CALENERGY RESOURCES (AUSTRALIA) LTD.

Geophysical and Geotechnical Site Surveys WA-424-P

Environment Plan Summary

Prepared By:	GHD
Date:	Dec 2013
Revision No:	Rev. 0
Controlled Doc. No:	A424-REG-PLN-582

This page is intentionally blank

TABLE OF CONTENTS

FIGURES

TABLES

1 OVERVIEW

1.1 Proposed Activity

CalEnergy Resources (Australia) Limited (CRA) proposes to undertake up to two geophysical and or geotechnical surveys within the Petroleum Permit area WA-424-P located in Commonwealth water within the Browse Basin.

Dependent upon rig availability, a jack-up will require both survey types and a semi-submersible rig will likely require a geophysical site survey only.

1.2 Compliance

This Environment Plan (EP) summary has been prepared as per the requirements of Regulation 11 (7) and (8) of the Environment Regulations. This document summarises the Browse Basin Offshore Drilling Campaign, WA-424-P Environment Plan (EP), as partially accepted under Regulation 11(1) of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Commonwealth) (Environment Regulations) by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

1.3 Survey Schedule

Geophysical/geotechnical survey operations may take place over approximately 4-6 days prior to drilling at up to two locations (approximately 8-12 days in total for two locations). The commencement and duration of the surveys will be dependent upon survey vessel availability, operational constraints and favourable metocean conditions. As such, this EP has been structured around a survey that may potentially occur at any time of the year.

1.4 Location of the Activity

The proposed site surveys will occur in Permit Area WA-424-P located in Commonwealth waters in Western Australia (WA). The Permit Area is located within the Browse Basin, approximately 425 km north-east of the regional population centre and port at Broome (Figure 1.1). The closest landfall to the permit boundary is approximately 75 km to the south-east in the Kimberley region on the WA coastline.

The primary survey will occur at a pre-drilling exploration well location ‘Pryderi-1’ with a second possible site survey to be conducted in the area surrounding either the ‘Mathonwy-A’ or ‘Taliesin-A’ location (Table 1.1 and Figure 1.2).

Table 1.1 Location of the proposed survey locations (GDA 94, Zone 51)

Survey Location		Longitude			Latitude		
		Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
Pryderi-1	*Survey location*	*124*	*03*	*43.49*	*14*	*35*	*38.77*
Mathonwy-A	*Possible survey location*	*124*	*00*	*06.56*	*14*	*31*	*46.06*
Taliesin-A	*Possible survey location*	*124*	*01*	*25.79*	*14*	*31*	*20.65*

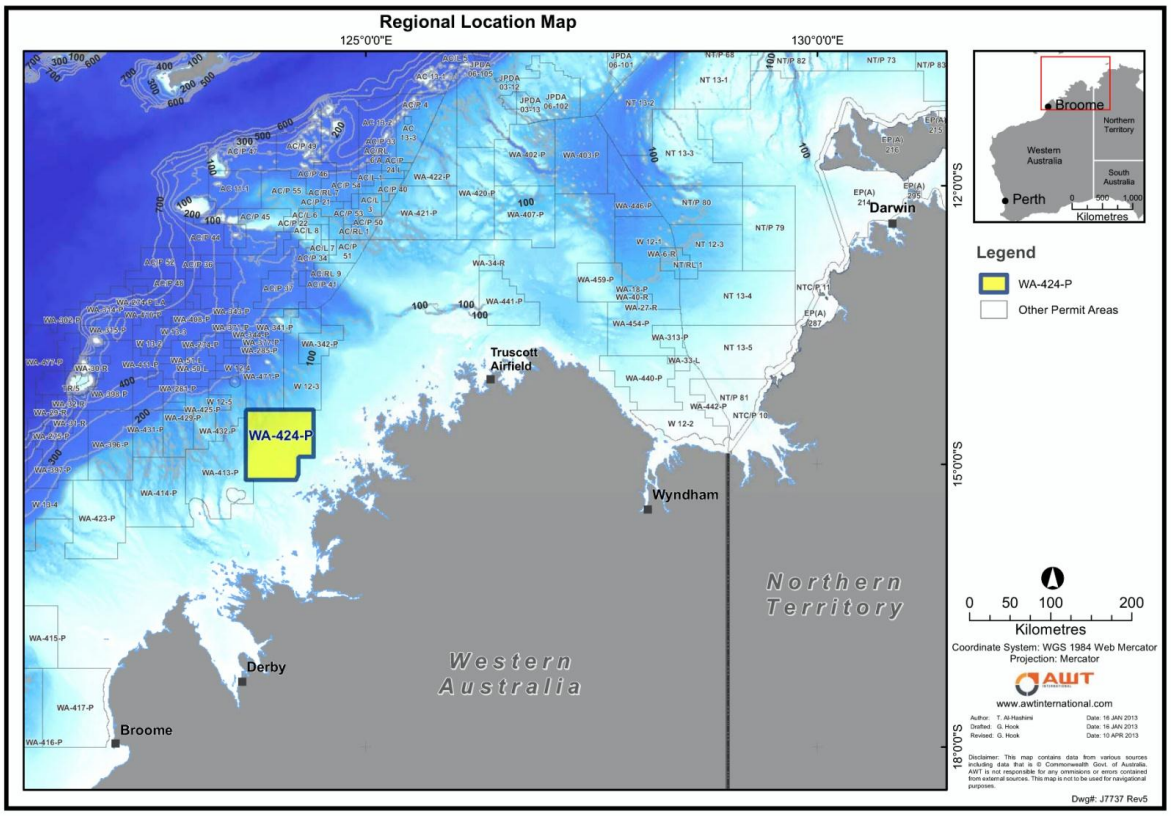


Figure 1.1 Regional location map

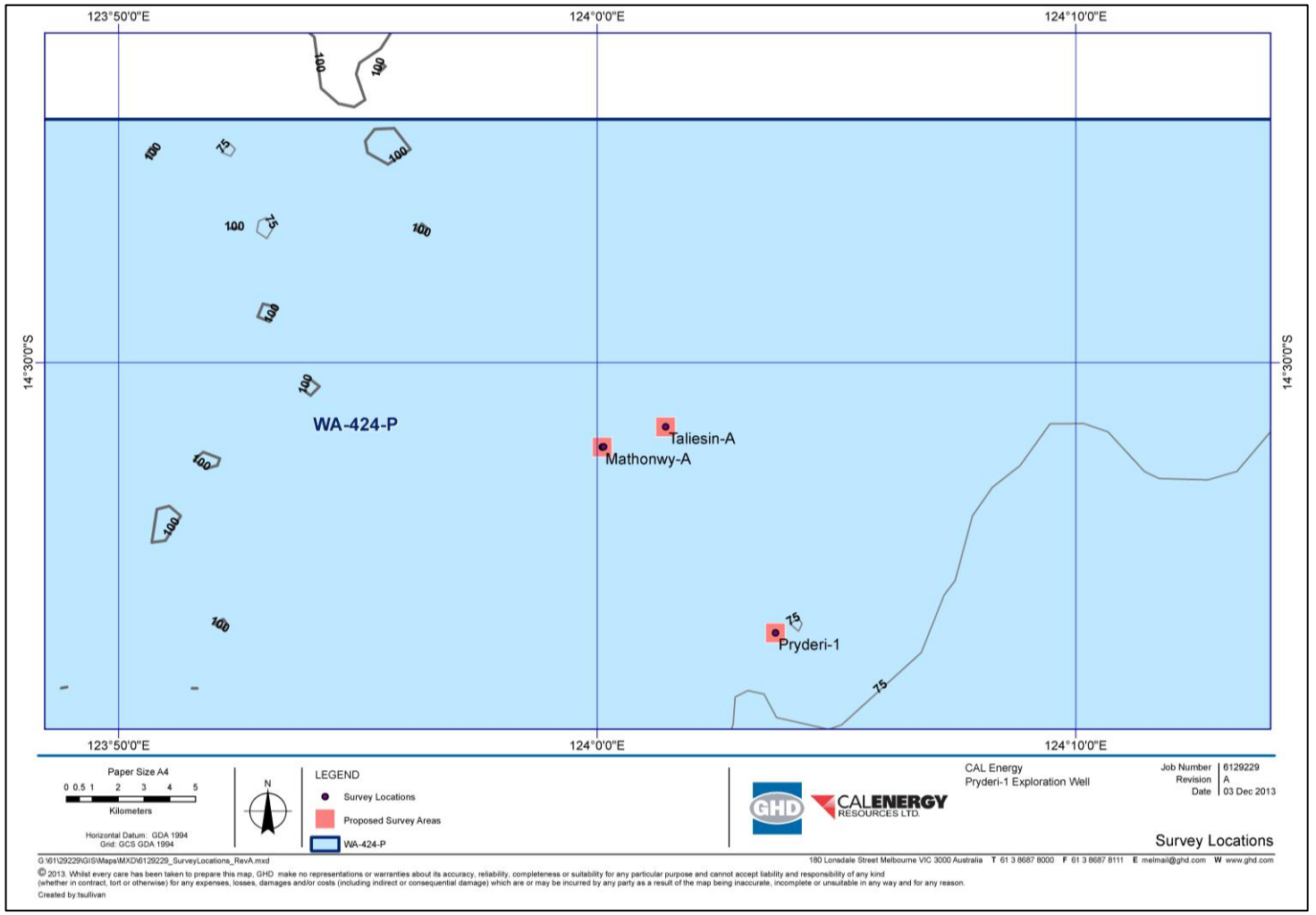


Figure 1.2 Location of the proposed and optional wells and survey areas within the permit area

2 DESCRIPTION OF THE ACTIVITY

2.1 Activity Overview

The primary survey will occur at a pre-drilling exploration well 'Pryderi-1' with a second possible site survey conducted in the area surrounding either 'Mathonwy-A' or 'Taliesin-A' location (Figure 1.2 and Figure 2.1). As stated previously, a rig has not yet been contracted to conduct the exploration drilling and can either be a jack-up mobile offshore drilling unit (MODU) or a semi-submersible MODU. In each potential scenario, varying surveys are required.

2.2 Jack-up MODU

Where a jack-up MODU is contracted for the proposed drilling campaign, both geophysical and geotechnical (drop core) surveys may be required prior to mobilisation of the MODU to site. If undertaken, the geophysical survey will be carried out over an area 1 x 1 km with transect lines spaced 100 m horizontally and cross lines every 250 m (Figure 2.1) centred on the Pryderi-1 location (if an optional survey is undertaken it will be of the same survey design as per Figure 2.1 but centred on the Mathonwy-A or Taliesin-A well location as per Table 1.1).

Geophysical survey components may consist of the following survey types:

- High resolution sub-bottom profiler to determine shallow and surface geology.
- Bathymetric survey.
- Multi-beam bathymetric system – mapping water depths.
- Side-scan sonar or high resolution multi-beam echo sounder – delineating seabed features and identifying any seabed hazards.
- Grab samples – one sample at each survey location. Some analysis of samples of physical parameters will be carried out on the vessel should, with further detailed analysis to be carried out as directed by the Operator, and at a NATA approved laboratory.

The geotechnical survey for the jack-up is required to determine the shallow and surface geology/sediments at each survey location and verify side-scan sonar interpretation. Survey components may comprise taking:

- Core penetration tests (CPTs) – three at each survey location at an approximate spread to represent locations of the jack-up footing. CPT depth will be to 30 m or 2.5 times spud can penetration, or until refusal.

- Boreholes - One borehole at each survey location drilled to approximately 30 m depth and adjacent to one of the CPT locations. Boreholes may be drilled from either a seafloor mounted unit (footprint of 2.5 x 2.5 m) or directly from a drill rig on the survey vessel.

Pre-loading of the jack-up legs on arrival at the well location may be required in the event that the geotechnical survey results report less than favourable conditions for the MODU.

2.3 Semi-submersible MODU

In event that a semi-submersible is selected, a geophysical survey may be required to satisfy pre-drill requirements, but not a geotechnical survey. If undertaken, the geophysical survey will be conducted in advance of mobilisation of the MODU into the permit area to ensure suitable seabed conditions exist to for anchoring. The geophysical survey will be carried out over a larger area than the geotechnical survey in order to accommodate for MODU anchoring requirements; i.e. 3 x 3 km grid with transect lines spaced 100 m horizontally and cross lines every 500 m is anticipated (Figure 2.1).

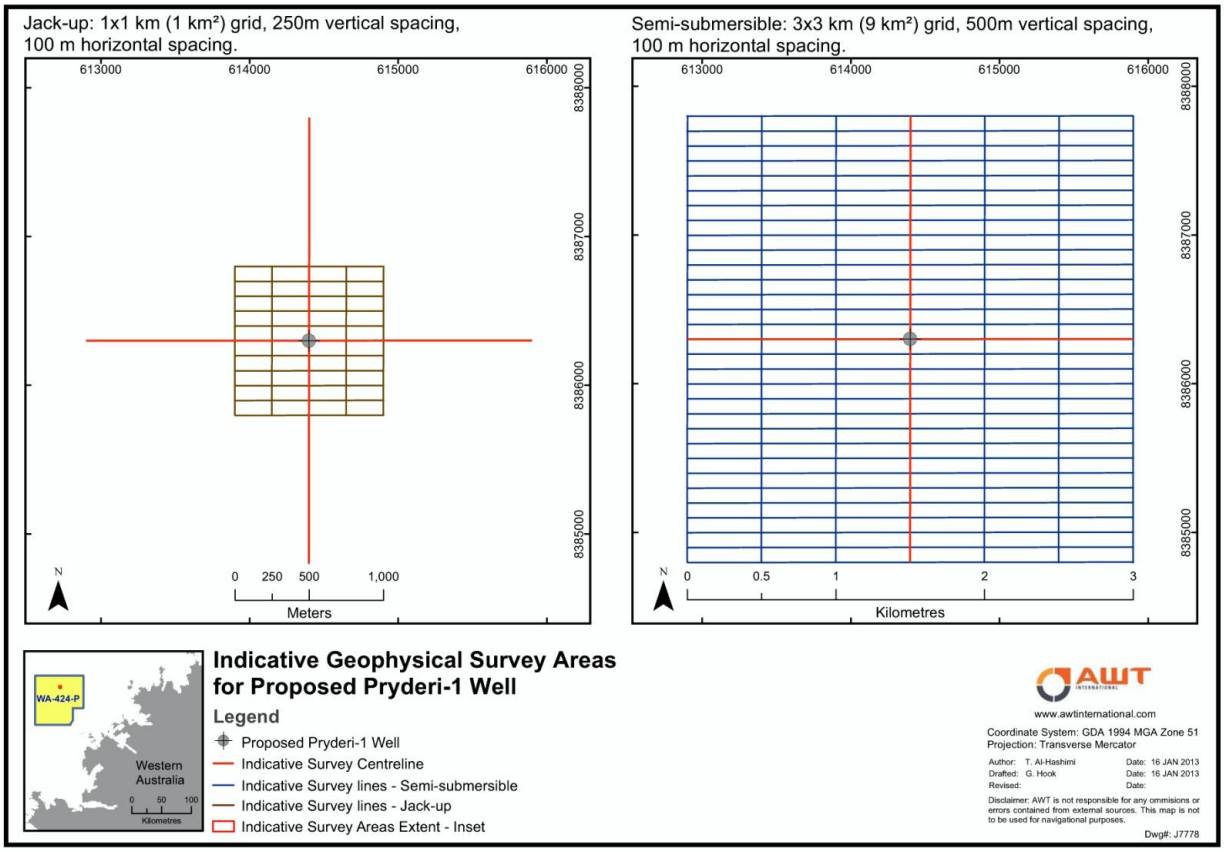


Figure 2.1 Proposed geophysical survey transect lines

3 DESCRIPTION OF THE ENVIRONMENT

3.1 Physical Environment

The WA-424-P permit area lies within the North-West Shelf Marine Bioregion (within the Kimberley Shelf sub-region of North Western Australia. The province is characterised by a dynamic oceanographic environment, influenced by strong tides, cyclonic storms, long-period swells and internal tides.

The region is dominated by the Indonesian Throughflow, which brings warm, low-nutrient, low-salinity water from the western Pacific Ocean through the Indonesian Archipelago to the Indian Ocean (SEWPaC, 2012). Mean sea surface temperatures in the region range between 22 °C in winter and 28 °C in summer (DEWHA, 2008).

During the summer months the north of the region is subject to onshore winds while the region's south experiences strong southerlies. During winter the winds are moderate in the south and are generally offshore in the north. Tropical cyclones typically occur between the months of November to April.

Wave climate in the region is composed of locally generated wind waves and swells propagated from distant western areas. Wind generated waves run mostly in the direction of the prevailing wind. In summer, waves generally approach from the west and southwest and in winter, from the south and east. Mean wave heights are less than 1 m and peak wave heights less than 2 m. During rare tropical cyclones, significant wave heights of up to 5 m can be generated; however the frequency of swells exceeding 2 m is less than 5%.

Large internal waves are experienced in the region as a result of pronounced temperature differences in the water column (i.e. where the warm, low salinity waters of the Indonesian Throughflow overlay colder, more saline, deeper ocean waters), with wave heights of up to 75 m (DEWHA, 2008) recorded.

The Kimberley region has some of the largest tidal ranges in the world. Tides are semi-diurnal (two high tides and two low tides each day) and generally quite large; up to 10 m during spring tides and less than 3 m in the neap tides for the Kimberley region (DEWHA, 2008).

The region is influenced by a complex system of ocean currents that change between seasons and between years, with surface currents exerting a strong influence. Dominant currents in the region include: the South Equatorial Current, the Indonesian Throughflow; the Eastern Gyral Current and the Leeuwin Current.

The WA-424-P permit area is situated on the continental shelf, within the area known as the 'middle shelf', i.e. where water depths range between 30 and 200 m, with the proposed exploration well located in approximately 80 m of water.

3.2 Biological Environment

The benthic habitats within the permit area are likely to include a range of sands and gravels on the shelf, to muds on the slope and abyssal plain (Baker *et al.,* 2008). These substrates are thought to support low density benthic communities of bryozoans, molluscs and echinoids (DEWHA, 2008). Sponge communities are also sparsely distributed on the shelf, and are found only in areas of hard substrate. Seabed surveys conducted over the Ichthys gas field (WA-285-P permit area), recorded populations of filter-feeding communities of sponges, gorgonians (sea whips and sea fans), soft corals, hydroids, bryozoans, fan worms and other polychaetes (INPEX, 2010).

Within the Permit Area there are no shorelines or other emergent features, however in the surrounding area, a range of benthic environments are present, which include coral reefs, macroalgae and seagrass beds and hard substrates with epiflora and fauna. These habitats exist extensively throughout the NWS area in the fringing areas of land masses, including many of the islands and shoals.

Areas of coral reef that are notably large or diverse include that at Ashmore Island (approximately 272km NW of Pryderi-1 location), Camden Sound Marine Park (approximately 70km South), Cartier Island (approximately 227km NW), Hibernia Reef (approximately 297km N), Maret Islands (approximately 101km E) , Scott Reef (approximately 234km W) and Seringapatam Reef (approximately 237km NW). Areas of notable seagrass beds include that around Ashmore and Cartier Island that in turn support other fauna including dugongs and seasnakes.

Using the online Protected Matters Search Tool (PMST), a search of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Database was conducted within a 10 km radius of the proposed Pryderi-1 well location. The identified 51 listed marine species and 10 whales and other cetaceans. Of these listed species, 9 threatened species (endangered or vulnerable) of marine fauna were identified, 17 of which are also migratory species. The species listed, or habitat important for these species, may occur within the area.

3.3 Socio-economic Environment

3.3.1 Commercial Fisheries

There are five Commonwealth managed commercial fisheries with licences to operate within or in the vicinity of permit area WA-424-P, with only the Western Tuna and Billfish Fishery that has recorded any recent activity in the area. These include:

- Western Skipjack Tuna Fishery
- Western Tuna and Billfish Fishery
- Southern Bluefin Tuna Fishery
- North-West Slope Trawl Fishery
- Northern Prawn Fishery

WA State Fisheries

There are 10 State managed commercial fisheries with licences to operate within or in the vicinity of permit area WA-424-P and include:

- Mackeral Managed Fishery
- Pearl Oyster Managed Fishery
- Northern Demersal Scalefish Fishery
- Kimberley Prawn Fishery
- North Coast Shark Fishery
- Kimberley Gillnet and Baramundi Managed Fishery

3.3.2 Petroleum Exploration and Production

The Browse Basin currently contains no petroleum production facilities, but is the subject of new developments in this area. The nearest projects are the Ichthys Gas Field Development (in construction), within WA-285-P being developed by INPEX Browse Ltd (INPEX). This project is located approximately 100 km north-west of the proposed Pryderi-1 location.

The Browse LNG Development proposes to commercialise the Browse Joint Venture's three gas and condensate fields: Brecknock, Calliance and Torosa, located 426 km off the Kimberley coast. The proposed Browse LNG Project in WA-28-R, WA-29-R, WA-30-R and WA-31-R is located approximately 240 km west of the proposed Pryderi-1 well location.

3.3.3 Shipping

The ports of northwest Australia (Onslow, Dampier, Cape Lambert, Port Hedland and Broome) handle large tonnages of iron ore and petroleum exports, resulting in very busy shipping routes through the area. There are no known commercial shipping lanes that traverse through the permit area The Australian Maritime Safety Authority (AMSA) advised through the consultation process that the west coast shipping route passes to the west of the WA-424-P permit; however though traffic along this route is not heavy (*AMSA Maritime Operations, pers comm.*).

3.3.4 Recreational Activities

There are no known recreational activities conducted within the Permit Area.

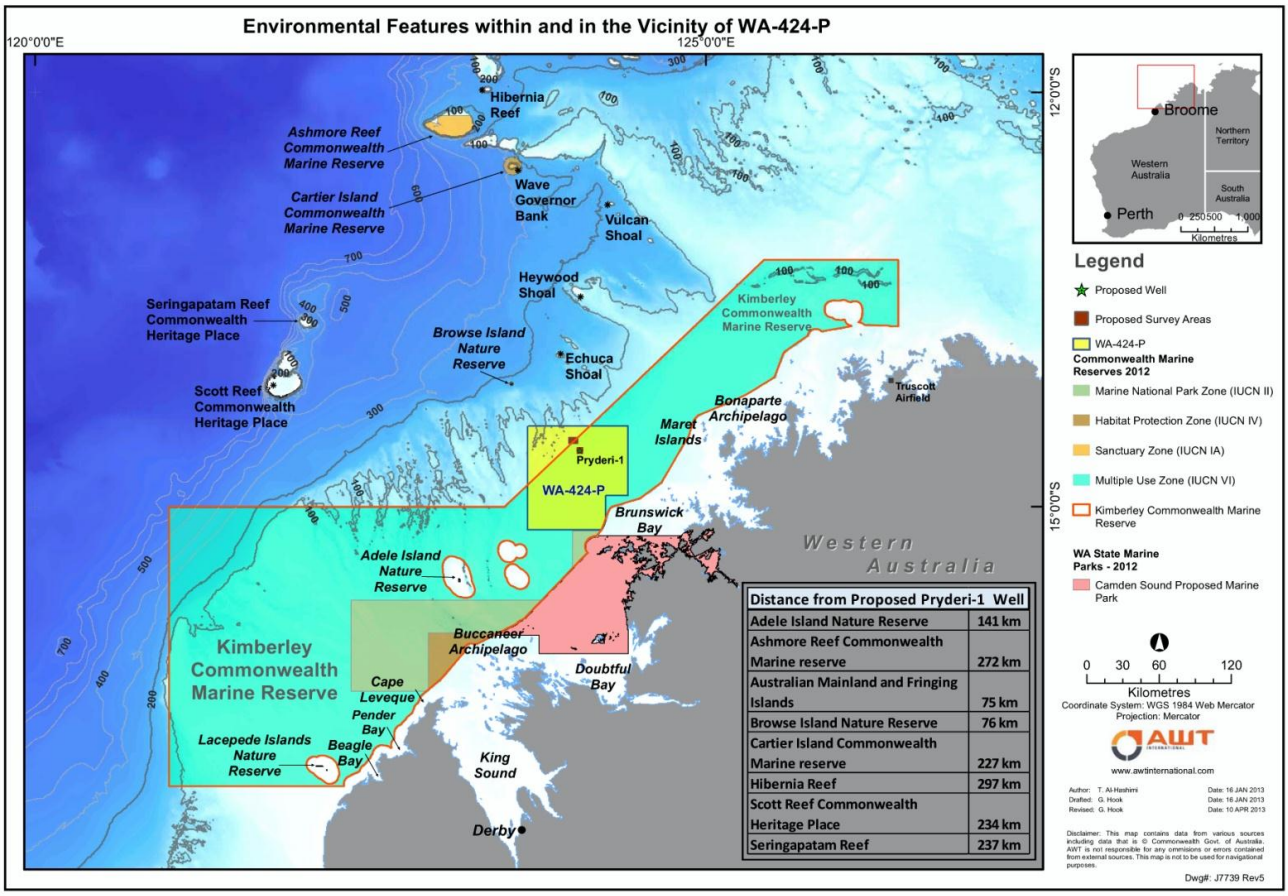
3.3.5 National Heritage

There are no known or recorded indigenous or non-indigenous archaeological or maritime heritage sites located within the permit area.

3.3.6 Commonwealth and State Marine Parks and Reserves

The Permit Area overlaps the Kimberley Commonwealth Marine Reserves 'multiple use zone' in which oil and gas operations may be permitted and are subject to referral under the EPBC Act. The proposed drilling campaign was referred under the Act in December 2011, and the assessment decision received was that the activity is '*not a controlled action if undertaken in a specific manner*'.

The proximity of other marine protected areas to the Permit Area are illustrated in Figure 3.1.



Distance from Proposed Pryderi-1 Well	
Adele Island Nature Reserve	141 km
Ashmore Reef Commonwealth Marine reserve	272 km
Australian Mainland and Fringing Islands	75 km
Browse Island Nature Reserve	76 km
Cartier Island Commonwealth Marine reserve	227 km
Hibernia Reef	297 km
Scott Reef Commonwealth Heritage Place	234 km
Seringapatam Reef	237 km

Figure 3.1 Environmental features in the vicinity of WA-424-P permit area

4 ENVIRONMENTAL HAZARDS AND CONTROLS

CRA undertook environmental risk assessment workshops to understand the potential environmental risks associated with the geophysical and geotechnical site surveys to ensure they are conducted in a manner that will reduce the risks and impacts to marine sensitivities to As Low As Reasonably Practicable (ALARP) and be of an acceptable level.

A summary of credible environmental hazards, risks and control measures to be applied during the surveys are shown in Table 5.1.

5 MANAGEMENT APPROACH

The survey activity will be managed in compliance with all measures and controls detailed within the EP partially accepted by NOPSEMA under the OPGGS(E) Regulations, other environmental legislation and CRAs Management System (CER EHSMS).

The objective of the EP is to ensure that potential adverse environmental impacts associated with routine operational events and unplanned events associated with the survey activity, are identified and assessed and to stipulate mitigation measures to avoid and/or reduce any adverse impacts to the marine environment to ALARP.

The EP details specific performance objectives, standards and procedures, and identifies the range of controls to be implemented (consistent with the standards) to achieve the performance objectives. The EP also identifies the specific measurement criteria and records to be kept to demonstrate the achievement of each performance objective.

As described in the EP, the implementation strategy includes the following:

- Identification of environmental risks (both CER Group and operational level).
- Assessing and ranking the risks associated with operations and activities.
- Definition, implementation and maintenance of a structured system of controls.
- Monitoring the effectiveness of the process, and identifying areas for improvement.

Key roles and responsibilities, training and competencies, reporting requirements (recordable and reportable) monitoring, auditing, management of non-conformance and review, incident response, record keeping and consultation of the activity are also detailed within the EP.

Table 5.1 Summary of credible environmental hazards and control measures to be applied during the surveys

Source of Hazard	Potential Environmental Impact	Preventative Control/Mitigation Measure
	Physical Presence	
Seabed Disturbance	Temporary loss/displacement of benthic habitat and associated biota in the direct footprint of the anchors and chain. Disturbance to marine archaeology (i.e. shipwrecks).	Preventative Controls: • Any shipwrecks found will be reported to the Maritime Heritage Office. • Vessels do not plan to anchor. Mitigation Controls: • Survey vessels will deploy and retrieve rig anchors to minimise drag. • Survey vessels to comply with anchoring procedures.

Underwater Noise (General)	Injury to hearing or other organs. Hearing loss may be temporary (temporary threshold shift (TTS)) or permanent (permanent threshold shift (PTS)).
	
	Masking or interfering with other biologically important sounds (including vocal communication, echolocation, signals and sounds produced by predators or prey).
	
	Disturbance leading to behavioural changes or displacement of fauna.
		Preventative Controls:
		• Vessel machinery will be maintained in accordance with the manufacturer's maintenance specifications to reduce noise emissions to the marine environment.
		• Crew members with given responsibilities for marine fauna observation on vessels.
		• Staff to be inducted in appropriate cetacean interaction.
		• Cetacean sighting forms will be completed and provided to the Department of Environment (DoE).
		• The Australian Guidelines for Whale and Dolphin Watching (DEWHA, 2005) for sea-faring activities will be implemented for vessels including:
		  ○ Caution zone (300 m either side of whales and 150 m either side of dolphins) – vessels must operate at no wake speed in this zone.
		  ○ No approach zone (100 m either side of whales and 50 m either side of dolphins) – vessels should not enter this zone and should not wait in front of the direction of travel or an animal or pod.
		Mitigation Controls:
		• None

Artificial Lighting	Disorientation, attraction or repulsion. Disruption to natural behavioural patterns and cycles.	Preventative Controls: • Lighting on the survey vessels is in accordance with maritime safety regulations/standards. • Where practicable, lighting will be limited to minimum required for safe operation. Mitigation Controls • Lights will be switched off or directed away from the ocean wherever practicable and safe to do so.
Interference with Other Marine Users	Risk of fishing gear snagging, particularly demersal trawl gear.	Preventative Controls: • Lighting on the vessel is in accordance with maritime safety regulations/standards. • The vessels personnel are trained, experienced and competent in watch keeping.

Source of Hazard	Potential Environmental Impact	Preventative Control/Mitigation Measure
		• Maintain 24-hour visual, radio, vessel radar watch. • Notice to Mariners providing timing/duration, location (co-ordinates) and description of planned activities to be issued by the Australian Hydrographic Office. <u>Mitigation Controls:</u> • None
Routine Discharges		
General Non-hazardous and Hazardous Wastes	Localised decline in water quality. Potential injury to fauna if disposed overboard (e.g. ingestion of plastics or entanglement). Seabed disturbance resulting in localised loss of benthic habitat in footprint of dropped object.	<u>Preventative Controls:</u> • General non-hazardous and hazardous solid wastes will be managed in accordance with the project EHSMP and with MARPOL 73/78 Annex V requirements. • Wastes will be segregated at source into recyclable and non-recyclable wastes, and stored in designated containers for transport onshore to a recycling contractor, where practicable, or waste disposal site. • Hazardous wastes materials will be handled and stored in accordance with the corresponding MSDS and detailed in the Chemical Register. • A waste manifest will be maintained detailing types and quantities of waste transported ashore for disposal or recycling. • Staff induction will include waste preventative and mitigation controls practices. • All lifting equipment will be certified and have an up-to-date maintenance/service log. • Lifting and transfer procedure to be in place to minimise the risk of dropping objects. • Lifting and transfers will be undertaken by competent, trained rig and vessel crew. • Recording and reporting of any items lost overboard that were unable to be recovered in the Daily Operations Report. • Accidental release of waste to the marine environment is reported and investigated and corrective actions are implemented. <u>Mitigation Controls:</u> • Any spills or container malfunctions on board will be cleaned up as soon as practicable. • Where practicable, material accidentally dropped overboard will be recovered.

Sewage and Sullage	Localised nutrient enrichment of surrounding waters in offshore open ocean waters.
	Turbidity in the water column.
		<u>Preventative Controls</u>:
		• Offshore disposal of sewage and sullage will be managed in accordance with MARPOL 73/78 Annex IV.
		  ○ Untreated sewage may be discharged at distances greater than 12 nautical miles (nm) from land (i.e. outside territorial waters).
		  ○ Sewage that has been treated, in accordance with MARPOL 73/78 Annex IV may be discharged within territorial waters but outside State/NT waters (i.e. >3 nm from land).
		• The vessels will use compliant Sewage Treatment Plants (STP) in accordance with MARPOL Annex IV.
		• STPs will be maintained in line with the manufacturer's specifications.

Source of Hazard	Potential Environmental Impact	Preventative Control/Mitigation Measure
		• Persons-onboard do not exceed the maximum carrying capacity of the vessel's sewage system. Mitigation Controls: • Any spills will be cleaned up and/or disinfected as soon as possible.
Putrescible Wastes	Localised nutrient enrichment of surrounding waters in offshore open ocean waters. Turbidity in the water column.	Preventative Controls: • Disposal of food scraps and putrescibles will be managed in accordance with MARPOL 73/78 Annex IV. • Vessels will use an organic waste macerator compliant with MARPOL Annex IV. Macerators will be maintained in line with manufacturers' specifications. • All cooking oils and greases will be collected, stored appropriately onboard and transported to an onshore registered facility for disposal. • All non-food galley wastes will be bagged and transported ashore for recycling or disposal in accordance with *Environmental Protection (Controlled Waste) Regulations 2004*. Mitigation Controls: • Food scraps and wastes will not be discharged within 3 nm of land. Instead putrescible wastes will be collected and transported onshore for disposal at a registered facility or disposed via maceration outside the 3 nm boundary. • For the vessels located >3 nm from land (i.e. outside State waters), food scraps will be macerated to a diameter of less than 25 mm prior to being disposed overboard.
Deck Drainage	Localised decline in water quality in the immediate vicinity of the discharge. Turbidity in the water column.	Preventative Controls: • OIW separator shut off valve activates when concentration exceeds 15 ppm. • Regular maintenance of OIW separator. • Biodegradable wash down detergents used. • Main deck drain scuppers closed in the event of a spill on deck. • Recovered oil recovered from the OIW separator will be returned to shore for disposal at a registered facility. • Daily inspections to ensure deck areas are clean of spillages and accumulations of oil, grease and chemicals. All spills and leaks are recorded and reported in Daily Operations Report. • Drainage and discharge overboard in accordance with MARPOL 73/78 Annex I. • Drainage water from areas that may be contaminated with traces of oil (e.g. bilge and machinery spaces) will be treated in an oil in water (OIW) separator. • Deck drains which contain rainwater only are directed overboard. • Minor oil/lubricant spills will be mopped up immediately with absorbent materials that will be disposed of onshore as hazardous waste in accordance with the Shipboard Oil Pollution Emergency Plan (SOPEP). Mitigation Controls: • None.

Source of Hazard	Potential Environmental Impact	Preventative Control/Mitigation Measure
Cooling Water	Thermal impacts to marine organisms. Localised decline in water quality with lowered dissolved oxygen concentrations due to elevated water temperature. Toxicity to marine biota due to biocides.	Preventative Controls: • Cooling water system is maintained by qualified personnel in accordance with manufacturer's specifications. • MSDS will be available for any biocides used. Mitigation Controls: • Biocides will be kept to a minimum in accordance with manufacturer's specification. • No hydrocarbons will be present in the cooling water discharge.
Desalination Brine	Localised increase in seawater salinity in the offshore open ocean environment. Toxic effects to marine biota due to use of anti-scalants.	Preventative Controls: • Freshwater generation will be limited to volumes necessary to operate. • Potable water system is maintained by qualified personnel in accordance with manufacturer's specifications. • Freshwater generators maintained by qualified personnel in accordance with manufacturer's specifications. • MSDS available for anti-scalants used in dosing. Mitigation Controls: • None.
Atmospheric Emissions	Minor deterioration of local and regional air quality due to emission of pollutants such as NO_X and SO_X.	Preventative Controls: • All combustion equipment to be maintained in accordance with maintenance procedures. • All refrigeration equipment to be maintained in accordance with maintenance procedures. Mitigation Controls: • Diesel used in vessels will have low sulfur content <4.5%. • Equipment fuel consumption to be monitored daily. • Reporting of atmospheric emissions as per regulatory requirements.
Non-routine events		

Introduction of Invasive Marine Species	Over-predation of native flora and fauna;
	Out-competing of native flora and fauna;
		Preventative Controls :
		• Vessels will adhere to all AQIS Guidelines on ballast water exchange and biofouling including:
		  ○ Australian Ballast Water Management (DAFF, 2011) and National Biofouling Management Guidance for Petroleum Production and Exploration Industry (DAFF, 2009) requirements.
		  ○ The vessels to be in possession of current International Anti-fouling System Certificates.

Source of Hazard	Potential Environmental Impact	Preventative Control/Mitigation Measure
	Human illness through released toxins; Depletion of viable fishing areas and aquaculture stock; Reduction of coastal aesthetics; Damage to marine and industrial infrastructure; Damage to vessel engines and propellers; and Reduction in vessel performance.	○ The vessels to have gained AQIS clearance to enter Australian waters (if previously outside Australian waters). • There is no planned exchange of ballast water within 12 nm of any coastline. <u>Mitigation Controls:</u> • Reporting of a known or suspect IMS immediately
Collision with Marine Fauna	Vessel collision with marine fauna such as cetaceans, whale sharks and turtles. Disturbance leading to behavioural changes or displacement of fauna.	<u>Preventative Controls</u>: • All marine megafauna interactions will adhere to the Australian Guidelines for Whale and Dolphin Watching (DEWHA, 2005). • Vessel speed limit restrictions will apply within exclusion zone. • 'Caution Zone' of 300 m either side of whales and 150 m either side of dolphins • Vessels to operate no wake speed in this 'Caution Zone'. • 'No Approach Zone' of 100 m either side of whales and 50 m either side of dolphins; vessels should not enter this zone and should not wait in front of the direction of travel of an animal or pod of animals. • Cetacean observations to be recorded on DoE cetacean sighting forms and returned to DoE. <u>Mitigation Controls</u>: • Implementation of Cetacean interaction measures in accordance with the Environmental Induction. • Reporting of any collisions with cetaceans to DoE.
Chemical Spills	Temporary localised decline in water quality. Temporary localised decline in sediment quality. Temporary minor toxicity to marine flora and fauna	<u>Preventative Controls</u>: • All crew will be required to attend a basic induction identifying chemical management and spill prevention and response measures. • Chemicals will be labeled and segregated away from flammable sources and high traffic areas. • Chemicals and hydrocarbons will be packaged, marked, labeled and stowed in accordance with MARPOL 73/98 Annex I, II and III regulations. Specifically, all chemicals (environmentally hazardous) will be stored in appropriately bunded areas and labeled. • Disposal of hazardous liquid wastes/chemicals will be at a registered onshore facility. • Up-to-date MSDS available onboard used and located in the Chemical Register.

Source of Hazard	Potential Environmental Impact	Preventative Control/Mitigation Measure
		• Chemical storage areas will be frequently inspected. • Ship Oil Pollution Emergency Plan (SOPEP) response kits located through the vessel adjacent to chemical storage frequent use areas. The quantity of spill recovery materials will be appropriate to the quantity of chemicals stored onboard the vessel. • Left-over bulk drilling solids (e.g., barite or bentonite) will be stored onboard and legally disposed of. <u>Mitigation Controls</u> • Chemical spills will be immediately cleaned up and contaminated material will be contained onboard for onshore disposal. All shipboard chemical and hydrocarbon spills will be managed in accordance with the SOPEP. • Management and response to spills entering the marine environment will be in accordance to procedures outline in the OSCP.
Diesel spill (refuelling)	Temporary localised decline in water quality. Temporary localised decline in sediment quality. Temporary toxicity to marine flora and fauna.	<u>Preventative Controls</u>: • No refueling to take place at night (unless safety considerations take priority), or during weather conditions exceeding those identified as safe to refuel. • Refueling only to be carried out and supervised by competent personnel. • Regular equipment checks to include dry break couplings on all fuel lines. • Inspection of all hoses, valves and connections prior to use. • Tank levels will be continuously monitored to prevent overflow. • All vessels will have a SOPEP which includes oil spill response measures. <u>Mitigation Controls:</u> • Management and response to spills entering the marine environment will be in accordance to procedures outline in the Oil Spill Contingency Plan (OSCP) and Emergency Management Plan (EMP). • Relevant staff to be inducted and trained in spill response procedure and the OSCP.
Diesel Spills (Vessel Collision)	Temporary localised decline in water quality. Temporary localised decline in sediment quality. Temporary toxicity to marine flora and fauna.	<u>Preventative Controls:</u> • Notice to Mariners will be issued by the Australian Hydrographic Service with details on survey activities, coordinates and duration. • Competent and experience vessel masters and crew to prevent collisions. • All vessels will have a SOPEP that includes oil spill response measures. • Relevant staff to be inducted and trained in spill response procedure and the OSCP <u>Mitigation Controls:</u> • Management and response to spills entering the marine environment will be in accordance to procedures outline in the OSCP and the ERMP.

6 CONSULTATION

CRA's Stakeholder Consultation Plan (SCP) provides for continued and ongoing engagement with stakeholders throughout project planning and operations, and is described in detail in Section 8 of the EP. CRA will maintain communications with all relevant stakeholders prior to, during all operations to ensure that they are informed of the timing of operations, activities being undertaken and how the campaign may affect other users of the area and can contact CRA to discuss any concerns.

CRA has developed and implemented a stakeholder consultation program in line with NOPSEMA's requirements, contacting identified relevant authorities, persons and organisations to inform the preparation of the EP and OSCP. Notably, CRA's Joint Venture partner IPM WA424P Pty Ltd ('IPM') initiated consultation with stakeholders in 2011 as part of the preparation of the EP and OSCP. CRA become Operator in 2012 and since that time, CRA has re-engaged with previously and newly identified stakeholders to inform them of the status of the proposed drilling campaign and seek comment. This has included providing identified stakeholders with information and consultation brochures, regular correspondence, and personal follow-up telephone calls.

Overall, there have been no objections and few specific issues or concerns raised by stakeholders regarding the proposed activities at time of submission. Issues raised by government agencies and non-government organisations include the exact timing and location of operations, potential impacts of seismic surveys on fishing operations and marine mammals. CRA has considered this feedback in the development of its management measures.

7 OPERATOR CONTACT DETAILS

Attention: Mr. Travis Enman

Business Manager

CalEnergy Resources (Australia) Limited

Level 1/ 12 St Georges Terrace

Perth WA 6000

Phone: (08) 6500 8500

Fax: (08) 6500 8599

Email: travis.enman@calenergyresources.com

8 REFERENCES

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). The North-West Marine Bioregional Plan: Bioregional Profile: A Description of the Ecosystems, Conservation Values and Uses of the South-West Marine Region. Canberra: DEWHA. Available from: http://www.environment.gov.au/coasts/mbp/publications/north-west/bioregional-profile.html.

Department of Sustainability, Environment, Water, Population and Communities (SEWPaC), (2012). Marine bioregional plan for the North-west Marine Region. Commonwealth of Australia 2012.

INPEX (2010). Ichthys Gas Field Development. Draft Environmental Impact Statement. Inpex Browse Ltd. Perth.