of two persons shall be in the vehicle during the trip between the rig camp and rig site.

If creek levels continue to rise above the level 2 notification creek levels, the OCR shall start to make the necessary arrangements to prepare to secure the well, based on operations and the time needed to perform the required well control measures.

The OCR and rig manager will ensure that food and water supplies are readily available should essential personnel be stranded on the rig site, for whatever reason.

A designated person will be appointed to monitor radios and phones at the rig site and at the rig camp at all times during the emergency situation.

LEVEL 3 (Evacuation and demobilising)

If a creek continues to rise to the below listed levels, the OCR shall initiate a level 3 notification to the Head Office following Central Petroleum Emergency Response protocols:

1. Creek level reaches 300mm for unsealed roads, or
2. Creek level reaches 400mm for sealed roads.

The well shall be secured and all details recorded by the OCR. Details may be recorded in a tally book and transferred to Well View when the opportunity arises.

The rig crews will shut-down and secure rig equipment, and then prepare to evacuate the rig site. Should conditions dictate that a fast evacuation is required, evacuation will take preference over equipment. At no stage will personnel put their life in danger for the sake of equipment, plant, and / or the environment.

Simple journey management, such as comm's between rig site and rig camp needs to be followed. However, should there be sufficient time based on the expected rains, and creek flooding, the mast may need to be lowered to eliminate possible rig instability due to poor well pad conditions.

The OCR shall take the following equipment with him on evacuation:

1. Rig laptop and power cord to secure valuable well information,
2. VHF radio, rig cell phone (Satellite phone if available) and contact list,
3. Emergency response notification sheet for that well that has the well and rig camp co-ordinates and emergency contact numbers,
4. Rig's first aid kit.

Once evacuated from the well site, the OCR shall monitor the creek as required to see if conditions are changing. The OCR will update the Rig Engineer, Field Superintendent, HSE team leader and D&C Superintendent as needed based on his findings.

In addition, the OCR shall formulate a detailed report on all activities leading to and including the evacuation process.

If conditions change that don't allow a safe evacuation of essential personnel via road due to extremely high creek levels (above 0.5 metre), personnel will return to the rig site. The OCR will inform the Rig Engineer, Field Superintendent, HSE team leader and D&C Superintendent of the situation. Evacuation via alternative methods (e.g. helicopter, boat, etc.) may be necessary depending on rate that the creek is raising.

The OCR shall provide the following information during correspondence with the above-mentioned people:

1. Number of personnel on rig site,
2. Any personnel medical emergency,
3. Rate at which creek is rising,
4. Intention to stay and wait it out or whether immediate evacuation is necessary,
5. Estimated time that food and water supplies will last,
6. Estimated time that diesel supplies will last.

The OCR shall monitor the creek as required and should conditions change that allow for evacuation via access roads, the OCR shall consult with the Rig Engineer, Field Superintendent, HSE team leader and D&C Superintendent prior to evacuation.

14.0 Responsibilities and Functions

15.1 Site Personnel

Rig Manager;

The Rig Manager is responsible for the direct control of Rig Emergency.

The Rig Manager will be completely familiar with the operations of the well site and the Emergency

Response and Drilling Operations Procedures

In the event of an emergency the Rig Manager will: Immediately assume control of the situation and coordinate with the Drilling Supervisor.

Implement and coordinate Emergency Response Procedure.

Assess the extent, nature and cause of the emergency in respect of:

- Possibility of escalation.
- Actual or Potential major escape of hydrocarbon.
- Actual or Potential major escape of toxic or corrosive gases.
- Actual or Potential fire and or explosion.
- Actual or Potential cause of damage or harm to personnel, equipment, well and environment.

Decide on immediate actions to contain and overcome the emergency. The actions to be considered include:

- Shut down of all or part of the operations including securing the well and activating rescue, firefighting equipment or other appropriate first-aid measures.
- Notify Area Manager and keep up-dates of status of emergency.
- Notifying, alerting or calling for assistance from the Client Company as necessary.
- Evacuate all non-essential personnel, or if necessary, all personnel to designated Muster Station, depending on the risk to personnel safety.
- Ensure all personnel are accounted for.
- Coordinate rescue of injured persons.
- Ensure that the safety of rescue or firefighting teams is not jeopardised.
- Ensure prompt treatment of injured persons.
- Implement and coordinate well control procedures.
- Document all events.
- Take photos of damage to equipment or location, etc., if possible.

Operating Company Representative (OCR)

The OCR will be completely familiar with the operations of the well site and the Emergency Response and Drilling Operations Procedures. In the event of an emergency the OCR will:

- Immediately report to the Ensign Rig Manager and assist him in his duties as listed above.
- Make contact with the Head Office following Central Petroleum Emergency Response protocols, and maintain contact with the team throughout the response

Drillers

- Alert all crew members via horn blast
- Implement initial well shut in procedures.
- Implement any immediate emergency response procedures necessary.
- Notify Rig Manager of the emergency.
- Act as directed by Rig Manager.
- Co-ordinate and control drilling crews in rescue and firefighting response roles.

Site Communication Officer (SCO)

The designated SCO is responsible for manning the communication centre, ensuring communications are maintained within and outside the well site in accordance with the Emergency Procedure. At the Rig Manager's direction, notify, alert and call for assistance, advise Area Manager and relevant emergency services. Log the time, person's names, action, requests and events will be maintained. The SCO will:

- Immediately man the communication centre.
- Implement, at the direction of the Rig Manager, the procedures applicable to the emergency.
- Immediately initiate an emergency log, noting down the time of sequential events and communication. All events, communications, instructions, etc., to be logged.
- Keep copies of all communications and instructions received and sent.
- All medical treatments and instructions to be logged, including names of receiver and caller and time of the call.

Note: To maintain communications, outgoing calls should be made on the facsimile/data line, leaving the designated voice line clear for incoming calls when possible

Mud Engineer (where applicable)

- In the event of an emergency the Mud Engineer will: Proceed as directed by the Rig Manager to assist or evacuate the location.
- Ensure mud is in such a condition to enable the required density increase to be achieved.
- As directed by the Drilling Supervisor, increase mud weight, in active system to ensure correct mud properties are achieved.
- Provide back-up well kill calculation if requested.

Cementer

In the event of an emergency the Cementer will:

- Proceed as directed by the Rig Manager to assist or evacuate the location.
- Be prepared to circulate/kill the well as directed by the Drilling Supervisor.
- As directed by the Rig Manager, pump kill mud and accurately record all pressures, rates and volumes of fluids pumped.

Mud Logger (where applicable)

In the event of an emergency the Mud Logger will:

- Proceed as directed by the Rig Manager, to assist or evacuate the location.
- Record all pressures, volumes, displacements, etc., relating to the well and circulating system.
- Provide back-up well kill calculations if requested.
- Monitor and test mud for corrosive, toxic or hydrocarbon gases.

15.0 Office Based Personnel Responsibilities

Area Manager

In the event of an emergency the Area Manager will:

Notify the Country Manager-Australia of emergency and keep up-dated of situation.

Provide Rig Manager with technical and emergency back-up.

In consultation with Drilling Superintendent and Country Manager-Australia, evaluate options and recommend action to the Rig Manager.

- Obtain a list of any casualties and details of injuries and pass to Country Manager-Australia.
- Obtain details of damage to equipment or the environment and pass to the Country Manager-Australia.
- Authorise responses as appropriate.
- Co-ordinate Medivac operations as required.
- Document all communications, instructions and reports.
- Alert ERG as required.

Client Management Team

In the event of an emergency the Client Management Team will:

- Liaise and coordinate as part of the Ensign ERG in responding to the emergency.
- Will assume all responsibility for reporting to the Government in accordance with the provisions of the Petroleum & Geothermal Act 2000 and Petroleum & Geothermal Regulations 2013

15.1 AFTER HOURS CONTACT NUMBERS (as at Feb 2018)

redacted	**redacted**	**redacted**
redacted	Country Manager-Australia	**redacted**
redacted	Senior Mechanical Engineer	**redacted**
redacted	Area Manager-South Australia (Aust)	**redacted**
redacted	Group HSE Manager	**redacted**
redacted	HR Manager	**redacted**
redacted	HSE & T Superintendent	**redacted**
**redacted	Drilling Superintendent	**redacted**
redacted	Drilling Superintendent	**redacted**
**redacted	Electrical Superintendent	**redacted**
**redacted*	Fabrications Superintendent	**redacted**
redacted	Senior HR Coordinator	**redacted**
**redacted	Weekend OFS Contact	**redacted**
redacted	W/House Super/logistics co-ord.	**redacted**

Responses to any given emergency are detailed in the RIG 932 ERP. All crew are to be familiar with its components and their responsibilities under the ERP. 50% of all crew are to be trained and current in Senior First Aid, with Rig Managers and Assistant Drillers qualified as Occupational First Aiders. First aid kits are to be maintained and stored in the Rig Manager's office, SMOKO Shack and Doghouse. All vehicles are to contain vehicle first aid kits. A Trauma kit is to be held within the Rig Manager's office and the First Aid room at the main camp. The diagram detailing emergency equipment and its location is attached to the ERP as Appendix 5.

Appendix 1: Medivac Patient Information

MEDIVAC PATIENT INFORMATION SHEET

Name of Patient:	Surname:	Given Names:

Date of Birth:		Company:		Designation:	

Nature of Injury / Illness:

Vital Signs:

Colour:		State / Extent of bleeding: (if any)	

Pulse Rate:		Blood Pressure:		Blood Group	

Any other symptoms considered important:

Treatment Given:

Allergies / any other medications used:

If medical problem, any previous history of same or simular nature:

Type of Medical Aid Required:

If X-rays requires:	Y/N	Ambulance / Stretcher / Case	Y/N	

Medical Escort required on flight:	Y/N	Any other helpful Information:

Signature: (Medic)

Appendix 2: Emergency Communications Log

Emergency Communications Log					
Date:		Name of Recorder		Sheet No.	
Time: 24 Hr/s	Name:	Organisation:	Message:	Outstanding Action	Phone / Email / Fax

Appendix 3: Incident Summary Sheet

Incident Summary Sheet			
Recorders Name:		**Date:**	
Name of Contact Person:		**Telephone Number:**	
Time of Incident - 24 Hr/s		**Description of Incident: (Below)**	
Description of Casualties:			
What is being done to contain the emergency?			
What is being done to recover from the emergency?			
What are the long term effects on the site / field?			
What emergency services have been requested for assistance?			

Appendix 4: Emergency Response Ground Rules

The following actions must be taken where Ensign is the Principal Contractor and when an emergency **has the potential:**

1) to exceed the resources available to the Person in Charge (PIC, Site Controller), at the incident location, to contain and resolve the emergency,

OR

2) to involve State or Federal authorities, next of kin, local communities, legal conflict or the media etc.

Where doubt exists, particularly where the incident could escalate, then emergency actions must be taken.

NOTIFICATION

Ensign must be contacted on (08) 8255 3011 confirming that there is an Emergency providing a brief description of the events and location. After hours numbers are to be used, where necessary.

Initial contact should be to:

Area Manager-South Australia: Mobile:
redacted **redacted**

Or

Country Manager-Australia Australia: Mobile:
redacted **redacted**

Group HSE Manager: Mobile:
redacted **redacted** **redacted**

EMERGENCY RESPONSE GROUP

Once one of the above personnel is contacted he will take responsibility for contacting other members of the Emergency Response Group as detailed on Page 9 to meet in the Ensign Operations Centre in Adelaide and to communicate via phone with the Client Management Team.

RESPONSIBILITIES

Client has overall responsibility for the emergency response management and the planning of recovery from its Permit Area.

Client has responsibility to ensure that their emergency response procedures and those of the Contractors and third parties are compatible.

The Principal Contractor (Ensign)

Ensign has responsibility for the overall activities (including emergency response) to be conducted for Client. However, should the emergency extend beyond the limited capacity of the Contractor to resolve, the Contractor will seek emergency response support from the Client. The Contractor will provide essential knowledge / skills to Client.

Subcontractors, Third Parties and Visitors Subcontractors, third parties and visitors at the scene of the emergency incident will take direction from the Rig Manager and his subordinates.

Responsibilities of the Person in Charge (PIC) at the Incident Location

The PIC (Site Controller) will be the Rig Manager. The PIC will have or in their absence the authority to call upon whatever local resources and emergency services are necessary / available at the time of an emergency.

The **PIC is responsible** for following emergency procedures and for:

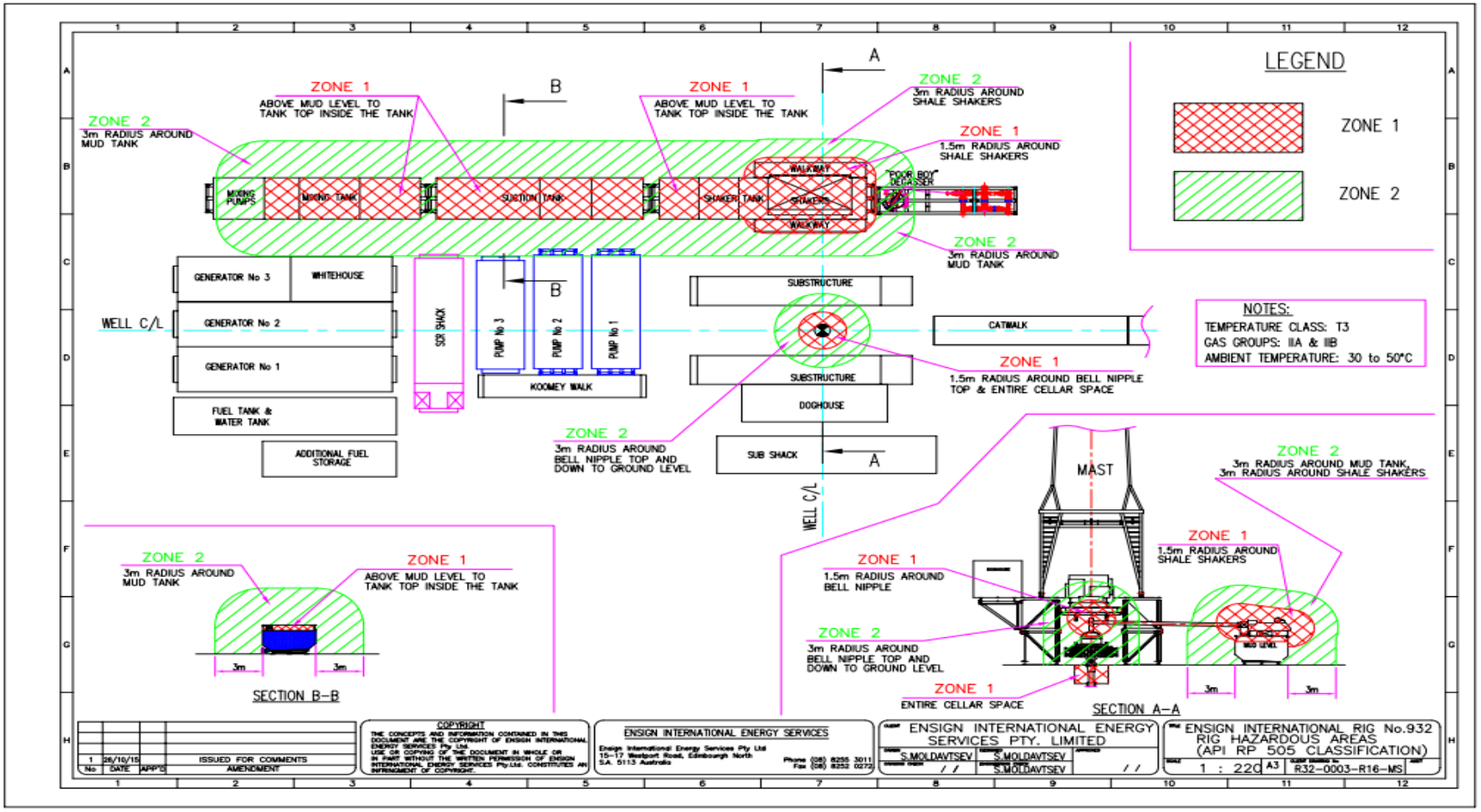
- Advising and coordinating the onsite management of the response with the Client Drilling Supervisor.
- Containment and recovery from the emergency at the incident location.

- Arrangements for all local resources required to respond to an emergency such as oil spill equipment / medivac / helicopters / boats etc.
- Immediate notification to:
  - Ensign's Adelaide Office
  - Client Management Team (via the Client Drilling Supervisor)

It is the PIC's responsibility to ensure that details of the emergency are communicated to Client Management Team. Alternatively, this can be done by the Client Drilling Supervisor (if he is onsite) at the incident site. The following communication routes are acceptable but understanding between the various parties must be checked frequently. Parallel reporting is recommended:

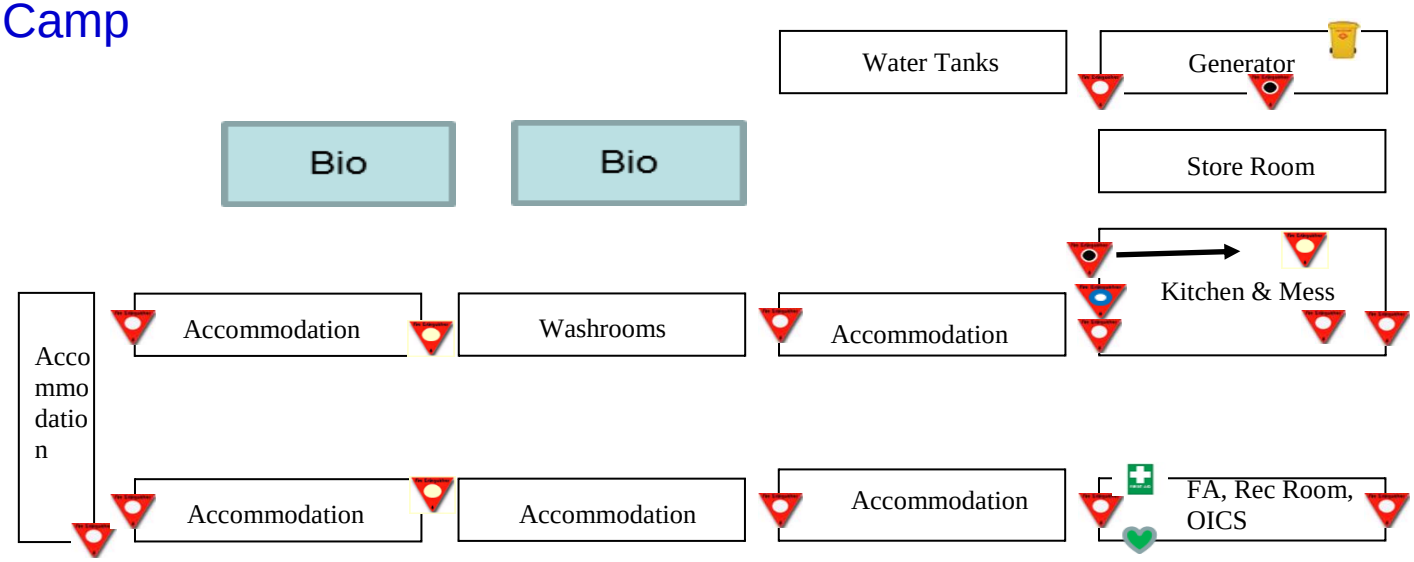
Client Drilling Supervisor or Ensign's PIC (Rig Manager) will relay all information on the emergency to Client Management and consult with him regarding the arrangements to be made for resources that the PIC cannot quickly arrange himself through Ensign's Emergency Response Group. Parallel reporting to both Client and Ensign's Emergency Response Group is to be monitored

Appendix 5: Hazardous Zone Schematics



Appendix 6: Emergency Equipment Layout- Camp & Rig

Camp



Fire Extinguisher—Dry Chemical

Fire Extinguisher—Wet Chemical

Fire Extinguisher—Co2

Fire Hose Reel

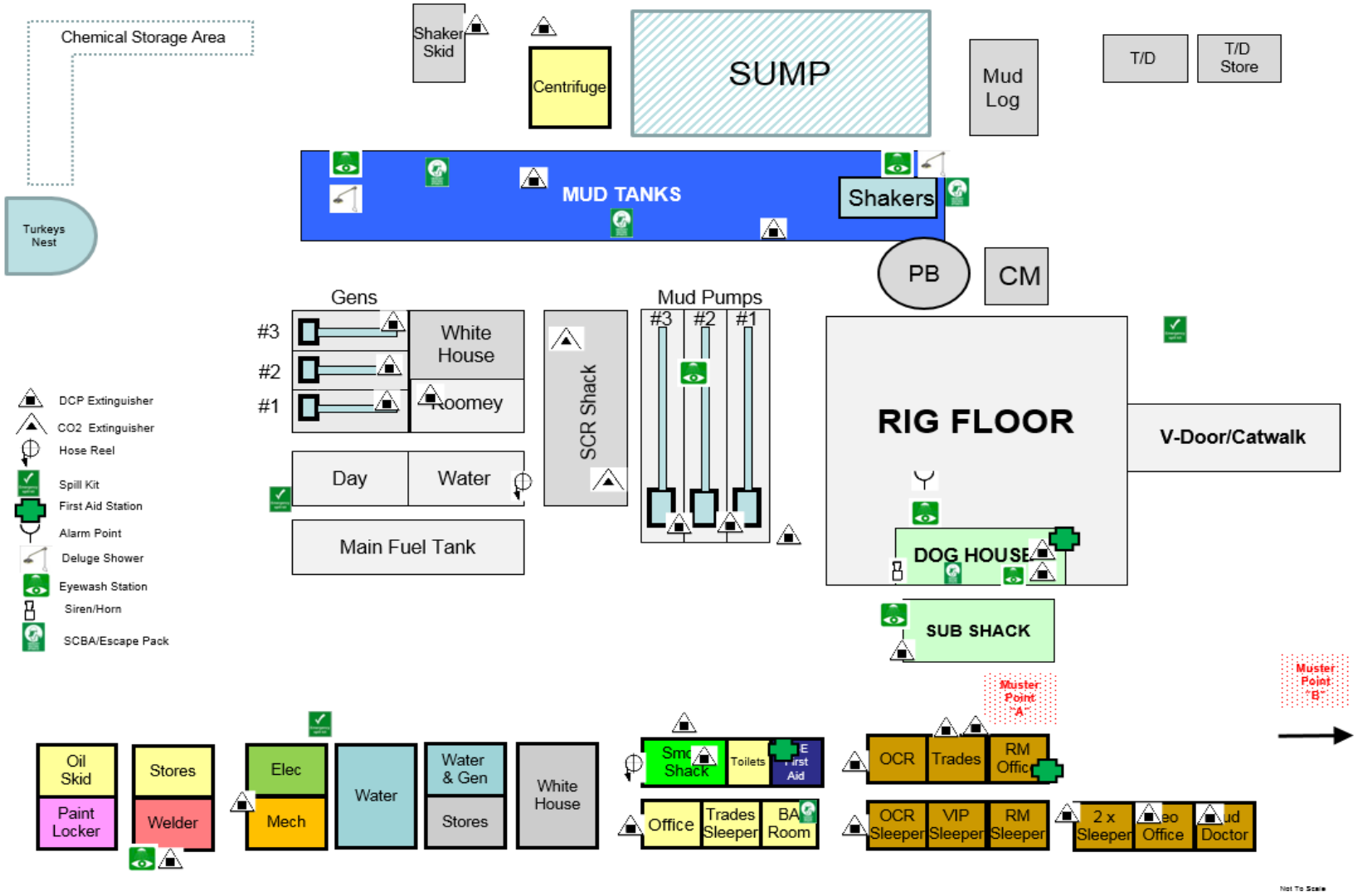
First Aid Kit

Defibrillator

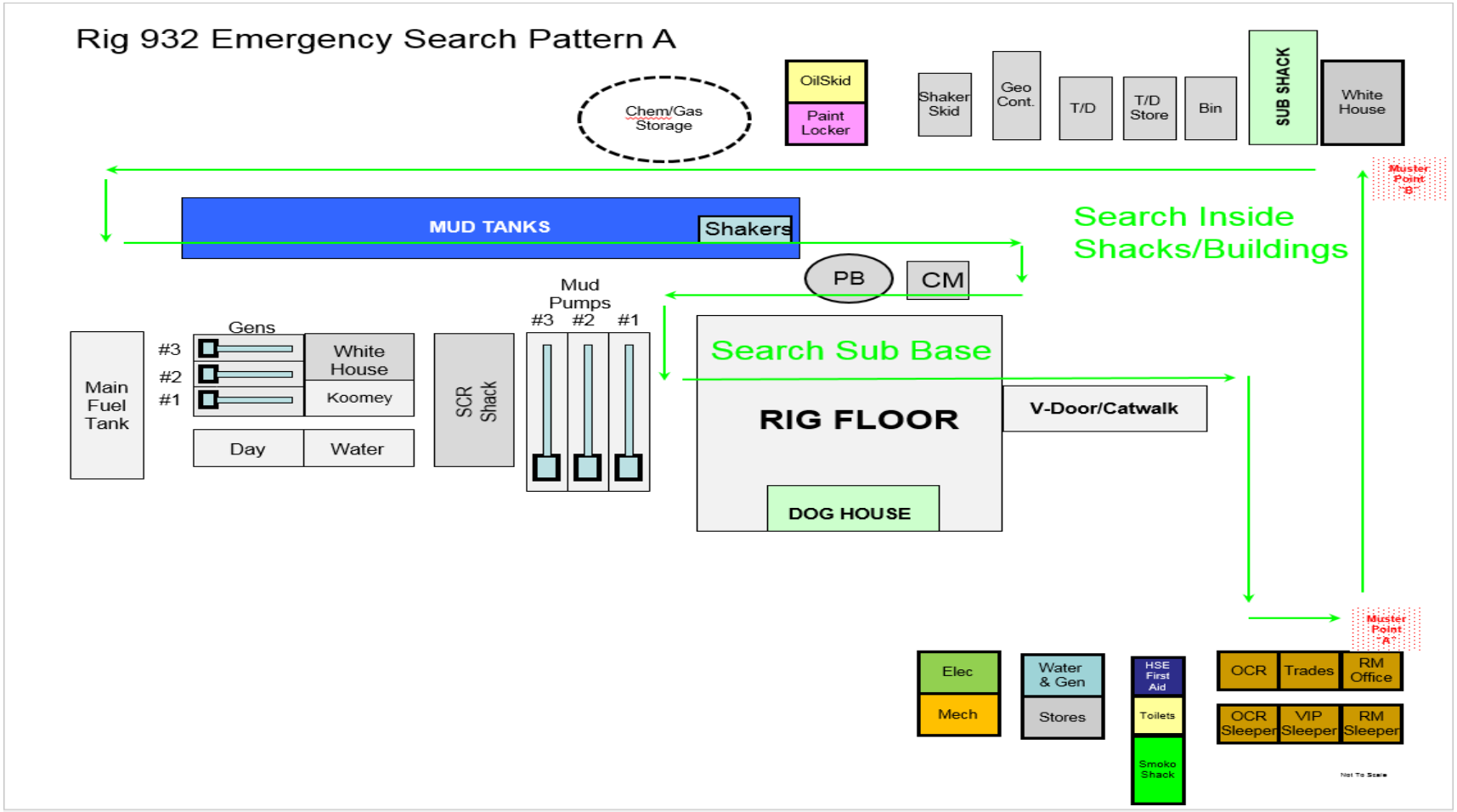
Spill Kit

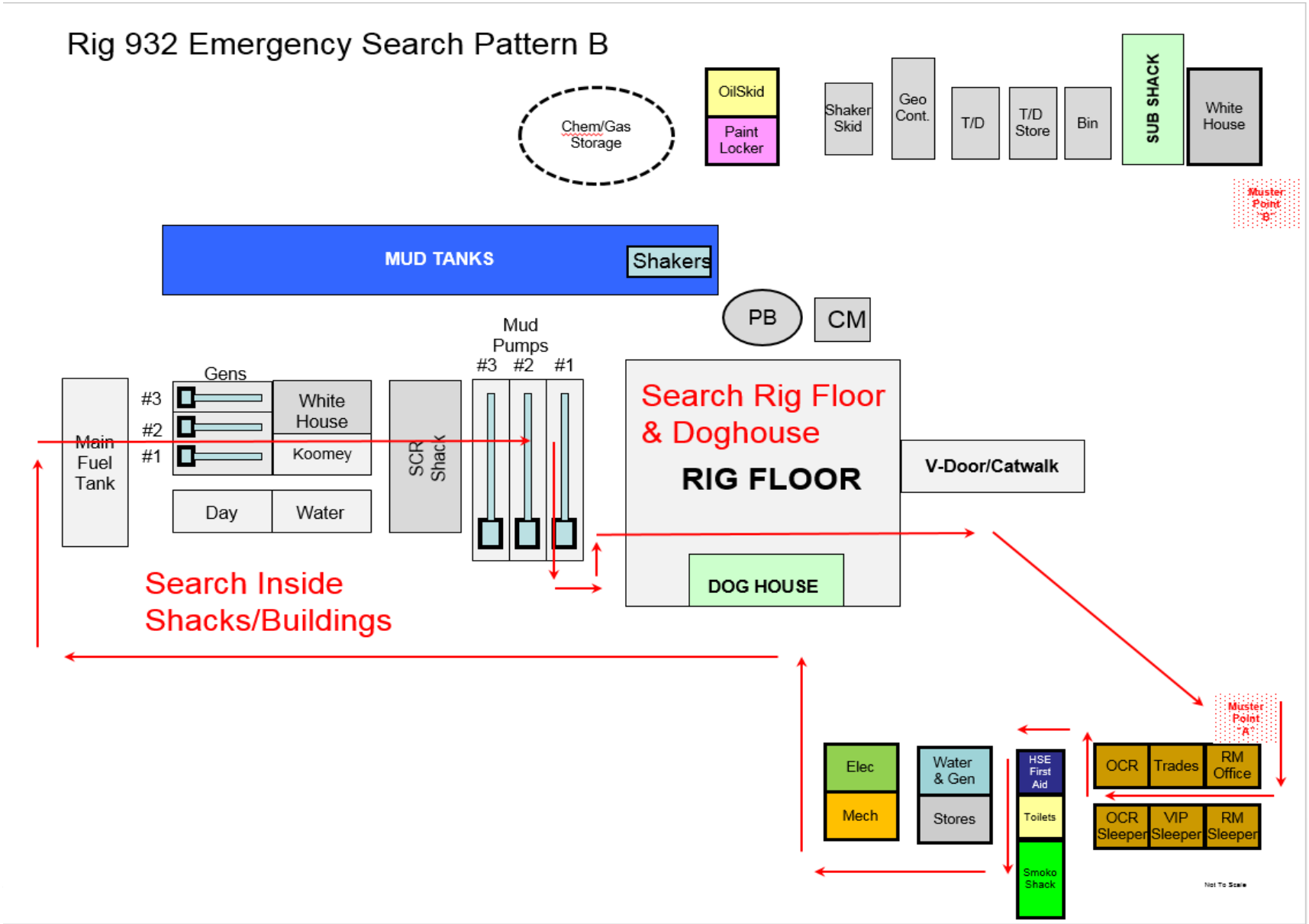
Muster Point

Rig 932 Emergency Equipment Layout

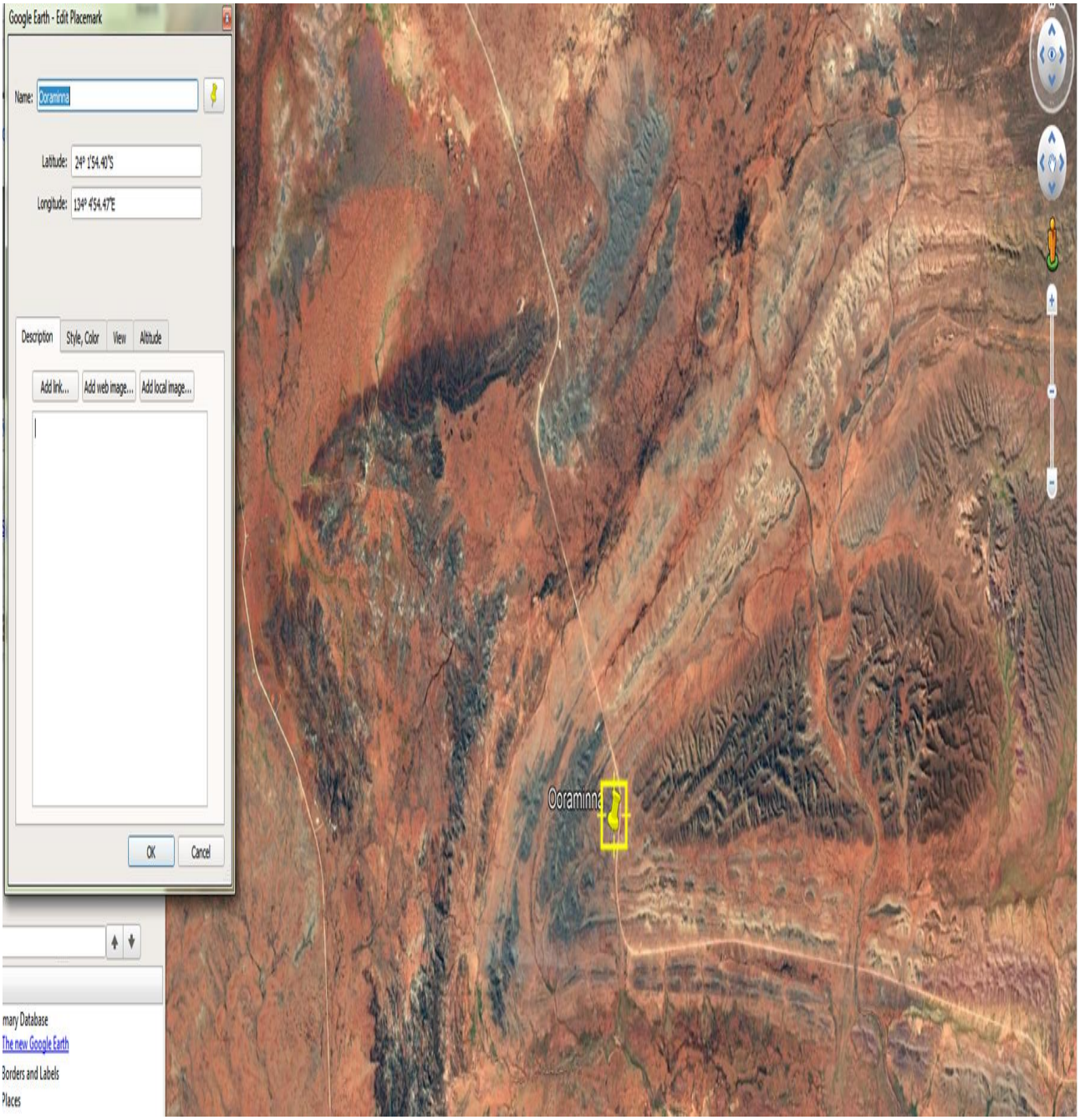


Appendix 7: Search and Rescue Pattern A & B




Rig 932 Emergency Search Pattern B
Chem/Gas Storage
OilSkid
Paint Locker
Shaker Skid
Geo Cont.
T/D
T/D Store
Bin
SUB SHACK
White House
Muster Point "B"
MUD TANKS
Shakers
PB
CM
Mud Pumps
#3 #2 #1
Gens
#3
#2
#1
White House
Koomey
Day
Water
Main Fuel Tank
SCR Shack
Search Rig Floor & Doghouse
RIG FLOOR
V-Door/Catwalk
DOG HOUSE
Search Inside Shacks/Buildings
Muster Point "A"
Elec
Mech
Water & Gen
Stores
HSE First Aid
Toilets
Smoko Shack
OCR
Trades
RM Office
OCR Sleeper
VIP Sleeper
RM Sleeper
Not To Scale

Appendix 8: Rig 932 Location Map



Appendix 9: 932 Rig Specific Emergency Response

ENSIGN Rig 932

Rig Number:	**932**	Date Completed:	**10.3.18**
Location:	**Mereenie, Palm Valley, Ooraminna, Northern Territory**		
Well Name:	**Mereenie 26**	Operator:	**Central Petroleum**
Longitude:	**139° 58' 56" E**	Latitude:	**29° 1' 1" S**
Mud Map Attached:	**Yes**		
Expected Duration of Ensign Personnel Working @ This Location.	From: **20.4.18**	To:	**27.5.18**

Mereenie Airstrip Driving Distance From Rig To Airstrip:	10	KM	.25 hrs	Estimate
Driving Distance From Rig To Medical Centre: (Mereenie)	11	KM	025 hrs	Estimate

Helicopter Landing Area Location @ Rig Site: Yes Details: Also at Camp site: Yes

Helicopter Landing Area Size: 80M Location: Southern Side Just out of Lease on road

Airstrip Available: No Helicopter Landing Available: YES

ON SITE MEDICAL SUPPORT

Qualified First Aiders. No.	10	Details:	1 OFA and 9 SFA
First Aid Kits (RFDS / AEA) No.	1	Details:	RM Office
Basic First Aid Kits No.	6	Details:	R.M. Office, Camp, Smoko shack & Dog house
Specific Equipment No.	1	Details:	Stretchers available for removal off rig floor.

Emailed To Adelaide Office Attention to: Area Manager Yes / No

SIGNED: **NAME:** **DATE** **20.3.18**

AIRSTRIPS

AIRSTRIP DETAILS (1)

Airstrip Name	**Mereenie Field Landing Strip**		
Longitude	**131° 33’ 43” E**	Latitude	**23° 58’ 36” S**
Location	**Mereenie Field Landing Strip**		
Strip Type (gravel etc.)	**Sealed – All Weather**		

Call Sign: **VKD 606** Frequency **126.70Hz**

Length	**1512**	Metres Long.	Width **30**	Metres Wide.
Contact Name				
Telephone Numbers		or		

AIRSTRIP DETAILS (2)

Airstrip Name	**Kings Creek Air Strip**		
Longitude	**131° 50’ 05” E**	Latitude	**24° 25’ 23” S**
Location	**Kings Creek Station**		
Strip Type (gravel etc.)	**gravel**		

Length	**1600**	Metres Long.	Width **20**	Metres Wide.
Contact Name				
Telephone Numbers	**08 8956 7474**			

EMERGENCY FACILITIES AND CONTACT NUMBERS

	Location	Contact	Phone Number
Medical Centre	**RFDS Alice Springs 24/7**	**Nurse**	**(08) 8951 7840/08 9851 7777**
	ISS First Response 24/7		**1300 134 406**
Ambulance Communication Supervisor		**Alice Springs**	**(08) 8959 6600**
Ambulance	**Alice Springs**	**Nurse**	**000/ (08) 8959 6600**
Hospital	**Alice Springs 24/7**	**Admissions**	**(08) 8951 7777**
Police	**Alice Springs**	**Police Station**	**000 or (08 8951 8822)**
Local Doctor	**Alice Springs Medical Clinic**	**Nurse**	**(08) 8952 2744**
Emergency Service	**NT Emergency Services**	**Alice Springs**	**000/131444**
Local Council	**Alice Springs Town Council**	**93 Todd St Alice Springs NT 0871**	**08 8950 0500**
Royal Flying Doctor	**As Above**		**As Above**
Fire Dept.	**NT Emergency Services**		**000 or 131444**
Poisons Info. Centre	**Adelaide**	**Operator**	**131126**

MEDICAL CENTRE

Name **Royal Flying Doctor Service**

Location **Alice Springs**

Distance From Rig. **Road** **230** **km** **3** **Hrs.** **Air** **180** **km** **60** **Mins**

Transport Available To Medical Centre By Means Of ;

Road **Yes** **Helicopter** **Yes** **Fixed Wing** **No**

HOSPITAL

Name **Alice Springs Hospital Phone: (08) 8951 7777**

Location **6 Gap Rd, The Gap NT 0870**

Distance From Rig. **Road** **230** **km** **3** **Hrs.** **Air** **180** **km** **1** **Hrs.**

Transport Available To Medical Centre By Means Of ;

Road **Yes** **Helicopter** **Yes** **Fixed Wing** **No**

Name:		**Position:**	**RM**
SIGNED:		**DATE:**	

Rig-932 Emergency Contacts

Emergency Contacts

Medical Centre:	**Mereenie**	**T: 08 8954 3822**
	Kings Canyon	**T: 08 8956 7807**
	Alice Springs Mall	**T: 08 8952 2744**
Ambulance:	**St John Alice Springs**	**000 or T: 08 8959 6600**
Fire:	**Emergency Fire**	**000 T: 131 444**
Royal Flying Doctors:	**Central Australia**	**T: 08 8951 7840/08 8951 7777**
Hospital 24/7	**Alice Springs**	**T: 08 8951 7777**
Police:	**Alice Springs**	**000 or T: 08 8951 8822**
Poisons Information	**National**	**T: 131126**

Ensign Contacts

Area Manager: Dave Murphy Mob: 0408492318 or 08 8209 3140

Drilling Superintendent's:

redacted **Mob:** **redacted** **or** **redacted**

redacted **Mob:** **redacted** **or** **redacted**

For further assistance, please check the Emergency Response Plan in the Rig in Manager's Office.