360 environmental

Office of the Environmental Protection Authority

File: ....

- 6 JUN 2013

A:		For Information
fa:		For Discussion
Officer:		For Action
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Dir. Bus Ops		GM Signature
Dir. SPPD		Dir for GM (copy to GM)
Dir. Strat Sup		Dir Signature (copy to GM)
		Mgr Direct (copy to GM)

INF060-2 AD Albany and Kemerton 60 MW

5 June 2013

Paul Vogel
Chairman
Environmental Protection Authority
Locked Bag 10
East Perth WA 6892

Dear Paul

Section 38 for 60 megawatt (MW) Power Stations in Albany and Kemerton

On behalf of our Client, Tesla Holdings, we are pleased to provide the enclosed *Section 38* Form and supporting document for two proposed 60 MW power stations to be located Lot 5 Down Road, Albany and Lot 5107 Marriot Road, Wellesley.

The supporting document has been developed to provide more detailed information further to the attached Section 38 application form.

Should you have any questions or require further action please do not hesitate to contact Judith Ruppert or the undersigned on (08) 9388 8360. We look forward to your comments.

Yours sincerely,

Tamara Smith

Tamara Smith

Director

Enc.: Section 38 form and supporting documents

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Environmental Protection Authority

GOVERNMENT OF WESTERN AUSTRALIA

Referral of a Proposal by the Proponent to the Environmental Protection Authority under
Section 38(1) of the *Environmental Protection Act 1986*.

EPA REFERRAL FORM

PROPONENT

PURPOSE OF THIS FORM

Section 38(1) of the *Environmental Protection Act 1986* (EP Act) provides that where a development proposal is likely to have a significant effect on the environment, a proponent may refer the proposal to the Environmental Protection Authority (EPA) for a decision on whether or not it requires assessment under the EP Act. This form sets out the information requirements for the referral of a proposal by a proponent.

Proponents are encouraged to familiarise themselves with the EPA's *General Guide on Referral of Proposals* [see Environmental Impact Assessment/Referral of Proposals and Schemes] before completing this form.

A referral under section 38(1) of the EP Act by a proponent to the EPA must be made on this form. A request to the EPA for a declaration under section 39B (derived proposal) must be made on this form. This form will be treated as a referral provided all information required by Part A has been included and all information requested by Part B has been provided to the extent that it is pertinent to the proposal being referred. Referral documents are to be submitted in two formats – hard copy and electronic copy. The electronic copy of the referral will be provided for public comment for a period of 7 days, prior to the EPA making its decision on whether or not to assess the proposal.

CHECKLIST

Before you submit this form, please check that you have:

	Yes	No
Completed all the questions in Part A (essential).	X	
Completed all applicable questions in Part B.	X	
Included Attachment 1 – location maps.	X	
Included Attachment 2 – additional document(s) the proponent wishes to provide (if applicable).	X	
Included Attachment 3 – confidential information (if applicable).		X
Enclosed an electronic copy of all referral information, including spatial data and contextual mapping but excluding confidential information.	X	

Following a review of the information presented in this form, please consider the following question (a response is optional).

Do you consider the proposal requires formal environmental impact assessment?	
☐ Yes ☒ No ☐ Not sure	
If yes, what level of assessment?	
☐ Assessment on Proponent Information	☐ Public Environmental Review

PROPONENT DECLARATION (to be completed by the proponent)

I, Ben Tan declare that I am authorised on behalf of Tesla Holdings Pty Ltd (being the person responsible for the proposal) to submit this form and further declare that the information contained in this form is true and not misleading.

Signature	Ben Tan
CEO	Tesla Holdings
Date	

PART A - PROPONENT AND PROPOSAL INFORMATION

(All fields of Part A must be completed for this document to be treated as a referral)

1 PROPONENT AND PROPOSAL INFORMATION

1.1 Proponent

Name	Tesla Holdings Pty Ltd
Joint Venture parties (if applicable)	N/A
Australian Company Number (if applicable)	63 141 729 857
Postal Address (where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State)	Level 3 Exchange House 68 St Georges Terrace Perth WA 6000
Key proponent contact for the proposal: • name • address • phone • email	Ben Tan Chief Executive Officer Level 3 Exchange House 68 St Georges Terrace Perth WA 6000 (08) 6143 1851 ben.tan@teslacorp.com.au
Consultant for the proposal (if applicable): • name • address • phone • email	Judith Ruppert 10 Bermondsey Street West Leederville, WA 6007 (08) 9388 8360 Judyruppert@360environmental.com.au

1.2 Proposal

Title	60 Megawatt Power Station - Lot 5 Down Road, Albany
Description	It has been proposed that a power station be constructed on the site with an expected total energy output of 60 MW per year. The proposed design includes 40 diesel fuelled Caterpillar type 3516B generator sets which are self-bunded. Other important components of the power station are as follows: • Two bunded transformers (11/132 kV 37.5 MVA); • 300,000 litre (L) capacity fuel tank(s) (safe fill, self-bunded); and • Control hut with separate rooms for control.

Extent (area) of proposed ground disturbance.	No native vegetation disturbance required.
Timeframe in which the activity or development is proposed to occur (including start and finish dates where applicable).	Construction will start once all necessary approvals and permits have been required and it is anticipated that commissioning would occur in mid-2016. There will be a commissioning period which includes the installation and testing of the full load of the proposed power station to ensure proposed management is appropriate and the power station is functionally operational. Operation will start post commissioning phase.
Details of any staging of the proposal.	N/A
Is the proposal a strategic proposal?	No
Is the proponent requesting a declaration that the proposal is a derived proposal? If so, provide the following information on the strategic assessment within which the referred proposal was identified: • title of the strategic assessment; and • Ministerial Statement number.	No
Please indicate whether, and in what way, the proposal is related to other proposals in the region.	N/A
Does the proponent own the land on which the proposal is to be established? If not, what other arrangements have been established to access the land?	The site is owned by LandCorp who have entered into an Option to Lease agreement with Tesla.
What is the current land use on the property, and the extent (area in hectares) of the property?	The site is located within the Mirambeena Industrial Park. The site is zoned as "Noxious Industry" under the City of Albany Planning Scheme No. 3. The area surrounding the site to the north and south is zoned "Special Use – Various". The areas to the east and west are zoned "Rural".

1.3 Location

Name of the Shire in which the proposal is located.	Shire of Albany.
For urban areas: • street address; • lot number; • suburb; and • nearest road intersection.	The site is located on Lot 5 on Down Road, Albany.
For remote localities: • nearest town; and • distance and direction from that town to the proposal site.	
Electronic copy of spatial data - GIS or CAD, geo-referenced and conforming to the following parameters: • GIS: polygons representing all activities and named; • CAD: simple closed polygons representing all activities and named; • datum: GDA94; • projection: Geographic (latitude/longitude) or Map Grid of Australia (MGA); • format: Arcview shapefile, Arcinfo coverages, Microstation or AutoCAD.	Enclosed?: Yes

1.4 Confidential Information

Does the proponent wish to request the EPA to allow any part of the referral information to be treated as confidential?	No
If yes, is confidential information attached as a separate document in hard copy?	

1.5 Government Approvals

Is rezoning of any land required before the proposal can be implemented? If yes, please provide details.		No	
Is approval required from any Commonwealth or State Government agency or Local Authority for any part of the proposal? If yes, please complete the table below.		Yes	
Agency/Authority	Approval required	Application lodged Yes / No	Agency/Local Authority contact(s) for proposal
Department of Environment and Conservation	Works Approval	No – a Works Approvals will be lodged following a	

		decision on this s38 referral.	
City of Albany	Development Application	The City of Albany has been informed about the project; however, a formal Development Application will be lodged following a decision on this s38 referral.	

PART B - ENVIRONMENTAL IMPACTS AND PROPOSED MANAGEMENT

2. ENVIRONMENTAL IMPACTS

Describe the impacts of the proposal on the following elements of the environment, by answering the questions contained in Sections 2.1-2.11:

- 2.1 flora and vegetation;
- 2.2 fauna;
- 2.3 rivers, creeks, wetlands and estuaries;
- 2.4 significant areas and/ or land features;
- 2.5 coastal zone areas;
- 2.6 marine areas and biota;
- 2.7 water supply and drainage catchments;
- 2.8 pollution;
- 2.9 greenhouse gas emissions;
- 2.10 contamination; and
- 2.11 social surroundings.

These features should be shown on the site plan, where appropriate.

For all information, please indicate:

- (a) the source of the information; and
- (b) the currency of the information.

2.1 Flora and Vegetation

2.1.1 Do you propose to clear any native flora and vegetation as a part of this proposal?

[A proposal to clear native vegetation may require a clearing permit under Part V of the EP Act (Environmental Protection (Clearing of Native Vegetation) Regulations 2004)]. Please contact the Department of Environment and Conservation (DEC) for more information.

(please tick) ☐ Yes — **If yes**, complete the rest of this section.

✔ No — **If no**, go to the next section

It is not proposed to clear any native vegetation for the as part of this proposal.

Searches of the DEC's Naturemap database (2013) and SEWPAC's (2013) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) *Protected Matters Search Tool* were undertaken to identify the potential for conservation significant species to exist within five kilometres of the site. The search results indicated there are no known occurrences of Declared Rare Flora (DRF) or Priority Flora on the site. Seven endangered plant species (or their habitat) are recorded as 'likely to occur' within five kilometres of the site. Further detail can be found in Section 3.6 in the *Lot 5 Down Road, Albany 60 Megawatt Power Station - Proponent Referral to the EPA* (360 Environmental 2013).

The site has been predominately cleared for agriculture in the past and there is currently very limited vegetation on site. It was noted during the site visit that the site is predominately covered in weeds; however, there is a small patch of Marri and Jarrah trees. There is no understory present. There is also native vegetation present along the southern boundary of the site. No native vegetation will be cleared to enable the development of this proposal.

For more detailed information please refer to *Lot 5 Down Road, Albany 60 Megawatt Power Station - Proponent Referral to the EPA* (360 Environmental 2013).

2.1.2 How much vegetation are you proposing to clear (in hectares)?

2.1.3 Have you submitted an application to clear native vegetation to the DEC (unless you are exempt from such a requirement)?

☐ Yes ☐ No **If yes**, on what date and to which office was the application submitted of the DEC?

It is not proposed to clear any vegetation for the as part of this proposal.

2.1.4 Are you aware of any recent flora surveys carried out over the area to be disturbed by this proposal?

☐ Yes ☐ No **If yes**, please attach a copy of any related survey reports and provide the date and name of persons / companies involved in the survey(s).

If no, please do not arrange to have any biological surveys conducted prior to consulting with the DEC.

2.1.5 Has a search of DEC records for known occurrences of rare or priority flora or threatened ecological communities been conducted for the site?

☐ Yes ☐ No If you are proposing to clear native vegetation for any part of your proposal, a search of DEC records of known occurrences of rare or priority flora and threatened ecological communities will be required. Please contact DEC for more information.

2.1.6 Are there any known occurrences of rare or priority flora or threatened ecological communities on the site?

☐ Yes ☐ No **If yes**, please indicate which species or communities are involved and provide copies of any correspondence with DEC regarding these matters.

2.1.7 If located within the Perth Metropolitan Region, is the proposed development within or adjacent to a listed Bush Forever Site? (You will need to contact the Bush Forever Office, at the Department for Planning and Infrastructure)

☐ Yes ☐ No **If yes**, please indicate which Bush Forever Site is affected (site number and name of site where appropriate).

2.1.8 What is the condition of the vegetation at the site?

2.2 Fauna

2.2.1 Do you expect that any fauna or fauna habitat will be impacted by the proposal?

(please tick) ☐ Yes **If yes**, complete the rest of this section.

✔ No **If no**, go to the next section.

No native vegetation will be cleared to enable development of this proposal.

A search of the DEC's Naturemap database (2013) and SEWPAC's (2013) *Protected Matters Search Tool* was undertaken to identify the potential for conservation significant Fauna species to exist within five kilometres of the site. The search results indicated there are no known occurrences of Threatened Fauna on the site; however, one Critically Endangered, one Endangered, five Vulnerable and one Marine and Migratory species listed under the EPBC Act were identified as potentially occurring within five kilometres of the site. No impact is expected to these species as a result of the development of this proposal.

For more detailed information please refer to *Lot 5 Down Road, Albany 60 Megawatt Power Station - Proponent Referral to the EPA* (360 Environmental 2013).

2.2.2 Describe the nature and extent of the expected impact.

2.2.3 Are you aware of any recent fauna surveys carried out over the area to be disturbed by this proposal?

☐ Yes ☐ No **If yes**, please attach a copy of any related survey reports and provide the date and name of persons / companies involved in the survey(s).

If no, please do not arrange to have any biological surveys conducted prior to consulting with the DEC.

2.2.4 Has a search of DEC records for known occurrences of Specially Protected (threatened) fauna been conducted for the site?

☐ Yes ☐ No (please tick)

2.2.5 Are there any known occurrences of Specially Protected (threatened) fauna on the site?

☐ Yes ☐ No **If yes**, please indicate which species or communities are involved and provide copies of any correspondence with DEC regarding these matters.

2.3 Rivers, Creeks, Wetlands and Estuaries

2.3.1 Will the development occur within 200 metres of a river, creek, wetland or estuary?

(please tick) ☐ Yes **If yes**, complete the rest of this section.

✔ No **If no**, go to the next section.

There are no watercourses present on the site but there are several in the surrounding area. There is one perennial swamp 300 metres south of the site and two earth dams 500 metres north and north-west of the site.

There are no Ramsar wetlands or Nationally Important Wetlands on or adjacent to the site. During the site visit it was observed there is water inundation present on the surface. There were also several soaks and watering stations present on the site. This waterlogging will be managed through the design and landscaping of the site and will not impact upon the project.

2.3.2 Will the development result in the clearing of vegetation within the 200 metre zone?

☐ Yes ☐ No **If yes**, please describe the extent of the expected impact.

2.3.3 Will the development result in the filling or excavation of a river, creek, wetland or estuary?

☐ Yes ☐ No **If yes**, please describe the extent of the expected impact.

2.3.4 Will the development result in the impoundment of a river, creek, wetland or estuary?

☐ Yes ☐ No **If yes**, please describe the extent of the expected impact.

2.3.5 Will the development result in draining to a river, creek, wetland or estuary?

☐ Yes ☐ No **If yes**, please describe the extent of the expected impact.

2.3.6 Are you aware if the proposal will impact on a river, creek, wetland or estuary (or its buffer) within one of the following categories? (please tick)

Conservation Category Wetland	☐ Yes	☐ No	☐ Unsure
Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998	☐ Yes	☐ No	☐ Unsure
Perth's Bush Forever site	☐ Yes	☐ No	☐ Unsure
Environmental Protection (Swan & Canning Rivers) Policy 1998	☐ Yes	☐ No	☐ Unsure
The management area as defined in s4(1) of the *Swan River Trust Act 1988*	☐ Yes	☐ No	☐ Unsure
Which is subject to an international agreement, because of the importance of the wetland for waterbirds and waterbird habitats (e.g. Ramsar, JAMBA, CAMBA)	☐ Yes	☐ No	☐ Unsure

2.4 Significant Areas and/ or Land Features

2.4.1 Is the proposed development located within or adjacent to an existing or proposed National Park or Nature Reserve?

☐ Yes ✔ No **If yes**, please provide details.

There are no Regional Parks or National Parks on or adjacent to the site.

2.4.2 Are you aware of any Environmentally Sensitive Areas (as declared by the Minister under section 51B of the EP Act) that will be impacted by the proposed development?

☐ Yes ✔ No **If yes**, please provide details.

There are no Environmentally Sensitive Areas (ESAs) on or adjacent to the site. The nearest ESAs are located approximately three kilometres to the northeast of the site. The Marbellup Nature Reserve is located approximately two kilometres to the south of the site. There are unlikely to be any specific wetland or conservation area related management measures required due to the separation distance between the proposed footprint and these assets.

2.4.3 Are you aware of any significant natural land features (e.g. caves, ranges etc) that will be impacted by the proposed development?

☐ Yes ✔ No **If yes**, please provide details.

2.5 Coastal Zone Areas (Coastal Dunes and Beaches)

2.5.1 Will the development occur within 300 metres of a coastal area?

(please tick) ☐ Yes **If yes**, complete the rest of this section.

✔ No **If no**, go to the next section.

2.5.2 What is the expected setback of the development from the high tide level and from the primary dune?

2.5.3 Will the development impact on coastal areas with significant landforms including beach ridge plain, cuspate headland, coastal dunes or karst?

☐ Yes ☐ No **If yes**, please describe the extent of the expected impact.

2.5.4 Is the development likely to impact on mangroves?

☐ Yes ☐ No **If yes**, please describe the extent of the expected impact.

2.6 Marine Areas and Biota

2.6.1 Is the development likely to impact on an area of sensitive benthic communities, such as seagrasses, coral reefs or mangroves?

☐ Yes ✔ No **If yes**, please describe the extent of the expected impact.

2.6.2 Is the development likely to impact on marine conservation reserves or areas recommended for reservation (as described in *A Representative Marine Reserve System for Western Australia*, CALM, 1994)?

☐ Yes ✔ No **If yes**, please describe the extent of the expected impact.

2.6.3 Is the development likely to impact on marine areas used extensively for recreation or for commercial fishing activities?

☐ Yes ✔ No **If yes**, please describe the extent of the expected impact, and provide any written advice from relevant agencies (e.g. Fisheries WA).

2.7 Water Supply and Drainage Catchments

2.7.1 Are you in a proclaimed or proposed groundwater or surface water protection area?

(You may need to contact the Department of Water (DoW) for more information on the requirements for your location, including the requirement for licences for water abstraction. Also, refer to the DoW website)

☐ Yes ✔ No **If yes**, please describe what category of area.

2.7.2 Are you in an existing or proposed Underground Water Supply and Pollution Control area?

(You may need to contact the DoW for more information on the requirements for your location, including the requirement for licences for water abstraction. Also, refer to the DoW website)

☐ Yes ✔ No **If yes**, please describe what category of area.

2.7.3 Are you in a Public Drinking Water Supply Area (PDWSA)?

(You may need to contact the DoW for more information or refer to the DoW website. A proposal to clear vegetation within a PDWSA requires approval from DoW.)

☐ Yes ✔ No **If yes**, please describe what category of area.

The site is not within any PDWSAs. The nearest is approximately one kilometre to the east of the Marbellup Brook Catchment Area which is a protected Public Drinking Water Source Area (PDWSA) under the *Country Areas Water Supply Act* (CAWS) *1947* and *Rights in Water and Irrigation Act 1914* (RIWI Act). Due the nature of the proposal and the limited site construction activities required for the installation of the infrastructure it is not anticipated that there will be any impact to the nearby PDWSA through run-off, changes to existing hydrological regimes, or use of water from the local aquifer.

2.7.4 Is there sufficient water available for the proposal?

(Please consult with the DoW as to whether approvals are required to source water as you propose. Where necessary, please provide a letter of intent from the DoW)

✔ Yes ☐ No (please tick)

Water is not required for operation of the plant.

2.7.5 Will the proposal require drainage of the land?

☐ Yes ✔ No **If yes**, how is the site to be drained and will the drainage be connected to an existing Local Authority or Water Corporation drainage system? Please provide details.

2.7.6 Is there a water requirement for the construction and/ or operation of this proposal?

(please tick) ☐ Yes **If yes**, complete the rest of this section.

✔ No **If no**, go to the next section.

2.7.7 What is the water requirement for the construction and operation of this proposal, in kilolitres per year?

2.7.8 What is the proposed source of water for the proposal? (e.g. dam, bore, surface water etc.)

2.8 Pollution

2.8.1 Is there likely to be any discharge of pollutants from this development, such as noise, vibration, gaseous emissions, dust, liquid effluent, solid waste or other pollutants?

(please tick) ✔ Yes — **If yes**, complete the rest of this section.

☐ No — **If no**, go to the next section.

2.8.2 Is the proposal a prescribed premise, under the *Environmental Protection Regulations 1987*?

(Refer to the EPA's *General Guide for Referral of Proposals to the EPA under section 38(1) of the EP Act 1986* for more information)

✔ Yes ☐ No **If yes**, please describe what category of prescribed premise.

Category 52: Electric power generation: premises (other than premises within category 53 or an emergency or standby power generating plant) on which electrical power is generated using a fuel.

2.8.3 Will the proposal result in gaseous emissions to air?

✔ Yes ☐ No **If yes**, please briefly describe.

Key air pollutants including nitrogen dioxide (NO_2), carbon monoxide (CO), hydrocarbon, sulfuret (SO_2) and particulate matter such as PM_{10} and $PM_{2.5}$ will be released (Table 1, 360 Environmental 2013).

POLLUTANT	OUTPUT
Carbon Monoxide (CO)	21.01 kg/ hour of operation
Nitrogen Dioxide (NO_2)	246.03 kg/ hour of operation
Particulate $Matter_{10}$	1.38 kg/ hour
Particulate $Matter_{2.5}$	1.34/ hour
Sulphur Dioxide (SO_2)	0.089 kg/ year

2.8.4 Have you done any modelling or analysis to demonstrate that air quality standards will be met, including consideration of cumulative impacts from other emission sources?

✔ Yes ☐ No **If yes**, please briefly describe.

According to the air quality impact assessment conducted by Synergetics (2013a), the predicted air quality impacts were found to fall below relevant regulatory assessment criteria, indicating that the proposed development is not deemed to exert a negative impact on the surrounding air environment.

2.8.5 Will the proposal result in liquid effluent discharge?

☐ Yes ✔ No **If yes**, please briefly describe the nature, concentrations and receiving environment.

2.8.6 If there is likely to be discharges to a watercourse or marine environment, has any analysis been done to demonstrate that the State Water Quality Management Strategy or other appropriate standards will be able to be met?

☐ Yes ✔ No **If yes**, please describe.

2.8.7 Will the proposal produce or result in solid wastes?

☐ Yes ✔ No **If yes**, please briefly describe the nature, concentrations and disposal location/ method.

Solid waste is expected to be minor and will be dealt with appropriately – e.g. any oily waste from inspections or maintenance will be disposed of via a controlled waste contractor.

2.8.8 Will the proposal result in significant off-site noise emissions?

✔ Yes ☐ No **If yes**, please briefly describe.

Synergetics Pty Ltd undertook an assessment of the noise impact from Tesla on the subject site in Albany (Synergetics 2013b). The total capacity of the proposed power station is 60 MW consisting of 40 x 1.6 MW Caterpillar diesel engines housed in four engine houses each containing ten engines. The engines are expected to run at no more than 500 hours per year. The power station noise was considered in two parts:

- Mechanical noise sourced from the surface of the engines and associated accessories; and
- Exhaust noise.

It was determined that both the engine noise and the exhaust noise will need to be attenuated to assure compliance with noise regulations.

It was calculated that at Albany, an engine house enclosure with a transmission loss of 33 dBA or more will provide sufficient attenuation for the mechanical noise, and a grouped exhaust muffler with an insertion loss of 47 dBA or more will provide sufficient attenuation for the exhaust noise. Tesla will build the plant to meet the *Environmental Protection (Noise) Regulations 1997*.

2.8.9 Will the development be subject to the *Environmental Protection (Noise) Regulations 1997*?

✔ Yes ☐ No **If yes**, has any analysis been carried out to demonstrate that the proposal will comply with the Regulations?

Please attach the analysis.

Synergetics Pty Ltd undertook an assessment of the noise impact from Tesla on the subject site in Kemerton (Synergetics 2013b). For more detailed information please refer to *Lot 5 Down Road, Albany 60 Megawatt Power Station - Proponent Referral* *to the EPA* (360 Environmental 2013). Tesla will build the plant to meet the *Environmental Protection (Noise) Regulations 1997*.

2.8.10 Does the proposal have the potential to generate off-site, air quality impacts, dust, odour or another pollutant that may affect the amenity of residents and other "sensitive premises" such as schools and hospitals (proposals in this category may include intensive agriculture, aquaculture, marinas, mines and quarries etc.)?

☐ Yes ✔ No **If yes**, please describe and provide the distance to residences and other "sensitive premises".

2.8.11 If the proposal has a residential component or involves "sensitive premises", is it located near a land use that may discharge a pollutant?

☐ Yes ☐ No ✔ Not Applicable

If yes, please describe and provide the distance to the potential pollution source

2.9 Greenhouse Gas Emissions

2.9.1 Is this proposal likely to result in substantial greenhouse gas emissions (greater than 100 000 tonnes per annum of carbon dioxide equivalent emissions)?

☐ Yes ✔ No **If yes**, please provide an estimate of the annual gross emissions in absolute and in carbon dioxide equivalent figures.

2.9.2 Further, if yes, please describe proposed measures to minimise emissions, and any sink enhancement actions proposed to offset emissions.

N/A

2.10 Contamination

2.10.1 Has the property on which the proposal is to be located been used in the past for activities which may have caused soil or groundwater contamination?

☐ Yes ✔ No ☐ Unsure **If yes**, please describe.

2.10.2 Has any assessment been done for soil or groundwater contamination on the site?

✔ Yes ☐ No **If yes**, please describe.

MBS Environmental conducted a soil assessment on the site in April 2011.The soil was classified as grey silty gravelly sand with high plasticity. The assessment did not demonstrate any evidence of heavy metal contamination or monocyclic aromatic hydrocarbons or organochlorine pesticides contamination. There was an elevation of concentrations of the heavier hydrocarbons (C15-C28 and C27-C36). These were above the health investigations (HIL) levels for residential and recreational land uses but not above the HILs for industrial land uses.

2.10.3 Has the site been registered as a contaminated site under the *Contaminated Sites Act 2003*? (on finalisation of the CS Regulations and proclamation of the CS Act)

☐ Yes ✔ No **If yes**, please describe.

.

A search of the DEC's Contaminated Sites Database has been undertaken which showed that the site has not been registered as contaminated site under the *Contaminated Sites Act 2003*.

2.11 Social Surroundings

2.11.1 Is the proposal on a property which contains or is near a site of Aboriginal ethnographic or archaeological significance that may be disturbed?

✔ Yes ☐ No ☐ Unsure **If yes**, please describe.

A search of the Aboriginal Heritage Inquiry System indicates there are no registered sites of Aboriginal heritage significance on the site. However, there are two sites within the surrounding area and these are as follows:

- Site 4630 – King River (Camp) – 130 metres north of the site; and
- Site 4632 – Downe Road, Albany (Artefacts/scatter) – 2.14 kilometres nort-east of the site.

There have been no specific surveys over the site but several have been completed in the area.

A search of the Heritage Council of Western Australia database of culturally significant sites in Western Australia was undertaken for the site. There are no reported culturally significant heritage sites on the site (Heritage Council of Western Australia 2011).

No World, Federal or National heritage places are listed as occurring on the site (SEWPAC 2013).

2.11.2 Is the proposal on a property which contains or is near a site of high public interest (e.g. a major recreation area or natural scenic feature)?

☐ Yes ✔ No **If yes**, please describe.

2.11.3 Will the proposal result in or require substantial transport of goods, which may affect the amenity of the local area?

☐ Yes ✔ No **If yes**, please describe.

Transport of bulk goods will only occur during construction. During operation of the site, no substantial transportation of goods will be required.

3. PROPOSED MANAGEMENT

3.1 Principles of Environmental Protection

3.1.1 Have you considered how your project gives attention to the following Principles, as set out in section 4A of the EP Act? (For information on the Principles of Environmental Protection, please see EPA Position Statement No. 7, available on the EPA website)

1. The precautionary principle.	✔ Yes	☐ No
2. The principle of intergenerational equity.	✔ Yes	☐ No
3. The principle of the conservation of biological diversity and ecological integrity.	✔ Yes	☐ No
4. Principles relating to improved valuation, pricing and incentive mechanisms.	✔ Yes	☐ No
5. The principle of waste minimisation.	✔ Yes	☐ No

3.1.2 Is the proposal consistent with the EPA's Environmental Protection Bulletins/Position Statements and Environmental Assessment Guidelines/Guidance Statements (available on the EPA website)?

✔ Yes ☐ No

3.2 Consultation

3.2.1 Has public consultation taken place (such as with other government agencies, community groups or neighbours), or is it intended that consultation shall take place?

✔ Yes ☐ No **If yes**, please list those consulted and attach comments or summarise response on a separate sheet.

On the 23 August 2011, letters were sent to nearby residents outlining the proposal and any comments sought. Comments were captured in a register and responded to by either Tesla directly or by 360 Environmental on behalf of Tesla.

Tesla Albany will keep nearby affected residents and industries informed about the timing and duration of construction activities on site.

Further to this, an initial scoping meeting was held with the Office of the Environment Protection Authority (OEPA) in 2011 and then an update meeting in April 2013. In both meetings, Tesla in conjunction with 360 Environmental introduced the project, its key environmental impacts and proposed management strategies. In the April 2013 meeting, the OEPA indicated that the project may receive a 'Not Assessed' as it can be managed under Part V of the EP Act. However, the OEPA suggested contacting the regional DEC office in Albany to introduce the project prior to lodging any Part V approvals.

After the OEPA meeting, 360 Environmental contacted the regional DEC office in Albany and sent a power point presentation with project overview, background, key environmental factors and proposed management strategies.

Both parties agreed on reconvening once the Part IV referrals have been lodged.

For more detailed information please refer to *Lot 5 Down Road, Albany 60 Megawatt Power Station - Proponent Referral to the EPA* (360 Environmental 2013).

4. REFERENCES

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Synergetics 2013a. *Air quality modelling for the power stations in Kemerton and Albany*, *Western Australia*. Prepared for Tesla Holdings Pty Ltd April 2013.

Synergetics 2013b. *Environmental noise assessment of proposed power stations in Kemerton and Albany*, *Western Australia*. Prepared for Tesla Holdings Pty Ltd May 2013.

Legend

Site Location

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED FROM LANDGATE 2006
- STREET DIRECTORY MAP SOURCED FROM STREETSMART 2008
- AERIAL PHOTOGRAPHY SOURCED FROM LANDGATE 2012
(© Western Australian Land Information Authority 2013)

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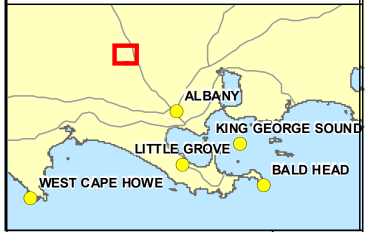
LOCALITY MAP



DRAWING ID			DATE
INF160-2			15/04/2013
HORIZONTAL DATUM AND PROJECTION GDA 1994 MGA Zone 50			
CREATED	CHECKED	APPROVED	REVISION
MRS	JR	FD	0

Tesla Albany Pty Ltd
Lot 5 Down Rd
Albany, WA

60MW Power Station

Figure 1 - Site Location

K:\Projects\2.0 INF\INF060-2 Albany and Kemerton Power Stations\Albany

360 environmental

Lot 5 Down Road, Albany

60 Megawatt Power Station – Proponent's Referral to the Environmental Protection Authority

Prepared for:

Tesla Albany Pty Ltd

June 2013

people • planet • professional

Document Reference	Revision	Prepared by	Reviewed by	Submitted to Client	
				Copies	Date
INF060-02 AC	A CLIENT DRAFT	JR	FD	1 electronic	21/05/13
INF060-02 AC	B CLIENT FINAL	JR	BT	1 electronic	22/05/13
INF060-02 AC	C FINAL TO THE OEPA	JR	FD	1 electronic copy (CD) 1 hard copy	04/06/13

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Executive Summary

Tesla Albany Pty Ltd proposes to construct a 60 megawatt peak load power station (the power station) on a portion of Lot 5 Down Road, Albany. The site is located in the Mirambeena Special Industrial Area approximately 15 kilometres (km) northwest of Albany, Western Australia.

The power station is proposed to provide peak loading capacity into the Western Power South West Interconnected Network as required by the network operator.

The proposed design includes 40 diesel fuelled Caterpillar type 3516B generator sets which are self-bunded. The power station will utilise approximately 15,750 litres (L) of diesel per hour and is to be operated for a maximum of 500 hours per year.

The key environmental factors relevant to the proposal have been identified as the following:

- Air emissions (including dust);
- Hydrocarbon transport, handling and storage; and
- Noise.

Hydrocarbons will be transported to site via main roads, however, as the power station is only to be operated during peak load times, transport will not be required on a regular basis. It is proposed to store 300,000 L of fuel on site which will be stored in safe fill self-bunded tanks in accordance with relevant Australian Standards and licenced as necessary with the Department of Mines and Petroleum. Spill response kits will be available to manage any potential spills and contingency measures will be in place to ensure potential environmental impacts are mitigated.

According to the air quality impact assessment conducted by Synergetics (2013a), the predicted air quality impacts were found to fall below relevant regulatory assessment criteria, indicating that the proposed development is not deemed to exert a negative impact on the surrounding air environment.

Calculations on the noise resulting from the proposed operations in Albany determined that both the engine noise and the exhaust noise will need to be attenuated to ensure compliance with noise regulations. It was calculated that at Albany, an engine house enclosure with a transmission loss of 33 A-weighted decibels (dBA) or more will provide sufficient attenuation for the mechanical noise, and a grouped exhaust muffler with an insertion loss of 47 dBA or more will provide sufficient attenuation for the exhaust noise.

Through implementation of appropriate management measures and operational controls, it is not anticipated that the implementation of this proposal will cause significant environmental impacts.

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1 Introduction

1.1 Overview

Tesla Albany Pty Ltd (Tesla Albany) proposes to construct a 60 megawatt (MW) peak load power station (the power station) on a portion of Lot 5 Down Road, Albany (the site) (Figure 1). The site is located in the Mirambeena Special Industrial Area approximately 15 kilometres (km) northwest of Albany, Western Australia. The power station will be located in the south west corner of Lot 5 (Figure 2).

The power station is required to provide peak loading capacity into the Western Power South West Interconnected Network (SWIN) as required by the network operator.

1.2 Purpose of this Document

The purpose of this document is to identify and assess the key potential environmental impacts associated with the proposal, for both construction and operation phases, and outline Tesla Albany's proposed management measures to avoid or mitigate them.

1.3 Proponent Information

The proponent is Tesla Albany Pty Ltd. The appropriate contact details are provided as follows:

Ben Tan

Chief Executive Officer

Level 3 Exchange House

68 St Georges Terrace

Perth WA 6000

Ph :+61 8 6143 1851

1.4 Report Structure

The remainder of the report comprises the following sections:

- Section 2 – Proposal Description;
- Section 3 – Location and Existing Environment;
- Section 4 – Environmental Impact Assessment and Management Strategy;
- Section 5 – Stakeholder Consultation;
- Section 6 – Summary;
- Section 7 – Limitations; and

- Section 8 – References.

2 Proposal Description

It has been proposed that a power station be constructed on the site with an expected total energy output of 60 MW per year (Table 1). The proposed design includes 40 diesel fuelled Caterpillar type 3516B generator sets which are self-bunded. The proposed site layout is shown in Figure 2. Other important components of the power station are as follows:

- Two bunded transformers (11/132 kV 37.5 MVA);
- 300,000 litre (L) capacity fuel tank(s) (safe fill, self-bunded); and
- Control hut with separate rooms for control.

Table 1. Key Project Characteristics

Element	Description
Project Location	Portion of Lot 5 on Diagram 72145 Down Road Dorne (City of Albany).
Life of Project	30 years.
Power Station Footprint	Approximately 6,630 m^2.
Nominal Configuration	40 x self-bunded diesel fuelled Caterpillar type 3516B generator sets.
Hydrocarbon storage	300,000 L in safe fill, self-bunded diesel fuel tank(s).
Operating Hours	Maximum 500 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
Inputs	
Nominal fuel (diesel) consumption	15,750 L per hour.
Approximate expected distillate demand	800,000 L per annum.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.
Outputs (500 hours per year)	
Nominal Power Output	60 MW
Carbon Monoxide (CO)	21.01 kg/ hour of operation
Nitrogen Dioxide (NO_2)	246.03 kg/ hour of operation
Particulate $Matter_{10}$	1.38 kg/ hour
Particulate $Matter_{2.5}$	1.34
Sulphur Dioxide (SO_2)	0.089 kg/ year
Noise at site boundary (Sound Pressure Level)	100.1 dBA
Noise at nearest sensitive premise (Sound Pressure Level)	90.9 dBA

The full functional design specification of the power plant is outlined in Appendix A.

2.1 Site Selection

As a result of the site selection process, this site was chosen due to its low environmental values. The site is located within a heavy industrial park, has already been cleared, and there is a sufficient distance between the site and any nearby sensitive receptors. A site visit was undertaken by two qualified environmental scientists from 360 Environmental on the 18th August 2011.

2.2 Water Supply/Resources

The site is connected to the Lower Great Southern Town Water Supply Scheme water and this will be utilised on site when required. Generally, no water will be required during operation. Small volumes may be necessary for equipment wash-down and in the event of an emergency.

2.3 Schedule

Construction will start once all necessary approvals and permits have been required and it is anticipated that commissioning would occur in mid-2016. There will be a commissioning period which includes the installation and testing of the full load of the proposed power station to ensure proposed management is appropriate and the power station is functionally operational. Operation will start post commissioning phase.

3 Location and Existing Environment

3.1 Location and Surrounding Land Use

The site is located on Lot 5 on Down Road, Albany. The site is located within the Mirambeena Industrial Park. The site is zoned as 'Noxious Industry' under the City of Albany Planning Scheme No. 3 (Western Australian Planning Commission [WAPC] 2011). The area surrounding the site to the north and south is zoned 'Special Use – Various'. The areas to the east and west are zoned 'Rural'. The nearest sensitive receptor which is a residential dwelling is approximately 1.5 km to the east (Figure 3). The site is owned by LandCorp who have given Tesla Albany permission to use the site (Appendix B).

3.2 Climate

The closest official Bureau of Meteorology (BoM) weather station which is still currently operating and has been operating for a sufficient period is at Albany Airport, where climate data is available between 1942 and July 2011 (BoM 2011). Recorded climatic data is summarised in Table 2.

Table 2. Average Weather Data from Albany Airport Weather Station

PARAMETER	RESULTS
Mean daily maximum temperature December	23.1 °C
Mean daily maximum temperature July	15.8 °C
Mean daily minimum temperature December	12.5 °C
Mean daily minimum temperature July	7.5 °C
Annual average rainfall	794.0 mm
Mean annual rain days (greater than 1 millimetre)	82.8 days

3.3 Landform and Soils

3.3.1 Topography

The site is relatively flat at 70 metres (m) Australian Height Datum (AHD) (Figure 4).

3.3.2 Geology and Soils

The soils have been classified as broadly undulating plateau with scattered lakes and depressions with yellow duplex soils and laterite on plains (Department of Agriculture and Food (DAF) 2011) (Figure 4). During the site visit it was noted that lateritic rock was present on the site.

MBS Environmental conducted a soil assessment on the site in April 2011 (Appendix C).The soil was classified as grey silty gravelly sand with high plasticity. The assessment did not demonstrate any evidence of heavy metal contamination or monocyclic aromatic hydrocarbons or organochlorine pesticides contamination. There was an elevation of concentrations of the heavier hydrocarbons (C_{15}-C_{28} and C_{27}-C_{36}). These were above the health investigations (HIL) levels for residential and recreational land uses but not above the HILs for industrial land uses.

3.3.3 Acid Sulfate Soils

The site has been classified as having no known Acid Sulfate Soils (ASS) risk in the first 0.75 m from the surface however the soil under this has been recorded as Potential Acid Sulfate Soils (PASS) (MBS Environmental 2011) (Appendix C).

If the excavation for the construction of the power station goes below this level ASS testing will be undertaken. If ASS are present a site specific ASS management plan will be created. This management plan would include management and treatment of the soils including any stockpiles soils.

3.4 Surface Water

There are no watercourses present on the site but there are several in the surrounding area (Figure 5).

There are no Ramsar wetlands or Nationally Important Wetlands on or adjacent to the site (Department of Sustainability, Environment, Water, Population and Communities SEWPAC) 2011). During the site visit it was observed there is water inundation present on the surface (Plate 1). There were also several soaks and watering stations present on the site (Plates 3 to 4). This waterlogging will be managed through the design and landscaping of the site and will not impact upon the project.

3.5 Groundwater

A search of the Department of Water's (DoW) *Water Information System* (WIN) database for groundwater bores within a three kilometres radius of the site has been undertaken (Appendix D) (Figure 6). The search indicates that there are two groundwater bores located within a one km radius of the site. These bores has been utilised for livestock and domestic or household uses. It is not known what date these were constructed or if they are still operational. There is no groundwater chemistry data available.

The site is not within a Public Drinking Water Source Area (PDWSA). The nearest is approximately one kilometre to the west, the Marbellup Brook Catchment Area which is protected under the *Country Areas Water Supply Act* (CAWS) 1947 and *Rights in Water and Irrigation Act* 1914 (RIWI Act) (Figure 6). Due the nature of the proposal and the limited site construction activities required for the installation of the infrastructure, it is not anticipated that there will be any impact to the nearby PDWSA through run-off, changes to existing hydrological regimes, or use of water from the local aquifer.

3.6 Flora and Vegetation

Searches of the DEC's *Naturemap* database (2013) and SEWPAC's (2013) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) *Protected Matters Search Tool* were undertaken to identify the potential conservation significant species to exist within five kilometres of the site (Appendix E). The search results indicated there are no known occurrences of Declared Rare Flora (DRF) or Priority Flora on the site (Figure 7). Seven endangered plant species (or their habitat) are recorded as 'likely to occur within the area' and are listed in Table 3.

Table 3. Flora Species Potentially Occurring within Five Kilometres of the Site.

Species	Common Name	Federal	State	
		EPBC Act	WC Act	DEC Priority
Andersonia jamesii				Priority 4
Banksia brownii	Brown's Banksia, Feather-leaved Banksia	Endangered	DRF	Threatened
Banksia goodii	Good's Banksia	Vulnerable	DRF	
Banksia serra				Priority 4
Boronia crassipes				Priority 3
Centrolepis caespitosa		Endangered		Priority 4
Chordifex abortivus	Manypeaks Rush	Endangered	DRF	Threatened
Conostylis misera	Grass Conostylis	Endangered	DRF	Threatened
Drakaea elastica	Glossy-leaved Hammer-orchid, Praying Virgin	Endangered	DRF	Threatened
Drosera fimbriata	Manypeaks Sundew			
Gastrolobium ferrugineum				Priority 2
Isopogon uncinatus	Hook-leaf Isopogon	Endangered	DRF	Threatened
Laxmannia jamesii				Priority 4
Lysinema lasianthum				Priority 4
Synaphea incurva				Priority 1
Usnea pulvinata				Priority 1

The site has been predominately cleared for agriculture in the past and there is currently very limited vegetation on site. It was noted during the site visit that the site is predominately covered in weeds; however, there is a small patch of Marri and Jarrah trees. There is no understory present (Plates 5 and 6). There is also native vegetation present along the southern boundary of the site (Plates 7 and 8).

It is unlikely that any of these species are present on site and as the proposed development does not involve clearing, it is unlikely to impact any threatened or priority flora species.

A search of the DEC's *Threatened Ecological Community* (TEC) *database* (2011b) indicates there are no TECs or Priority Ecological Communities (PEC) known to exist on the site; however, the following are found within five kilometres of the site (Figure 7).

- *Banksia coccinea* thicket (*Banksia coccinea* Shrubland/*Eucalyptus staeri*/Sheoak Open Woodland)

A search of SEWPAC's (2013) EPBC Act *Protected Matters Search Tool* was undertaken and identified there are no TEC listed under the EPBC Act within three kilometres of the site (Appendix E).

Thus, it is unlikely that the proposed development will impact any TECs or PECs.

3.7 Fauna

A search of the DEC's *Naturemap* database (2013) and SEWPAC's (2013) *Protected Matters Search Tool* was undertaken to identify the potential for conservation significant Fauna species to exist within five kilometres of the site (Appendix E). The search results indicated there are no known occurrences of Threatened Fauna on the site; however, the species listed below are known to exist within five kilometres of the site (Figure 8). Further, one Critically Endangered, one Endangered, five Vulnerable and one Marine and Migratory species listed under the EPBC Act were identified as potentially occurring on the site (Appendix E) and are listed in Table 4.

Table 4. Fauna Species Potentially Occurring within Five Kilometres of the Site.

Species	Common Name	Federal	State	
		EPBC Act	WC Act	DEC Priority
Atrichornis clamosus	Noisy Scrub-bird	Vulnerable	Schedule 1	
Botaurus poiciloptilus	Australasian Bittern		Schedule 1	
Calyptorhynchus banksii subsp. naso	Forest Red-tailed Black-Cockatoo		Schedule 1	
Calyptorhynchus baudinii	Baudin's Cockatoo		Schedule 1	
Calyptorhynchus latirostris	Carnaby's Black Cockatoo	Endangered	Schedule 1	
Dasyurus geoffroii	Western Quoll	Vulnerable	Schedule 1	
Falco peregrinus	Peregrine Falcon		Schedule 4	
Galaxiella munda	Western Mud Minnow		Schedule 1	
Galaxias truttaceus hesperius	Spotted Galaxias (western subspecies), Western Spotted Galaxias, Western Trout Galaxias		Schedule 1	
Hydromys chrysogaster	Water-rat	Critically Endangered		Priority 4
Isoodon obesulus subsp. fusciventer	Southern Brown Bandicoot			Priority 5
Leipoa ocellata	Malleefowl	Vulnerable	Schedule 1	
Merops ornatus	Rainbow-Bee-eater	Marine and Migratory	Schedule 4	
Numenius madagascariensis	Eastern Curlew		Schedule 1	
Phascogale tapoatafa subsp. ssp. (WAM M434)	Brush-tailed Phascogale		Schedule 1	
Pseudocheirus occidentalis	Western Ringtail Possum	Vulnerable	Schedule 1	
Setonix brachyurus	Quokka	Vulnerable	Schedule 1	

It is unlikely that any protected species occur within the site as the area has been predominately cleared.

3.8 Conservation Areas

There are no Environmentally Sensitive Areas (ESA), Regional Parks or National Parks on or adjacent to the site. The nearest conservation areas are several ESAs which are located approximately three kilometres to the northeast of the site (Figure 8). The Marbellup Nature Reserve is located approximately two kilometres to the south of the site. There are unlikely to be any specific wetland or conservation area related management measures required due to the separation distance between the proposed footprint and these assets.

3.9 Heritage

In Western Australia, the *Aboriginal Heritage Act 1972* protects places and objects customarily used by, or traditional to, the original inhabitants of Australia. A register of such places and objects is maintained under the Act, however, all sites are protected under the Act whether they have been registered or not.

A search of the Aboriginal Heritage Inquiry System indicates there are no registered sites of Aboriginal heritage significance on the site (Figure 9) (Department of Indigenous Affairs (DIA) 2011) (Appendix F). There are two sites within the surrounding area and these are as follows:

- Site 4630 – King River (Camp); and
- Site 4632 – Downe Road, Albany (Artefacts/scatter).

There have been no specific surveys over the site but several have been completed in the area (DIA 2011) (Appendix F).

Although no Aboriginal heritage sites of significance are recorded as occurring on the site, if any heritage sites are found, approval under Section 18 of the *Aboriginal Heritage Act* 1972 will be required to disturb the sites.

A search of the *Heritage Council of Western Australia* database of culturally significant sites in Western Australia was undertaken for the site. There are no reported culturally significant heritage sites on the site (Heritage Council of Western Australia 2011).

No World, Federal or National heritage places are listed as occurring on the site (SEWPAC 2013).

4 Environmental Impact Assessment and Management Strategy

4.1 Overview

The following environmental factors are considered to be the key factors associated with the proposal:

- Hydrocarbon transport, handling and storage;
- Air emissions (including dust); and
- Noise.

These environmental factors are discussed in more detail below, together with proposed management actions.

4.2 Principles of Environmental Protection

Tesla Albany will adopt the principles of environmental protection outlined in section 4A of the *Environmental Protection Act 1986* and expanded upon on in the Environmental Protection Authority (EPA) Guidance Statement No 33 *Environmental Guidance for Planning and Development* (2008). These principles are as follows:

- Precautionary Principle - where serious or irreversible (environmental) damage is likely to occur, actions to take measures to prevent the environmental degradation should not be postponed due to lack of scientific uncertainty. If there is an uncertainty, the action should be conservative in favour of preventing realisation of the risk;
- Principle of Intergenerational Equity - the project should not compromise the health, diversity and productivity of the environment for future generations;
- Principle of the Conservation of Biological Diversity and Ecological Integrity - decisionmakers should not knowingly reduce biodiversity and integrity unless it is completely unavoidable. Conservation where possible through offsetting the impacts is expected; and
- Principle of Waste Minimisation - the project should minimise waste generation and its discharge to the environment by exploring the waste hierarchy (prevent, minimise, reuse, recycle) for waste generation and disposal.

Table 5 shows how consideration has been given to the principles of environmental protection within the project.

Table 5. Principles of Environmental Protection as Related to the Project

PRINCIPLES OF ENVIRONMENTAL PROTECTION	RELEVANT (YES/NO)	IF YES, CONSIDERATION AFFORDED
The Precautionary Principle Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In application of this precautionary principle, decisions should be guided by: (a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and (b) an assessment of the risk – weighted consequences of various options.	Yes	Site selection was undertaken to avoid, as far as practicable, harm to environmental values. This was achieved by selecting an already cleared site in an industrial area. Mitigation measures have been proposed as well as opportunities for environmental offsets, as a last resort.
Principle of Intergenerational Equity The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.	Yes	Due to the already degraded nature and location of the site, impacts are expected to be minimal. The site is located in a state defined heavy industrial estate and has significant buffer zones surrounding the region. Therefore it is highly unlikely that future generations will be disadvantaged.
Principle of the Conservation of Biological Diversity and Ecological Integrity. Conservation of biological diversity and ecological integrity should be a fundamental consideration.	Yes	Site selection was undertaken to avoid, as far as practicable, harm to environmental values. This was achieved by selecting an already cleared site in an industrial area. The biodiversity and ecological integrity of the potentially impacted region will be maintained.
Principle of Waste Minimisation All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.	Yes	The project is expected to generate minimal wastes. Wastes will be managed with consideration of the waste hierarchy.

4.3 Air Quality (Including Dust)

4.3.1 Background

According to the air quality impact assessment conducted by Synergetics (2013a), the predicted air quality impacts were found to fall below relevant regulatory assessment criteria, indicating that the proposed development is not deemed to exert a negative impact on the surrounding air environment (Appendix G).

The modelled ground level concentrations (GLCs) at the various receptors were presented and compared against the relevant assessment criteria. A 'compliance factor' (CF) was also reported as the ratio of the guideline value and the calculated GLC. A value of CF < 1 indicates the calculated GLC is higher than the guideline value whereas a value ≥ 1 indicates the calculated GLC is equal to or below the guideline value. The CF allows an immediate assessment of the potential for the facility to exceed guideline GLC values.

All modelled GLCs at the discrete modelling receptors are presented in Appendix G. Also included are the GLCs at the nearest residential receptor. All GLCs for each of the proposed power stations were below relevant assessment criteria.

4.3.2 Management Objectives

The management objectives for air quality for this project are as follows:

- Best practice is applied to maximise energy efficiency and minimise emissions;
- To ensure that air emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards;
- There is an ongoing program to monitor and report emissions and periodically access opportunities to further reduce greenhouse gas emissions over time; and
- Surrounding land users are protected such that dust will not adversely impact upon welfare and amenity during construction.

4.3.3 Potential Impacts

Potential impacts associated with the installation and operation of the power station includes reduction of local air quality due to:

- Increased atmospheric carbon dioxide concentration; and
- Release of key air pollutants including nitrogen dioxide (NO_2), carbon monoxide (CO), hydrocarbon, sulfuret (SO_2) and particulate matter such as PM_{10} and $PM_{2.5}$.

The major concern with air pollution is the release of greenhouse gases.

Air emissions can also have impacts on air quality and human health if not properly monitored.

Dust generated by construction, if deposited on adjacent native vegetation has the potential to disrupt the photosynthetic, respiratory and/or water balance processes of plants, thereby causing mortality or decreased health and increased susceptibility to disease. Dust can also have impacts on air quality and human health if not properly monitored.

4.3.4 Proposed Management Strategies

Management measures to reduce any potential air emissions include the following:

- Generators will be maintained and serviced regularly to ensure all machinery is running at its most efficient and optimal to minimise emissions;
- Regular checks on vehicles and machinery/equipment;
- Replacement and report on machinery/equipment will occur if not meeting air quality controls; and
- Ensuring machinery on site are properly maintained and serviced in accordance with manufacturer's specifications to minimise potential unacceptable air quality emissions.

Periodic monitoring will be implemented to confirm success of the management measures.

The management strategies to reduce dust during construction and the need for dust suppression include:

- Vehicle access will be restricted and vehicles must remain on designated access tracks and parking areas, at controlled vehicle speeds;
- Compacted or cleared areas will be stabilised. The extent of exposed surfaces such as stockpiles and cleared areas (e.g. during construction), and the duration of which these areas are exposed, will be minimised;
- Maintaining general housekeeping practices to ensure there is no accumulation of waste or loose materials that may generate dust;
- Using water trucks/water cannons during construction activities to dampen areas identified as being potentially dust generating. Frequency will be determined by the Contractor based on weather conditions;
- The site will be covered in blue metal to reduce any potential for dust generation;
- Cease works until remedial actions can be implemented if dust emissions are considered significant;

- Ensuring machinery on site is properly maintained in accordance with manufacturer's specifications (especially any dust suppression systems) to minimise potential for dust generation; and
- All staff to be inducted on dust control measures of the power station.

Where dust reduction is not possible dust suppression will be undertaken by water spray.

If any complaints are made with regards to dust the management measures will be reviewed to see if any improvements can be made.

Regular monitoring is not necessary for dust control. If visible plumes of dust are being generated and they are visible to off-site neighbours/community work will cease. The site manager must be informed and provide permission to recommence work once remedial actions have been undertaken. During operation, no dust is expected.

4.3.5 Predicted Outcome

Given these management strategies, the short duration of construction and operation at below air quality standards, it is predicted that there will be no significant impact to the local air quality.

4.4 Hazardous Materials Management

4.4.1 Background

The most significant hazardous material to be stored and utilised at the site is hydrocarbon (diesel fuel). The on-site storage of hydrocarbons is proposed to be a maximum of 300,000 L in safe fill, self-bunded tanks. At full load the power station will use approximately 15,750 L of diesel per hour. No other significant amounts of chemicals will be stored on site.

Transport of the hazardous materials will occur on an as needs basis via main roads. The transport is not expected to cause significant traffic impacts, or reduction in amenity to nearby land users, as the power station is only to be operational during peak loading times and as such will not demand constant delivery of these materials.

4.4.2 Management Objectives

The management objective for the management of hazardous materials is to ensure there is no contamination on the site as a result of construction and operation.

4.4.3 Potential Impacts

If inappropriately managed, the transport, handling, storage and use of hazardous materials (including potential leaks and spills) and the disposal of associated waste streams have the potential to:

- Degrade the environment through the contamination of soil, groundwater and surface waters;
- Create risk to human safety or health, potentially resulting in injury or spread of disease; and
- Reduce the amenity of an area due to visual and odorous impacts.

4.4.4 Proposed Management Strategies

To manage hazardous materials at the site the following measures will be in place:

- All hydrocarbons will be contained in standard storage fuel tanks located in a bunded area, in double skinned, self-bunded fuel tanks or in portable bunds. All storage will be in accordance with the Australian Standards AS1940 and AS1692 and an appropriate licence from the Department of Mines and Petroleum;
- Any significant leakage or spill into a bunded area will be collected by an appropriate waste removal company;
- Spill response kits, and instructions for their use, will be located adjacent to bunded areas;
- Generator bunds are to be covered so as not to collect rainfall; and
- Bunds will be maintained as part of the site maintenance schedule.

In the unlikely event of an accidental spill of hazardous materials, the excess materials will be collected using a spill response kit. Any contaminated soils will be immediately excavated, removed from site and disposed at an appropriately licenced facility. All spills will be reported through an incident reporting procedure and reporting to the DEC will occur as necessary.

4.4.5 Predicted Outcome

With these management strategies in place, the risk of environmental impacts is considered to be a low.

4.5 Noise

4.5.1 Background

Synergetics Pty Ltd undertook an assessment of the noise impact from Tesla on the subject site in Albany (Synergetics 2013b). The total capacity of the proposed power station is 60 MW, consisting of 40 x 1.6 MW Caterpillar diesel engines housed in four engine houses each containing ten engines. The engines are expected to run at no more than 500 hours per year.

The power station noise was considered in two parts:

- Mechanical noise sourced from the surface of the engines and associated accessories; and
- Exhaust noise.

Calculations on the noise resulting from the proposed operations in Albany quantified the level of muffler insertion loss and engine enclosure transmission loss required to meet the assessment criteria.

It was determined that both the engine noise and the exhaust noise will need to be attenuated to assure compliance with noise regulations.

It was calculated that at Albany, an engine house enclosure with a transmission loss of 33 dBA or more will provide sufficient attenuation for the mechanical noise, and a grouped exhaust muffler with an insertion loss of 47 dBA or more will provide sufficient attenuation for the exhaust noise (Appendix H).

4.5.2 Management Objectives

The management objectives in regards to noise are as follows:

- Compliance with any statutory requirements and acceptable standards in relation to noise to protect the amenity of the community; and
- To avoid unacceptable adverse impacts on the natural environment, including native fauna.

4.5.3 Potential Impacts

If noise levels are not managed efficiently, they may impact on the surrounding land users. Following implementation of the engine and exhaust noise controls, it was calculated that the power station will comply with boundary noise requirements and hence the requirements of the *Environmental Protection (Noise) Regulations (EPR) 1997* (WAEPA 1997a) will be satisfied.

4.5.4 Proposed Management Strategies

To manage noise levels the following strategies will be in place:

- All machinery and equipment shall be fitted with the appropriate noise control equipment where necessary;
- Regular checks on vehicles and machinery/equipment;
- Replacement and repair on machinery/equipment will occur if not meeting noise control requirements;
- Adherence with the *Environmental Protection (Noise) Regulations 1997;*
- During construction known noisy activities will not occur outside the hours of 7am until 6pm weekdays;

- All staff to be inducted on noise control measures of the power station;
- Generator sets will be housed in noise attenuating enclosures;
- The acoustic equipment including engine exhaust muffler, acoustic louves and ventilation fan are designed and manufactured to meet the acoustic requirements of the installation equipment; and
- Property boundary noise level will not exceed legislated levels measured at the fence line.

If any complaints are made with regards to noise the management measures will be reviewed to see if any improvements can be made.

4.5.5 Predicted Outcome

Due to the location of the power plant within an industrial area, the short duration of construction and operation and as compliance with the regulatory standards will be achieved, the environmental risk is believed to be small.

4.6 Summary of Environmental Factors and Management

Table 6 provides a summary of the environmental factors and management for the project.

Table 6. Summary of Environmental Factors and Management

Management Objective(s)	Background	Potential Impact	Proposed Environmental Management	Predicted Outcome(s)
Air Quality (including Dust)				
Best practice is applied to maximise energy efficiency and minimise emissions. To ensure that air emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards. There is an ongoing program to monitor and report emissions and periodically access opportunities to further reduce greenhouse gas emissions over time. Surrounding land users are protected such that dust will not adversely impact upon welfare and amenity during construction.	According to the air quality impact assessment conducted by Synergetics (2013a), the predicted air quality impacts were found to fall below relevant regulatory assessment criteria, indicating that the proposed development is not deemed to exert a negative impact on the surrounding air environment.	Increased atmospheric carbon dioxide concentration. Release of key air pollutants including nitrogen dioxide (NO_2), carbon monoxide (CO), hydrocarbon, sulfuret (SO_2) and particulate matter. If dust is deposited on adjacent native vegetation has the potential to disrupt the photosynthetic, respiratory and/or water balance processes of plants, thereby causing mortality or decreased health and increased susceptibility to disease. Dust can also have impacts on air quality and human health if not properly monitored.	Generators will be maintained and serviced regularly to ensure all machinery is running at its most efficient and optimal to minimise emissions. Regular checks on vehicles and machinery/equipment. Replacement and report on machinery/equipment will occur if not meeting air quality controls. Ensuring machinery on site are properly maintained and serviced in accordance with manufacturer's specifications to minimise potential unacceptable air quality emissions. Periodic monitoring will be implemented to confirm success of the management measures. Vehicle access will be restricted and vehicles must remain on designated access tracks and parking areas, at controlled vehicle speeds. Compacted or cleared areas will be stabilised. Extent of exposed surfaces such as stockpiles and cleared areas, and the duration of which these areas are exposed, will be minimised. Maintaining general housekeeping practices to ensure there is no accumulation of waste or loose materials that may generate dust. Using water trucks/water cannons during construction activities to dampen areas identified as being potentially dust generating. Frequency will be determined by the Contractor based on weather conditions. The site will be covered in blue metal to reduce any potential for dust generation. Cease works until remedial actions can be implemented if dust emissions are considered significant. Ensuring machinery on site is properly maintained in accordance with manufacturer's specifications (especially any dust suppression systems) to minimise potential for dust generation.	With these management strategies, the short duration of operation and as the power station will be operating at below air quality standards it is predicted that there will be no significant impact to the local air quality.

Management Objective(s)	Background	Potential Impact	Proposed Environmental Management	Predicted Outcome(s)
			All staff to be inducted on dust control measures of the power station. Where dust reduction is not possible dust suppression will be undertaken by water spray. If any complaints are made with regards to dust the management measures will be reviewed to see if any improvements can be made. Regular monitoring is not necessary for dust control. If visible plumes of dust are being generated and they are visible to off-site neighbours/community work will cease. The site manager must be informed and provide permission to recommence work once remedial actions have been undertaken.	
Hazardous Materials (e.g. Hydrocarbons)				
The management objective for the management of hazardous materials is to ensure there is no contamination on the site as a result of construction and operation.	The most significant hazardous material to be stored and utilised at the site is hydrocarbons (diesel fuel). The on-site storage of hydrocarbons is proposed to be a maximum of 300,000L in safe fill, self-bunded tanks.	Degrade the environment through the contamination of soil, groundwater and surface waters. Create risk to human safety or health, potentially resulting in injury or spread of disease. Reduce the amenity of an area due to visual and odorous impacts.	All hydrocarbons will be contained in standard storage fuel tanks located in a bunded area, in double skinned, self-bunded fuel tanks or in portable bunds. All storage will be in accordance with the Australia Standards AS1940 and AS1692 and an appropriate licence from the Department of Mines and Petroleum. Any significant leakage or spill into a bunded area will be collected by an appropriate waste removal company. Spill response kits, and instructions for their use, will be located adjacent to bunded areas. Generator bunds are to be covered so as not to collect rainfall. Bunds will be maintained as part of the site maintenance schedule. In the unlikely event of an accidental spill of hazardous materials, the excess materials will be collected using a spill response kit. Any contaminated soils will be immediately excavated, removed from site and disposed at an appropriately licenced facility. All spills will be reported through an incident reporting procedure and reporting to the DEC will occur as necessary.	
Noise				
Compliance with any statutory requirements and acceptable standards in relation to noise to protect the amenity of the community	The power station noise was considered in two parts:	If noise levels are not managed efficiently they may impact on the surrounding land users.	All machinery and equipment shall be fitted with the appropriate noise control equipment where necessary.	Due to the location of the power plant within an industrial area, the short operating duration and as

Management Objective(s)	Background	Potential Impact	Proposed Environmental Management	Predicted Outcome(s)
To avoid unacceptable adverse impacts on the natural environment, including native fauna.	• Mechanical noise sourced from the surface of the engines and associated accessories; and • Exhaust noise. Calculations on the noise resulting from the proposed operations in Albany quantified the level of muffler insertion loss and engine enclosure transmission loss required to meet the assessment criteria. It was determined that both the engine noise and the exhaust noise will need to be attenuated to assure compliance with noise regulations. It was calculated that at Albany, an engine house enclosure with a transmission loss of 33 dBA or more will provide sufficient attenuation for the mechanical noise, and a grouped exhaust muffler with an insertion loss of 47 dBA or more will provide sufficient attenuation for the exhaust noise.		Regular checks on vehicles and machinery/equipment. Replacement and repair on machinery/equipment will occur if not meeting noise control requirements. Adherence with the *Environmental Protection (Noise) Regulations 1997*. During construction known noisy activities will not occur outside the hours of 7am until 6pm weekdays. All staff to be inducted on noise control measures of the power station. Generator sets will be housed in noise attenuating enclosures. The acoustic equipment including engine exhaust muffler, acoustic louves and ventilation fan are designed and manufactured to meet the acoustic requirements of the installation equipment. Property boundary noise level will not exceed legislative requirements measured at the fence line. If any complaints are made with regards to noise, the management measures will be reviewed to see if any improvements can be made.	compliance with the regulatory standards will be achieved the environmental risk is believe to be small.

5 Stakeholder Consultation

5.1 Objectives

The purpose of undertaking stakeholder consultation was to achieve the following objectives:

- To provide information about the project and to tap stakeholder information on key environmental and social baseline information in the project area;
- To provide opportunities to stakeholders to discuss their opinions and concerns;
- To manage expectations and misconceptions regarding the project;
- To discuss potential impacts and verify significant or major environmental, social and health impacts identified; and
- To inform the process of developing appropriate mitigation and management measures for effective implementation.

5.2 Strategy

On the 23 August 2011, letters were sent to nearby residents outlining the proposal and any comments sought (Appendix I). Comments were captured in a register and responded to by either Tesla directly or by 360 Environmental on behalf of Tesla.

Tesla Albany will keep nearby affected residents and industries informed about the timing and duration of construction activities on site.

Further to this, an initial scoping meeting was held with the Office of the Environment Protection Authority (OEPA) in 2011 and then an update meeting in April 2013. In both meetings, Tesla in conjunction with 360 Environmental introduced the project, its key environmental impacts and proposed management strategies. In the April 2013 meeting, the OEPA was confident that the project would receive a 'Not Assessed' as it can be managed under Part V of the EP Act. However, the OEPA suggested contacting the regional DEC office in Albany to introduce the project prior to lodging any Part V approvals.

After the OEPA meeting, 360 Environmental contacted the regional DEC office in Albany and sent a power point presentation with project overview, background, key environmental factors and proposed management strategies.

Both parties agreed on reconvening once the Part IV referrals have been lodged.

An overview of all key stakeholders is presented in Table 7.

Table 7. Key Stakeholders

STAKEHOLDER	DATE OF CONSULTATION
Office of Environment Protection Authority	Mid-2011 16 April 2013
Department of Environment and Conservation	18 April 2013
Members of the Community	23 August 2011 and ongoing

5.3 Outcomes

There were four responses from the community in response to the letters. A summary of their comments is provided in Table 9 below.

Table 8. Summary of Landowner Comments

LANDOWNER	COMMENTS	HOW RECEIVED	ACTION
Louise Balgrove - Down Road - Albany	Qu) Is the plant only going to be used for hours per year, that seems like a lot of effort for something that won't be on much. A) Yes, it is a peak loading power station so only required to be used when the system needs a boost	Phone call - 29 August 2010	No follow up required.
Peter Eades - Lot 12 Redmond Road, Albany WA 6330 (9845 3080)	Opposed to anything that will make noise as he already has noise issues from the wood chip mill. See letter.	Letter (via fax) - 29 August 2011	Write a letter back explaining the noise modelling and the level that will be received at his property.
Email from Luke Gatti	Wanted to know why he hasn't received a letter yet about the proposal. A) we are still checking how to proceed with consultation for crown lots and so are yet to send him a letter.	Email - 30/8/11	Responded via email on 7/9/11 to say that we will be in touch with him once we have liaised with EPA about how to correspond with crown land tenants

LANDOWNER	COMMENTS	HOW RECEIVED	ACTION
			and/or owners.
Phone call from Lindsay Black	Wanted to know how the power lines connected up to the system. A) They will run down Down road to meet up with the existing lines.	Phoned in - 31 August 2011	360 Environmental got in touch with him via phone.

6 Summary

Tesla Albany Pty Ltd proposes to construct a 60 megawatt peak load power station (the power station) on a portion of Lot 5 Down Road, Albany. The site is located in the Mirambeena Special Industrial Area approximately 15 km northwest of Albany, Western Australia.

The power station is proposed to provide peak loading capacity into the Western Power South West Interconnected Network as required by the network operator.

The proposed design includes 40 diesel fuelled Caterpillar type 3516B generator sets which are self-bunded. The power station will utilise approximately 15,750 L of diesel per hour and is to be operated for a maximum of 500 hours per year.

The key environmental factors relevant to the proposal have been identified as the following:

- Air emissions (including dust);
- Hydrocarbon transport, handling and storage; and
- Noise.

Hydrocarbons will be transported to site via main roads, however, as the power station is only to be operated during peak load times, transport will not be required on a regular basis. It is proposed to store 300,000 L of fuel on site which will be stored in safe fill self-bunded tanks in accordance with relevant Australian Standards and licenced as necessary with the Department of Mines and Petroleum. Spill response kits will be available to manage any potential spills and contingency measures will be in place to ensure potential environmental impacts are mitigated.

According to the air quality impact assessment conducted by Synergetics (2013a), the predicted air quality impacts were found to fall below relevant regulatory assessment criteria, indicating that the proposed development is not deemed to exert a negative impact on the surrounding air environment.

Calculations on the noise resulting from the proposed operations in Albany determined that both the engine noise and the exhaust noise will need to be attenuated to ensure compliance with noise regulations. It was calculated that at Albany, an engine house enclosure with a transmission loss of 33 dBA or more will provide sufficient attenuation for the mechanical noise, and a grouped exhaust muffler with an insertion loss of 47 dBA or more will provide sufficient attenuation for the exhaust noise.

Through implementation of appropriate management measures and operational controls, it is not anticipated that the implementation of this proposal will cause significant environmental impacts.

7 Limitations

This report is produced strictly in accordance with the scope of services set out in the contract or otherwise agreed in accordance with the contract. 360 Environmental makes no representations or warranties in relation to the nature and quality of soil and water other than the visual observation and analytical data in this report.

In the preparation of this report, 360 Environmental has relied upon documents, information, data and analyses ("client's information") provided by the client and other individuals and entities. In most cases where client's information has been relied upon, such reliance has been indicated in this report. Unless expressly set out in this report, 360 Environmental has not verified that the client's information is accurate, exhaustive or current and the validity and accuracy of any aspect of the report including, or based upon, any part of the client's information is contingent upon the accuracy, exhaustiveness and currency of the client's information. 360 Environmental shall not be liable to the client or any other person in connection with any invalid or inaccurate aspect of this report where that invalidity or inaccuracy arose because the client's information was not accurate, exhaustive and current or arose because of any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to 360 Environmental.

Aspects of this report, including the opinions, conclusions and recommendations it contains, are based on the results of the investigation, sampling and testing set out in the contract and otherwise in accordance with normal practices and standards. The investigation, sampling and testing are designed to produce results that represent a reasonable interpretation of the general conditions of the site that is the subject of this report. However, due to the characteristics of the site, including natural variations in site conditions, the results of the investigation, sampling and testing may not accurately represent the actual state of the whole site at all points.

It is important to recognise that site conditions, including the extent and concentration of contaminants, can change with time. This is particularly relevant if this report, including the data, opinions, conclusions and recommendations it contains, are to be used a considerable time after it was prepared. In these circumstances, further investigation of the site may be necessary.

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FIGURES

Legend

Site Location

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
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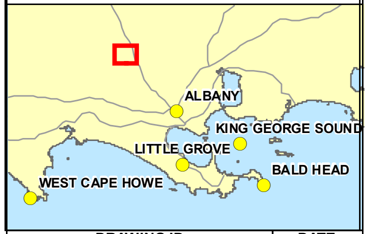

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Tesla Albany Pty Ltd
Lot 5 Down Rd
Albany, WA

60MW Power Station

Figure 1 - Site Location

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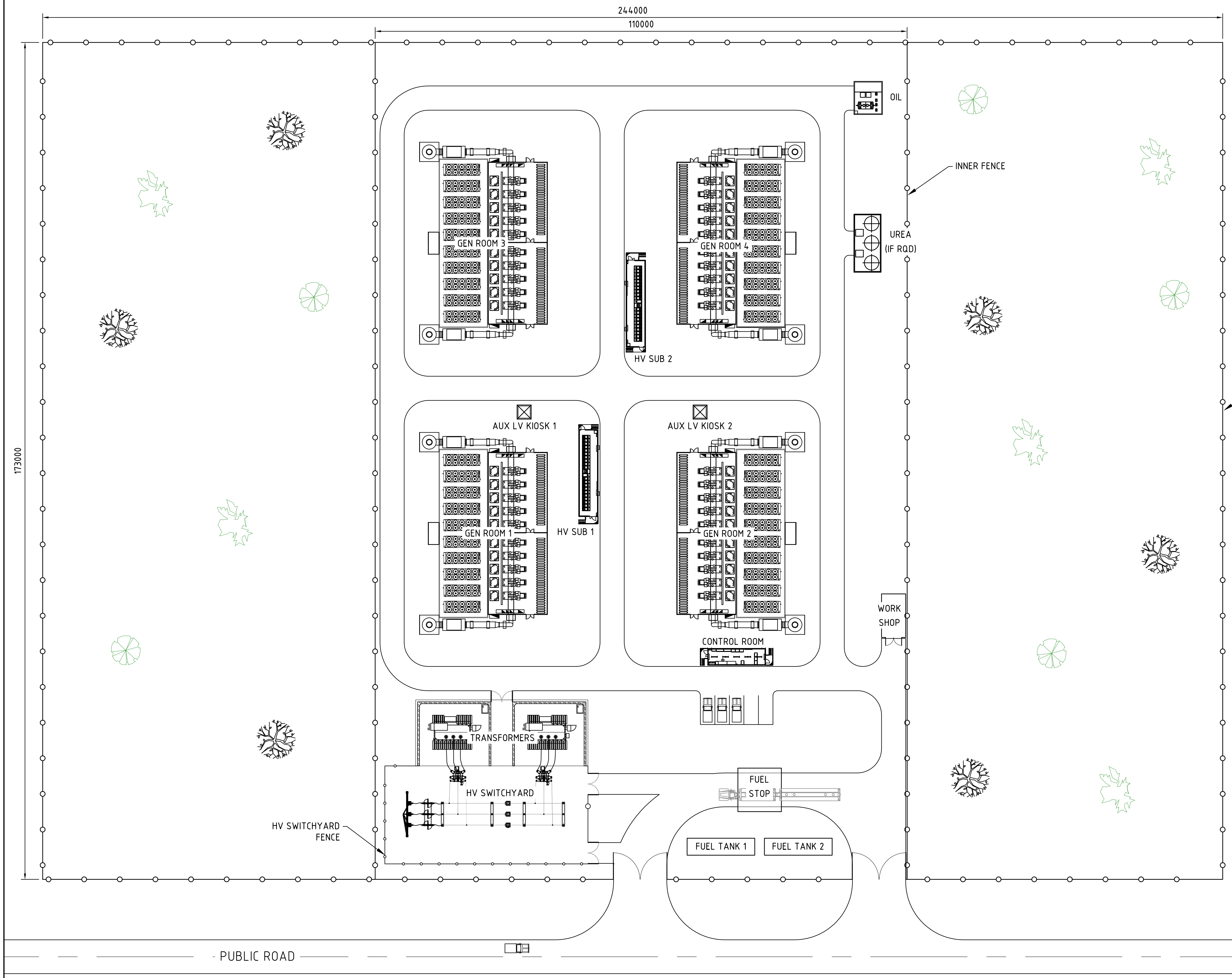

NOTES

1. PACKAGE DIMENSIONS ARE TYPICAL. VENDOR TO ADVISE PROPOSED PACKAGE DIMENSIONS.
2. UREA TANKS SHOWN. VENDOR TO ADVISE IF REQUIRED. REMOVE FROM DESIGN IF NOT REQUIRED.
3. VENDOR TO INCLUDE DETAILS OR ANY OTHER PACKAGES REQUIRED.
4. GENERATOR ROOM DESIGN IS TYPICAL. VENDER TO INCLUDE PROPOSED DESIGN, WITH GENERATOR COOLING,VENT EXHAUST AND ANCILIARIES SHOWN.
5. ROAD LAYOUT DESIGN TYPICAL. VENDOR TO ADJUST LAYOUT AND DIMENSIONS SUITABLE FOR VEHICLES REQUIRED FOR NORMAL OPERATION MAINTENANCE, EMERGENCY ACCESS AND THE REPLACEMENT OF EQUIPMENT.

DRAWING No.	REFERENCE DRAWING	No.	DATE	REVISION	DRN	CHK	APP	No.	DATE	REVISION	DRN	CHK	APP
								A	14.06.11	ISSUED FOR INFORMATION ONLY	JFC	DG	GM

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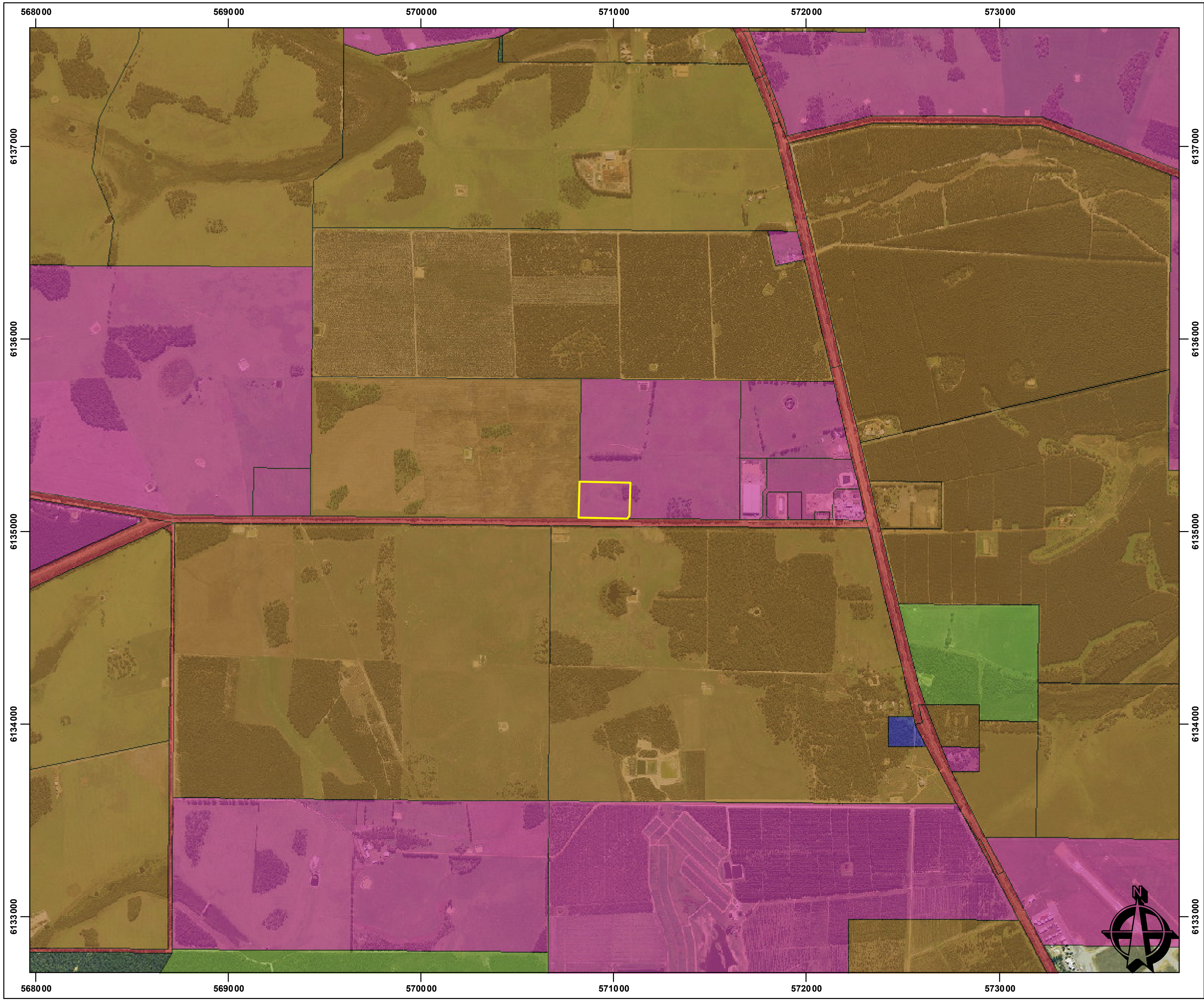
CHECKED	DG	DATE	JUNE 2011
DESIGNED	PME	DATE	JUNE 2011
JOB	N/A		
CAD FILE:	SEE DRAWING NO.		

CLIENT	TESLA CORPORATION			
PROJECT	ALBANY POWER STATION			
TITLE	40 x 1.6MW POWER STATION PROPOSED SITE LAYOUT			
SHEET	A1	SCALE	NOT TO SCALE	REV
DRG No.	6773-L-001			A



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Site Location

Surrounding Land Use

- Freehold
- Crown
- Reserve
- Lease
- Road

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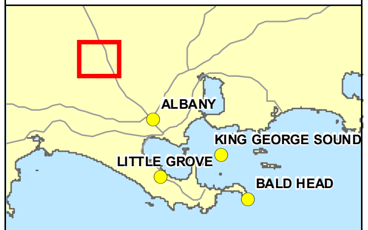

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60MW Power Station

Figure 3 - Surrounding Land Uses

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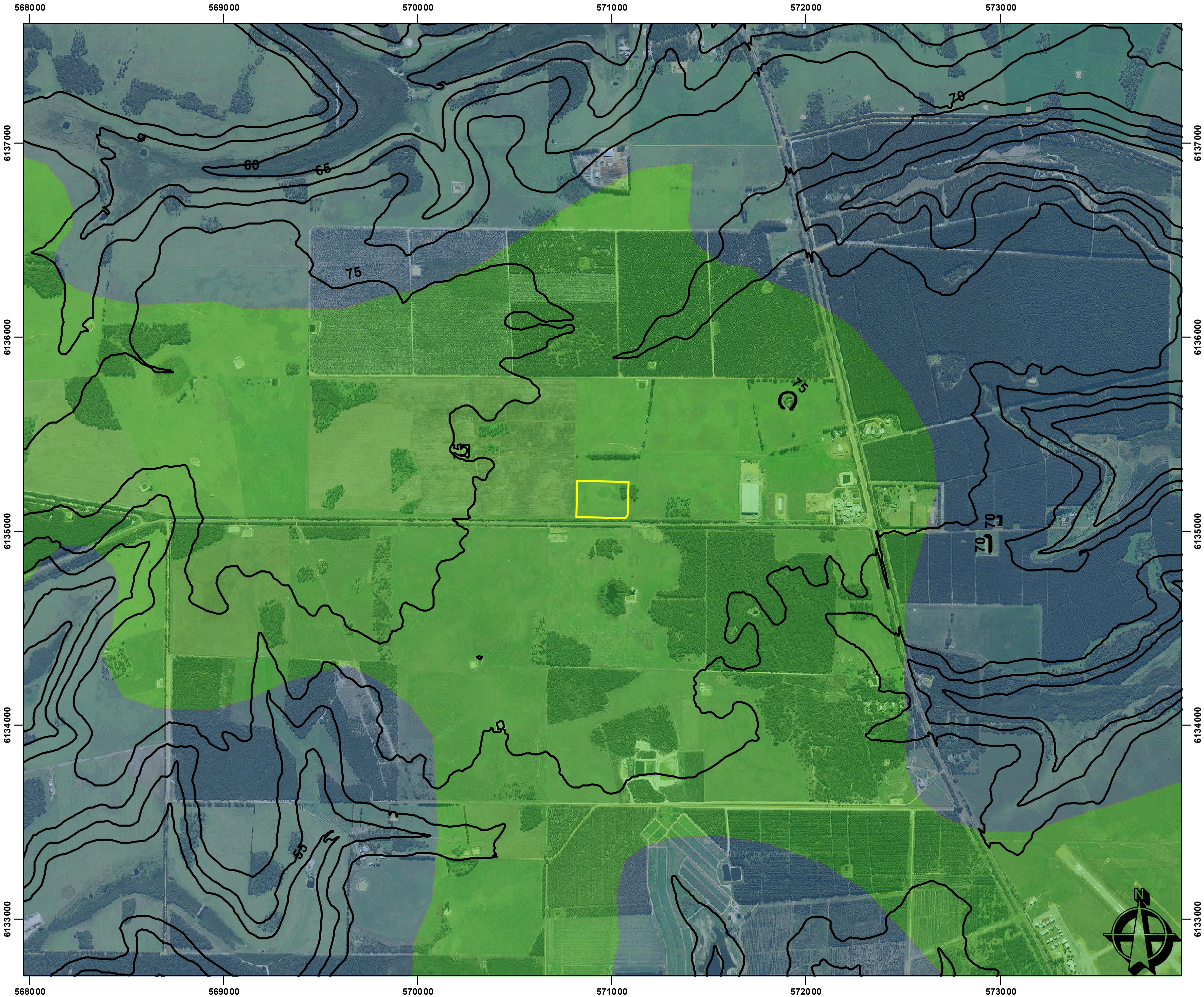

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Site Location

Elevation

Soils

Duplex sandy gravel, pale deep sand and wet soil

Shallow gravel, duplex sandy gravel and deep sandy gravel

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Figure 3 - Soils and Landform

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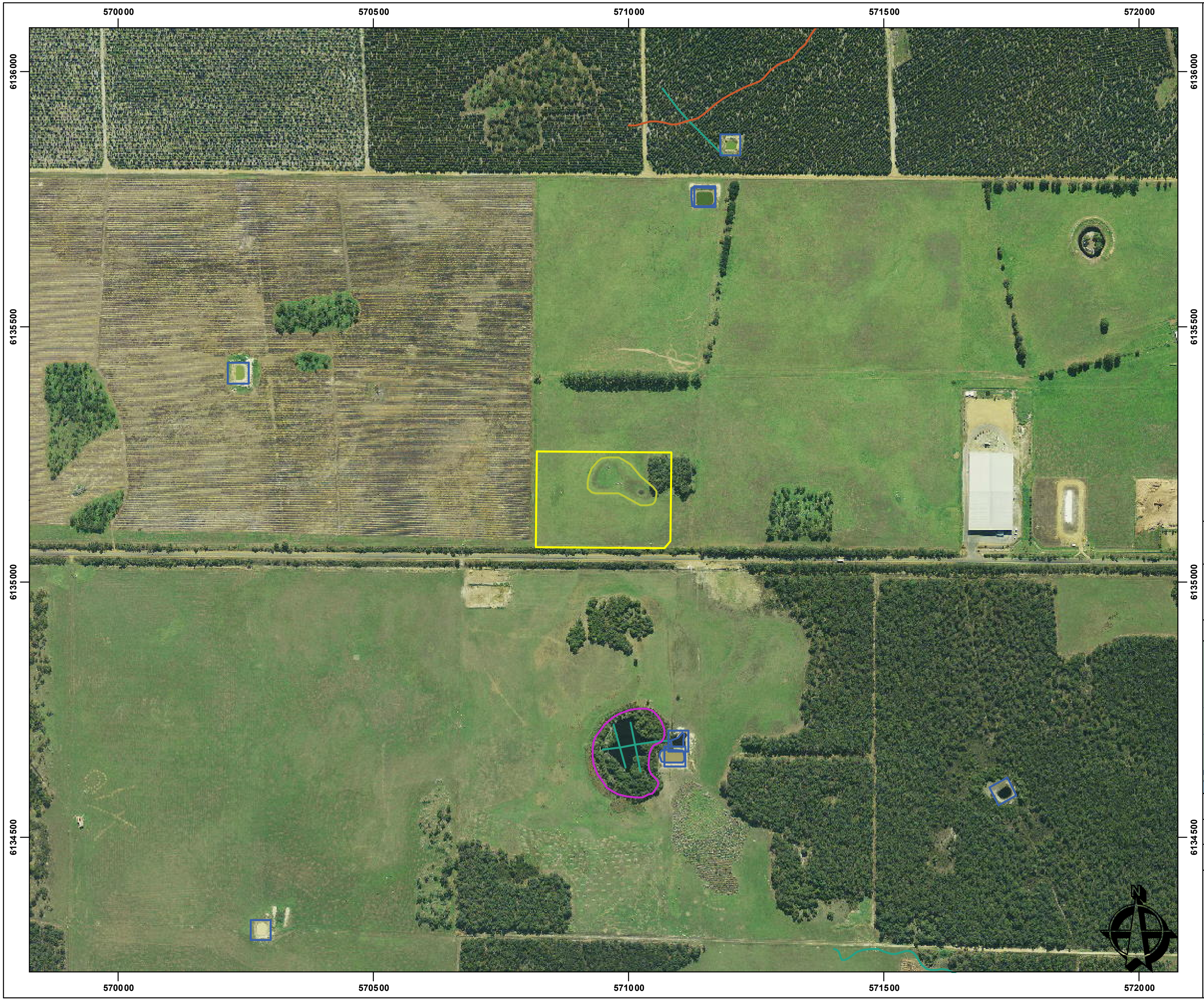

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Site Location

Surface Water Features

- Area Subject to Inundation
- Drain - minor
- Earth Dam
- Swamp - perennial
- Watercourse - minor, non-perennial

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
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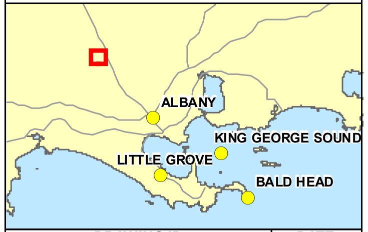

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60MW Power Station

Figure 5 - Surface Water

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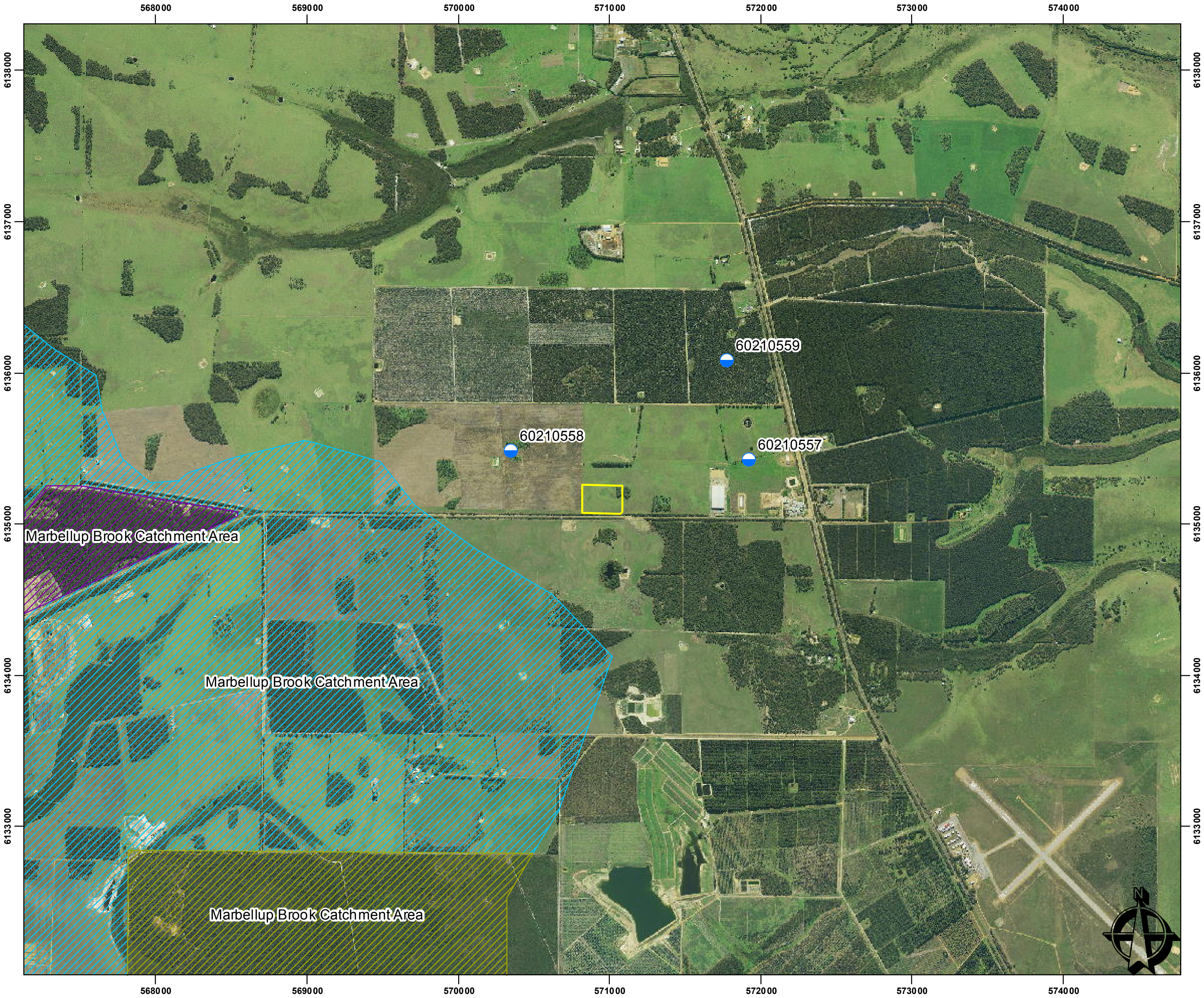

Legend

- Site Location
- WIN Bore Locations

Public Drinking Water Source Areas

- Priority One
- Priority Two
- Priority Three

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
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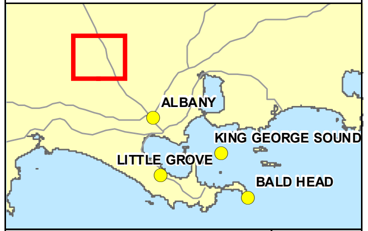

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Figure 6 - WIN Bore Locations and Public Drinking Water Source Areas (PDWSA)

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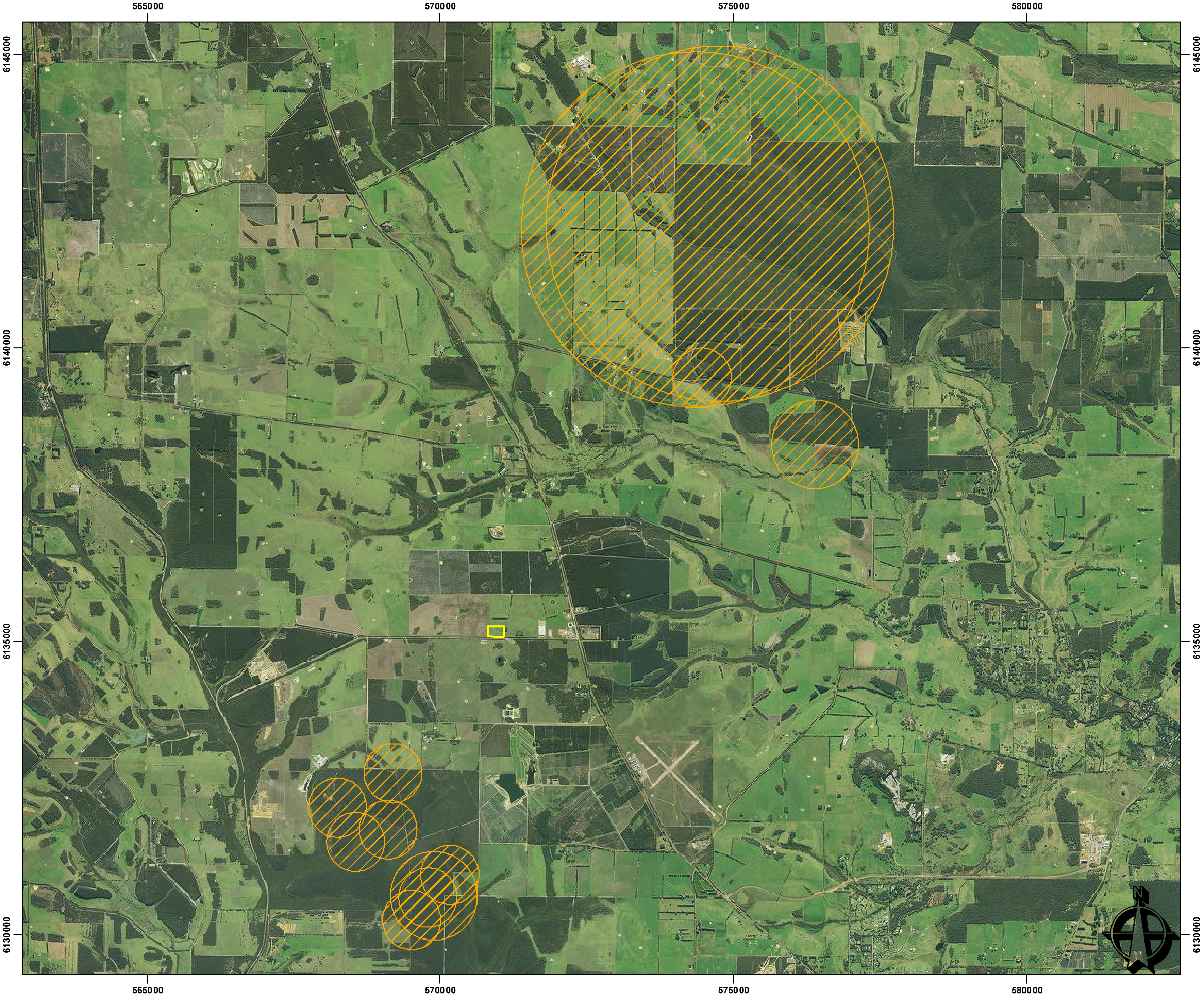

Legend

Site Location

TEC/PEC Search Results

Banksia coccinea thicket

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED FROM LANDGATE 2006
- STREET DIRECTORY MAP SOURCED FROM STREETSMART 2008
- AERIAL PHOTOGRAPHY SOURCED FROM LANDGATE 2012
- WIN BORE DATA SOURCED FROM DEPARTMENT OF WATER 2012

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0 375 750 1,500 2,250 3,000

Metres

1:87,621 @ A4

LOCALITY MAP

DRAWING ID	DATE
INF160-2	15/04/2013

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
MRS	JR	FD	0

Tesla Albany Pty Ltd
Lot 5 Down Rd
Albany, WA

60MW Power Station

Figure 7 - TEC / PEC Locations

K:\Projects\2.0 INF\INF060-2 Albany and Kemerton Power Stations\Albany

Legend

- Site Location
- Environmentally Sensitive Areas
- DEC Managed Areas
- South Coast Significant Wetlands

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED FROM LANDGATE 2006
- STREET DIRECTORY MAP SOURCED FROM STREETSMART 2008
- AERIAL PHOTOGRAPHY SOURCED FROM LANDGATE 2012
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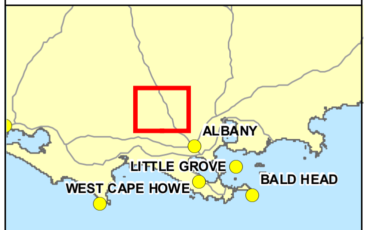
0 250 500 1,000 1,500 2,000
Metres
1:57,200 @ A4

LOCALITY MAP



DRAWING ID	DATE
INF160-2	15/04/2013

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
MRS	JR	FD	0

Tesla Albany Pty Ltd
Lot 5 Down Rd
Albany, WA

60MW Power Station

Figure 8 - Conservation Areas

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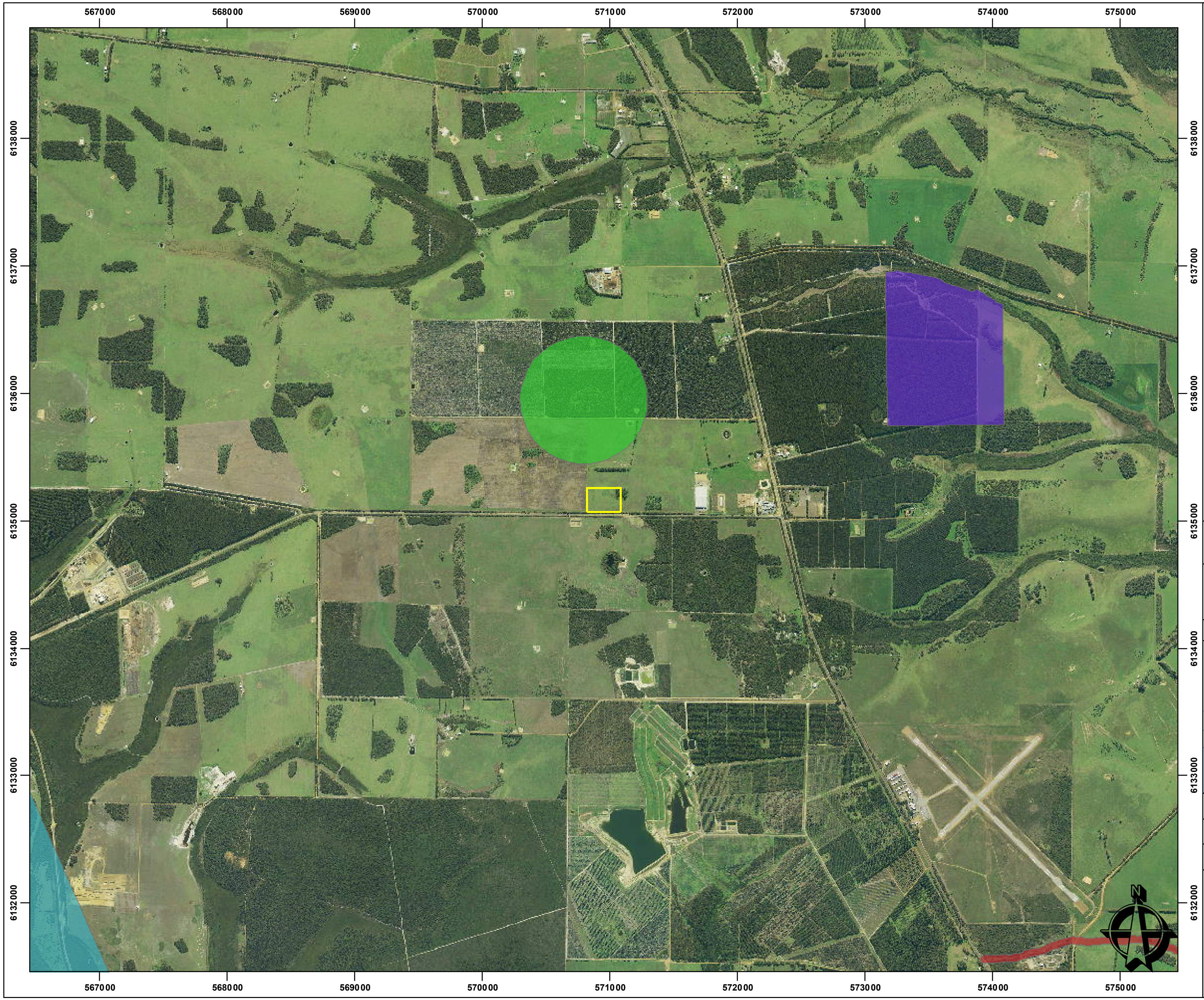

Legend

Site Location

Aboriginal Heritage

Creek 3

Downe Road

King River

Marbellup Brook

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED FROM LANDGATE 2006
- STREET DIRECTORY MAP SOURCED FROM STREETSMART 2008
- AERIAL PHOTOGRAPHY SOURCED FROM LANDGATE 2012
- WIN BORE DATA SOURCED FROM DEPARTMENT OF WATER 2012

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0 200 400 800 1,200 1,600
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1:40,000 @ A4

LOCALITY MAP

DRAWING ID	DATE
INF160-2	15/04/2013

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
MRS	JR	FD	0

Tesla Albany Pty Ltd
Lot 5 Down Rd
Albany, WA

60MW Power Station

Figure 9 - Aboriginal Heritage

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PLATES

Plate 1. Surface water present on site.

Plate 2. Soakwell present on site.

Plate 3. Soakwell present on site.

Plate 4. Soakwell present on site.

Plate 5. Marri and Jarrah Trees present on site.


Plate 6. Marri and Jarrah Trees present on site with limited understory.

Plate 7. Remnant bush longer the southern boundary.

Plate 8.Remnant bush along southern boundary.

APPENDIX A

Full Functional Design Specification

WorleyParsons
resources & energy

EcoNomics™

TESLA CORPORATION

Albany 60MW Power Station

Functional Specification

101012-00304

101012-00304-GE-FSP-0003

14 April 2011

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TESLA CORPORATION
ALBANY 60MW POWER STATION
FUNCTIONAL SPECIFICATION

Disclaimer

PROJECT 101012-00304 - ALBANY 60MW POWER STATION

REV	DESCRIPTION	ORIG	REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
0	Issued for Use	S Haddon	R Crous	G Reyneke	14-April-11		

CONTENTS

1 INTRODUCTION

1.1 General

This project is for the design, procurement, construction and commissioning of a diesel fired power station to deliver a net power output of 60 MW at an ambient temperature of 41 degrees Celsius. The power station will operate as a peaking power station and as such does not require redundancy in the number of generators installed. It is anticipate that the power station will operate for less than 500 hours per year.

The power station will be connected to the South West Interconnected Network (SWIN) and shall meet all the requirements for this connection.

The power station will be an unmanned facility. The power station control system will allow remote monitoring and control of all equipment on the site. Safety systems shall be in place to ensure equipment undergoing maintenance or testing is prevented from being operated remotely.

The power station shall be designed for high reliability and availability.

As the duty is intermittent peak lopping, it is anticipated that multiple reciprocating diesel engines would render the most favourable financial outcome. This configuration is not prescribed, and the Contractor is instructed to offer a plant designed to meet power output and reliability criteria while minimising the installation cost of the power station.

1.2 Definitions and Abbreviations

EPC	–	Engineer Procure Construct
SWIN	–	South West Interconnected Network
HMI	–	Human Machine Interface
SCADA	–	Supervisory Control and Data Acquisition
PLC	–	Programmable Logic Controller
LAN	–	Local Area Network

2 CODES, STANDARDS AND STATUTORY REQUIREMENTS

2.1 Code and Statutory Requirements

The power station shall comply with relevant Australian Standards, Western Australian electricity regulations and the Electricity Networks Access Code 2004 (WA) (the “Access Code”) including Technical Rules published by Western Power as required by the Access Code (referred to herein as the “Technical Rules”).

All aspects of design, materials, construction and workmanship shall comply with all relevant Government Acts, by-laws and regulations having jurisdiction over them. These shall include but not limited to the latest issue and/or addendum of the following Statutory Acts and Regulations:

- Western Australian Electricity Act 1945
- Western Australian Electricity Regulations 1947
- WA Occupational Safety & Health Act 1984
- WA Occupational Safety & Health Regulations 1996
- Environmental Protection (Noise) Regulations 1997
- Building Code of Australia 2008
- Western Australian Electrical Requirements (WAER) including all amendments
- Western Australian Dangerous Goods Safety Act 2004
- Western Australian Dangerous Goods Safety Regulations 2007

2.2 Australian Standards

The works shall comply with all relevant current Australian Standards. The Standards shall include but not be limited to the following:

AS 1170 series	Structural design actions
AS/NZS 1020	The control of undesirable static electricity
AS 1319	Safety signs for the occupational environment

AS 1345	Identification of the Contents of Pipes, Conduits and Ducts
AS 1359	Rotating electrical machines
AS 1429	Polymeric insulated cables for electricity supply at working voltages 1.9/3.63 kV up to and including 19/33 kV
AS 1660.5.2	Test methods for electric cables, cords and conductors - Fire tests
AS 1670	Fire detection, warning, control and intercom systems - System design, installation and commissioning
AS/NZS 1680	Interior lighting
AS 1692	Steel tanks for flammable and combustible liquids
AS 1767	Insulating Liquids
AS/NZS 1768	Lightning Protection
AS 1796	Certification of welders and welding supervisors
AS 1824	Insulation Co-ordination
AS 1940	The storage and handling of flammable and combustible liquids
AS 2024	High voltage AC switchgear and controlgear-switch fuse combinations
AS/NZS 2053	Conduits and Fittings for Electrical Installations
AS 2067	Switchgear assemblies and ancillary equipment for alternating voltages above 1 kV
AS/NZS 2229	Fuel dispensing equipment for explosive atmospheres
AS 2293	Emergency escape lighting and exit signs for buildings
AS 2374	Power Transformers
AS 2419	Fire hydrant installations
AS 2467	Maintenance of electrical switchgear
AS 2650	Common specifications for high-voltage switchgear and controlgear standards
AS 2676	Guide to the installation, maintenance, testing and replacement of secondary batteries in buildings
AS 2700	Colour standards for general purpose
AS/NZS 3000	Electrical Installations (known as the Australian/New Zealand Wiring Rules)
AS 3008.1.1	Electrical installations - Selection of cables - Cables for alternating voltages up

	to and including 0.6/1 kV
AS/NZS 3010	Electrical installations - Generating sets
AS 3011	Electrical installations - Secondary batteries installed in buildings
AS/NZS 3012	Electrical installations - Construction and demolition sites
AS 3123	Approval and test specification - Plugs, socket-outlets and couplers for general industrial application
AS 3439	Low-voltage switchgear and controlgear assemblies
AS 3947	Low voltage switchgear and control gear
AS 4029	Stationary batteries – lead acid
AS 4041	Pressure Piping
AS 4398	Insulators - Ceramic or glass - Station post for indoor and outdoor use - Voltages greater than 1000 V a.c.
AS 4436	Guide for the selection of insulators in respect of polluted conditions
AS 4509	Stand-alone power systems
AS 4594	Internal Combustion Engines - Performance
AS 5000.1	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 kV
AS 60034	Rotating electrical machines
AS 60044	Instrument transformers
AS 60076	Power Transformers
AS 60214	Tap changers
AS 60265.1	High-voltage switches - Switches for rated voltages above 1 kV and less than 52 kV
AS 60265.2	High-voltage switches - High voltage switches for rated voltages of 52 kV and above
AS 60269	Low-voltage fuses
AS/NZS 60479	Effects of current on human beings and livestock
AS 60529	Degrees of protection provided by enclosures (IP Code)
AS 60598	Luminaires
AS 60947	Low-voltage switchgear and controlgear

AS 61000	Electromagnetic Compatibility (EMC)
AS 61558	Safety of power transformers, power supply units and similar
AS 62271	High voltage switchgear and controlgear
IEC 60255	Measuring relays and protection equipment
IEC 60287	Electric cables - Calculation of the current rating
IEEE C37.013	AC high voltage generator circuit breakers rated on a symmetrical current basis

In the event that an Australian Standard does not exist for the corresponding work, the work shall comply with the relevant IEC standard and other international standards.

3 WORK BY CONTRACTOR

3.1 Scope of Work

The EPC contractor ("Contractor") shall complete the design, procurement, installation and commissioning the power plant at the nominated project site.

In general, the Scope of Work shall include but shall not necessarily be limited to:

- Design and documentation, including as built documentation, hazardous area dossiers, operations and maintenance manuals, studies, reports and submissions as may be required
- Obtaining statutory approvals
- Procurement
- Manufacture including workshop inspection, testing and documentation
- Packaging and protection
- Transportation and delivery to the project site
- On site works including site management, site security, provision of temporary facilities (lay down areas, site buildings, water, construction power, communications, first aid facilities, ablution facilities etc)
- Installation, site testing (including documentation) and coordination with equipment suppliers
- Commissioning and performance testing (including documentation)
- Regular removal of site rubbish, waste and debris during the works
- Removal of all temporary construction facilities and final site clean-up at the completion of the works
- Training of operations staff

The power station shall be designed and set out to ensure ease of access for operation and maintenance purposes.

3.1.1 Site Preparation

The Contractor shall be responsible for all site preparation and finishing works including:

- Clearance, excavation, filling and site grading
- Site access roads and hardstand areas to suit the site layout and purpose

- Storm water drainage systems including oil/water separators and storm water retention and disposal systems if required
- Utilities and underground services
- All fencing, including security fencing and gates
- Landscaping
- Site signage
- Embankments and berms

3.1.2 Structural / Buildings

The Contractor shall design, document, supply, install and commission the following:

- HV Switchroom
- Store / Workshop
- Ablutions block (may be part of the workshop)
- Generator hall or acoustic enclosures
- Foundations
- Bunds
- General support structures, access platforms and stairs

3.1.3 Mechanical

The mechanical scope includes but is not limited to the design, documentation, supply, installation, testing and commissioning of:

- Generating sets
- Fuel system including, tanks, pumps and piping
- Lubricating oil system including, tanks, pumps and piping
- Engine cooling systems
- Exhaust systems
- Ventilation and air conditioning
- Fire protection

3.1.4 Electrical

The electrical scope includes but is not limited to the design, documentation, supply, installation, testing and commissioning of:

- Generators
- Step-up transformers
- Site services transformers
- HV switchyard
- HV switchboards
- LV switchboards
- Protection schemes
- Tariff and power quality metering
- Earthing systems
- Lightning protection system
- Plant auxiliary power systems
- Battery backed DC supplies
- Cables, cable supports, cable pits and conduits
- Site and building services including small power distribution boards, interior and exterior lighting, socket outlets, security system, fire detection and alarm system

3.1.5 Control and SCADA

The Control and SCADA scope includes but is not limited to the design, documentation, supply, installation, testing and commissioning of:

- Generator unit control systems
- Power station PLC system
- SCADA system including HMI software, PC hardware and printers
- Communications systems including communication interfaces, network equipment and cabling
- Administrative LAN and telephone systems
- Uninterruptable AC power supplies

3.2 Terminal Points

The terminal points for the design and construction of the power station shall be as follows:

- Boundary of Power Station - perimeter fence
- Electrical - outgoing circuit isolators of the 132 kV switchyard
- Diesel fuel - tanker unloading connection
- Lubricating oil - tanker offloading connection
- Waste oil - discharge connection for road tanker loading
- Potable water - supply pipe, flanged at site boundary
- Service water - supply pipe, flanged at site boundary
- Fire water - supply pipe, flanged at site boundary
- Access roads - access roads constructed by others at the power station perimeter fence
- Civils - all works including completion of bulk earthworks pad, structural excavation, structural backfill, drainage and foundations
- Communications system - Telstra connection and / or radio link
- Storm water drains to tie in to an open drain culvert at plant site boundary

4 APPROVALS BY CONTRACTOR

The preliminary design shall be submitted by the Contractor to the Owner for review prior to submissions for approval by any statutory authorities or Western Power.

The Contractor shall obtain the following approvals:

- Western Power for the connection of the facility to the network
- All other statutory approvals necessary for the completion and operation of the works

Note that whilst the Owner has primary responsibility for the Development and Environmental approvals for the site, the Contractor is responsible for providing all necessary supporting documentation and must collaborate with the Owner to enable the Owner to achieve the successful development and environmental approvals for the project.

4.1 Western Power Approvals

4.1.1 Design Approval

The Contractor shall design the proposed power station and compile a submission to Western Power for approval of the design. The submission, signed and certified by an NPER Registered Professional Engineer, will be submitted to the Owner for review prior to the submission by the Owner to Western Power.

The submission shall include, but is not limited to (subject to Western Power requirements), the following:

- Single line diagrams
- Protection scheme diagrams
- System studies including fault levels, steady state and transient analysis
- Engine, generator and AVR control system models as required by Western Power
- Equipment data for all transformers, HV switchgear (including post insulators, VTs and CTs) and protection relays
- SCADA and communications key diagram
- Earthing design including earthing system diagram
- Site layout
- HV switchroom layout
- Switchyard layout

4.1.2 Commissioning Certification Approval

The Contractor shall, prior to connecting to the network for testing and commissioning, obtain Western Power's approval for commissioning as follows:

- Confirmation to Western Power by an NPER registered Professional Engineer that the information supplied as required by Attachment 3 of the Technical Rules is correct and up to date.
- Arrange for an NPER registered professional electrical engineer to certify that the facility complies with the Technical Rules, manufacturers recommendations and good practice and is ready for testing and commissioning in accordance with the requirements of the Technical Rules
- Submit the completed forms and any associated documentation to the Owner who will lodge it with Western Power.

4.1.3 Approval to Operate

The Contractor shall obtain Western Power Approval for the connection of the facility to the network in the manner described below.

Following commissioning and testing but prior to connecting the facility to the network for normal operation the Contractor shall arrange for an NPER registered professional engineer to certify that the facility complies with the Technical Rules, manufacturer's recommendations and good practice and is ready for normal operation.

The Contractor shall submit the completed form and any other associated documentation to the Owner for submission to Western Power.

4.2 Site Development Approvals

With the exception of the Development Approval and the Environmental Approvals the Contractor shall make all necessary submissions and obtain all necessary approvals and licences from any relevant Authority for all development off and on the site. For Development and Environmental Approvals the Contractor shall provide all necessary supporting documentation and assistance as is necessary to assist the Owner in achieving the approvals.

5 SAFETY AND RISK REQUIREMENTS

5.1 Fire Detection Systems

Fire detection shall be installed in the HV switchroom and the generator building / enclosures. The fire detection systems shall be designed to relevant Australian Standards and will be controlled by a single fire indication panel located in the HV switchroom. The status of the fire detection system including alarms shall be available on the site SCADA system.

5.1.1 Switchroom

The fire detection system within the switchroom shall consist of a Very Early Smoke Detection and Alarm (VESDA) System and the fire indication panel. Fire detection within the switchroom shall shut down the power station and isolate the power station from the Western Power network.

5.1.2 Engine Hall / Enclosures

The engine hall or engine enclosures shall include fire detection consisting of UV or IR detectors reporting the fire indication panel. Detection of fire by no less than two detectors on a generator set shall trigger an alarm and shut down the complete power station including the ventilation and fuel supply.

5.2 Fire Protection

Fire protection systems required for the site shall meet the requirements of the Building Code of Australia and all relevant regulations. All fire protection systems installed shall comply with the requirements of the relevant Australian Standards.

5.2.1 Diesel Fuel Storage Facility

A fire protection system shall be installed for the diesel fuel storage facility as required by AS 1940.

5.2.2 Switchroom

Fire extinguishers shall be installed within the switchroom in accordance with regulations. As a minimum four hand held 4.5 kg powder type ABE type fire extinguishers shall be installed within the switchroom.

5.2.3 Engine Hall / Enclosures

Fire extinguishers shall be installed within the Engine Hall or adjacent to the generator enclosures in accordance with regulations. A minimum of one hand held 4.5 kg powder type ABE fire extinguisher shall be installed for each generator set.

5.3 Site Security

A site security system shall be installed with remote monitoring capabilities to a manned security centre. The security system shall include a minimum of 6 infra red capable site security cameras, entry trips at the site gate and switchroom, tamper alarms on the fuel systems and an alarm controller with remote alarm and monitoring capabilities. The site audible alarm must comply with Local Council regulations for noise levels.

The security system camera controller shall include the capability for selecting and viewing of camera images remotely via the VPN connection. The system must continuously record and store camera video and have the capacity for at least 2 weeks video records available on its hard disk for later retrieval if required.

A security camera or cameras shall be positioned to adequately monitor the diesel storage tanks.

The Contractor shall provide design details of the proposed security system including a functional description of its features and a site layout plan showing location of controls, sensors and cameras for review by the Owner prior to placement of orders or commencement of work.

5.4 Signage

A 2 m x 1 m sign shall be erected on the fence adjacent to and to the left of the main gate. The sign shall be professionally printed onto a powder-coated 3 mm aluminium sheet. The graphics, colours and fonts will be agreed with the Owner prior to placement of order. The wording shall state:

TESLA CORPORATION

AUTHORISED ENTRY ONLY

IN CASE OF EMERGENCY CONTACT (number to be advised).

6 ENVIRONMENTAL REQUIREMENTS

The development shall conform to all relevant environmental legislation including:

- Environmental Protection Act 1986; and
- Environmental Protection (Noise) Regulations 1997.

Other environmental guidelines and codes of practice relevant to the development include:

- National Environment Protection Council - National Environmental Protection (Ambient Air Quality) Measure (NEPM) 2003; and
- National Environmental Protection Council - National Environmental Protection (Air Toxics) Measure (NEPM) 2004.

6.1 Emissions

Emissions from the power station shall be kept to a minimum with the EPA (Environment Protection Agency, USA) Tier 1 standard for non-road diesel engines used as minimum requirements. The emissions from the power station shall be modelled to show compliance with the NEPM, DEC and EPA requirements.

6.2 Noise Limits

The noise emissions at the power station shall not exceed those specified by the Environmental Protection (Noise) Regulations 1997.

The following limits for noise emissions shall not be exceeded:

- If a diesel engine enclosure is provided the sound pressure level shall not exceed 85 dBA at 1 m from equipment enclosure and 1.5 m above ground.
- If an engine hall is provided the sound pressure level within the engine hall shall not exceed 105 dBA at 1 m from equipment and 1.5 m above ground
- The sound pressure level shall not exceed 65 dBA at site boundary

6.3 Bunding

All areas on the site that contain oil such as fuel storage tanks, generator sets, oil tanks and transformers shall be provided with spill containment/bund in accordance with AS 1940 and AS 3780, as applicable. All spill containment areas shall be drained to the oil / water separator.

7 SITE LOCATION AND DETAILS

7.1 Location and Ambient Conditions

The power station will be located at Mirambeena in the City Albany in Western Australia. Refer to Appendix 1 for the site location.

The site has the following ambient conditions, as determined from the Bureau of Meteorology.

		Minimum	Maximum
Elevation AHD	m	3	-
Ambient Temperature	°C	-0.1	44.8
Relative Humidity	%	67	82

7.2 Geotechnical data

A geotechnical report for the site is provided in Appendix 2. The Contractor is shall complete any additional geotechnical investigations required including soil resistivity testing. Copies of all geotechnical reports and testing carried out shall be provided to the Owner.

8 QUALITY ASSURANCE / QUALITY CONTROL REQUIREMENTS

The Contractor shall carry out quality control and inspection of all materials and processes of manufacture to ensure that materials and workmanship comply with the requirements of this specification and relevant Australian standards.

A Quality Plan (QP) shall be provided and shall include:

- Organisation details
- Responsibility of personnel in the organisation for quality control and quality assurance of the work
- Details of the quality system procedure and work instructions
- Procurement control
- Quality audit
- Non-conformance control
- Corrective action
- Quality records
- Control of inspection, measuring and testing equipment
- Document control
- Material/equipment handling, storage, identification and control
- Interface control with associated and other packages related to the work
- Design control

The Contractor shall provide within the Quality Assurance Plan a Site Quality Control program which will detail out for all the equipment, quality practice and procedure during various stages of site activities starting from receipt of materials/equipment at site.

All documents and records related to quality control and quality assurance of this project shall be made available at anytime during the tenure of the project.

The quality system may be audited at any time.

9 MECHANICAL AND PROCESS TECHNICAL REQUIREMENTS

9.1 Process and Mechanical Basis of Design

The power station shall be designed to provide a net power output of 60 MW at an ambient temperature of 41°C. The net power output shall be measured at the 132 kV switchgear when the power station is operating with all required auxiliaries. Engine and equipment derating for extreme ambient conditions shall also be considered in accordance with ISO 3046 to allow for the difference between site and design conditions.

The power plant shall be designed on the following basis:

- Maximum Ambient temperature 41°C
- Relative Humidity 40%
- Maximum noise level at 1 m distance from engine hall or generator set acoustic enclosure and 1.5 m above ground 85 dB
- Fuel Diesel Oil as per specification
- Engine duty Peak
- Power plant reliability ≥ 98%
- Engine emissions Refer to emission limits

The power station shall be designed such that it has blackstart capability. This facility will require the installation of a dead bus relay and to test that all 11 kV circuit breakers other than bus-tie circuit breakers, are open prior to closing a generator onto the dead bus. Check synch relays shall be installed where required on the bus-tie(s), 132 kV and other circuit breakers to prevent closing where systems are unsynchronised.

9.2 Engine

The diesel engine shall be of proven design and be complete with fuel, oil, starting and combustion air filtration systems suitable for the environment. The engine shall be turbocharged and include a liquid cooled aftercooler.

9.2.1 Starting

The engine starting system shall be complete with:

- 24 volt electric starting motor;
- 24 volt battery set sized for six consecutive starts;

- battery rack;
- battery isolator; and
- battery cables.

The batteries for the engine starting shall be sized for 6 consecutive cranking cycles. The battery charging system shall be a two rate, equalize and float system having the capacity to restore full battery charge from a fully discharged state within 5 hours.

9.2.2 Governor

The generator sets shall be complete with an electronic speed governor complying with the requirements of ISO 8528 Part 5 Class A1.

9.2.3 Combustion Air Intake

The combustion air filters shall be mounted on the engine and include heavy duty air cleaners fitted with service indicators. Air filters shall be located such that inspection and maintenance can be undertaken at ground level.

9.2.4 Lubrication

Lubrication system shall include, but not be limited to:

- engine driven oil pump;
- full flow filtration;
- oil level indication;
- oil level regulator;
- oil cooler;
- crankcase ventilation complete with an oil separator;
- flexible connection between the oil supply and return piping and the engine; and
- all associated piping, valves, instruments and fittings necessary for the lubrication system.

9.2.5 Fuel System

The engine fuel system shall include:

- Full flow filtration;
- Engine driven fuel pump;

- Fuel cooler;
- Flexible connections between the fuel supply piping and the engine; and
- all associated piping, valves, instruments and fittings necessary for the fuel system.

9.2.6 Control System

Instrumentation included on the engine shall include but not be limited to;

- oil pressure;
- coolant temperature (jacket and aftercooler);
- oil differential pressure;
- intake manifold temperature;
- service meter;
- intake manifold pressure; and
- generator bearing RTDs.

Engine protection shall include but not be limited to:

- low oil pressure;
- high coolant temperature;
- low coolant level;
- overspeed;
- emergency stop; and
- start, run and stop switch.

9.3 Diesel Fuel System

The diesel fuel oil system consists of:

- diesel road tanker unloading system;
- Bulk fuel storage system;
- Fuel transfer pumping systems;
- Generator set service tanks; and
- Interconnecting piping and valves

The road tanker unloading facility shall be designed for simultaneously unloading both trailers of double road trains. The unloading pumps shall be sized to unload the tanker in less than one hour. Duty / standby unloading pumps shall be installed. The pumps shall be configured to allow loading of road tankers from the power station for fuel maintenance.

Bulk fuel storage tanks shall be installed to provide 24 hours continuous power station operation. The bulk fuel storage system shall be installed in accordance with AS 1940. Tank design shall comply with the requirements of AS 1692. The tank level shall be monitored by the SCADA system.

Fuel transfer pumps shall be installed to transfer fuel from the bulk tank(s) to the generator set service tanks. Duty / standby pumps shall be installed. Start / stop of the pumps shall be controlled by level switches within the generator set service tanks. Pump status shall be monitored by the SCADA system. The pump, valve and piping arrangements shall be configured such that fuel can be transferred between all fuel tanks on the site for fuel maintenance.

One fuel service tank of 1,000 litres useable capacity shall be provided for operation of each generator set. The tanks shall be complete with level indication marked in litres, level switches for transfer pump control and alarm. The service tanks shall be designed in accordance with AS 1692. The service tanks shall be painted with oil resistant paint.

All fuel transfer piping shall be designed and installed in accordance with AS 4041. Piping joints shall be fully welded or flanged. Screwed joints shall be avoided.

9.4 Cooling system

Each generator set shall include a complete closed loop cooling water system to adequately cool the engine for operation at full load during the highest ambient conditions and shall comply with the engine manufacturer's requirements.

The closed loop cooling system shall include radiator, lube oil cooler, temperature regulators, expansion tank pressure gauges, thermometers, all control instrumentation, all piping including control valves, fittings, pipe and fabrication, engine-driven jacket water pump, combustion air cooler, intercooler, any other cooling water pumps required by the engines design, and miscellaneous piping for a satisfactory operating system.

9.5 Exhaust system

The engine exhaust system shall be designed to meet the project noise limits and the engine backpressure requirements. The exhaust silencer shall be installed outside the engine hall or enclosure. Exhaust ducting within the engine hall or enclosure shall be thermally insulated using 50 mm thick mineral wool with aluminium sheathing.

Expansion bellows shall be provided at the connection to the engines. Flexible insulation blankets shall be installed on the exhaust bellows.

9.6 Oily water system

Oily water from transformers, engines and oil pumping areas shall be collected and sent to the oil water separator. Water discharged from the oil water separator shall be of suitable quality to discharge to the environment. Oil collected in the separator shall be pumped into trucks for disposal off site. High and low level alarms shall be provided on the oil separator and co-ordinated with the plant instrumentation and control system.

9.7 Lubricating Oil Storage

A lubricating oil storage and handling system shall be installed. The lubricating oil storage and handling system shall include:

- Road tanker unloading and loading facility
- A new 5,000 litre self bunded new lubricating oil storage tank
- A new 5,000 litre self bunded waste lubricating oil storage tank
- Positive displacement pump to transfer new oil from the storage tank to the engine sumps
- Positive displacement pump to transfer waste oil from the engine sump to the waste oil storage tank
- All interconnecting pipes, valves and supports
- System controls.

The operation of the lubricating oil system shall be completed manually.

10 ELECTRICAL TECHNICAL REQUIREMENTS

The electrical installation shall comply with relevant Australian Standards, Western Australian electricity regulations and the Electricity Networks Access Code 2004 (WA) (the "Access Code") including Technical Rules published by Western Power as required by the Access Code (referred to herein as the "Technical Rules"). The power station will be connected to the 132 kV network.

10.1 HV Switchroom

The Contractor shall design, supply, construct and commission the HV switchroom for the power station. The switchroom, including all internal walls and doors, shall have a minimum 2 hour fire rating. The HV switchroom building will also contain the control room for the station. The switchroom will house:

- The Western Power RTU, SCADA and tariff metering equipment as per Western Power approved connection arrangement;
- The control and protection cabinets for the outdoor HV circuit breakers for the network connections;
- The HV circuit breakers for generator protection, isolation, control and synchronization;
- LV switchboards;
- High level / supervisory control station with HMI;
- Enclosed rack unit to house:
    - Cable interface and terminations.
    - Communications equipment.
    - High level control system interface.
- UPS and battery supplies to support all operation of critical loads, and the Western Power RTU, SCADA and tariff metering equipment for a minimum of 8 hours.

In addition to compliance with Australian Standards, the design shall consider all Western Power standards and requirements for design of substations and housing Western Power equipment, including access and egress requirements.

The switchroom shall be air conditioned utilising a minimum of two x 100% split system air conditioners.

10.2 HV switchgear

The HV switchgear used for the project shall be suitable for the voltage, current and fault levels of the installation and comply with the Western Power requirement for network connected applications and be approved for that purpose.

The switchgear selected shall be adequately rated for fault break and fault make operation at the site maximum fault level available with both the full generation capacity and maximum network capacity connected.

The generator and transformer feeder HV switchgear shall be indoor type and shall be lockable in the isolated position for maintenance with a visible air gap. The switchgear shall be approved for connection to the Western Power network and shall incorporate the required protection relays for correct and reliable operation.

The network connection HV switchgear shall be outdoor type and shall be lockable in the isolated position for maintenance. The switchgear shall be approved for connection to the Western Power network and shall incorporate local control panels providing correct and reliable operation of the circuit breakers including tripping, closing, interlocking and plant control system interface facilities. Protection, check synch and plant control system interface facilities shall be located in the control and protection cabinets referred to in Clause 10.1.

HV switchgear shall be capable of being operated and monitored from the Power Station Control System.

The Contractor shall submit its equipment list identifying the type and manufacturer of the switchgear, including datasheets, as part of the design review to be conducted prior to submission of the proposal to Western Power.

10.3 Main Connection

Western Power will provide the metering equipment (except VTs and CTs, refer to Clause 10.8), marshalling panel and the connections to the network. Space shall be provided within the switchroom to allow installation of the Western Power RTU, SCADA and metering equipment as per Clause 10.1.

10.4 Transformers

10.4.1 General

Transformers shall be located within outdoor compounds and in accordance with AS 2067. Separation distances shall comply with AS 2067, however as a minimum, a separation distance of no less than six metres shall be provided between the Switchroom/Control Room and the transformer compound fence/wall.

Oil filled transformers shall be installed such that oil leaks, either slow or from a rupture, are safely contained and the oil may be disposed of safely and easily and to minimise fire or environmental risk.

The transformer compound shall be of concrete construction with a concrete bund. The bund shall be designed in accordance with the requirements of AS 1940 and AS 2067. A concrete plinth shall be provided for mounting each transformer. The top of the transformer plinth shall be at least 100 mm higher than the bund wall.

As a minimum a 100 mm layer of screened crushed aggregate (nominal size of 25 mm) shall be provided in the compound for fire quenching purposes. The volume of the aggregate shall be taken into consideration when determining the bund volume.

Each type of transformer shall have been type tested and compliant with applicable Australian Standards, including but not necessarily limited to AS 2374, AS 60076 and other listed standards. Type test certificates issued by an accredited testing authority shall be provided by the Contractor. Each transformer shall be subjected to all standard tests listed in AS 2374 and AS 60076.

10.4.2 Step-up transformers

The power station step up transformer(s) shall be suitably rated to operate under the full range of ambient conditions possible at the site under all plant and network operating conditions. The transformer rating shall also be compliant with the requirements of the Technical Rules.

The tap changer(s) shall be the on-load type. The tapping range of the transformer tap changer(s) shall meet the requirements of the Technical Rules. Control of the tap changer(s) shall be from the Power Station Control System.

The transformer(s) shall be outdoor type fitted with cable connection boxes suitably designed for heat shrink terminations.

The transformer(s) shall be fitted with protection and monitoring facilities such as Buchholz relays, over pressure, oil level and temperature sensing. Such protection and monitoring shall be connected to the Power Station Control System.

10.4.3 Site Services Transformers

The power station site services transformer(s) shall be suitably rated to operate under the full range of ambient conditions possible at the site under all plant and network operating conditions.

The tap changer(s) shall be the off-load type.

The transformer(s) shall be outdoor type fitted with cable connection boxes suitably designed for heat shrink terminations.

The transformer(s) shall be fitted with protection and monitoring facilities such as over pressure, oil level and temperature sensing. Such protection and monitoring shall be connected to the Power Station Control System.

10.5 Cables

All cables shall comply with relevant Australian Standards.

LV cables shall be rated according to the requirements of AS 3008.1.1. HV cables shall be rated in accordance with IEC 60287 or manufacturer's data.

The selected cables including any screens must be adequately rated for the fault levels applicable within the installation.

All site HV cables within the station shall be installed in accordance with the requirements of AS 2067 and AS/NZS 3000. All HV cables shall have fault rated screens rated for the network fault level at the point of connection.

All site low voltage cables shall be installed according to category A requirements of AS/NZS 3000.

10.6 Earthing

10.6.1 General

A combined high voltage and low voltage earthing system, in accordance with the requirements of AS 2067 and AS/NZS 3000, shall be installed in plant areas at each transformer.

Low voltage earthing shall generally be of the direct earthed system in accordance with the requirements of AS/NZS 3000. The earthing system shall be a TN-C-S system as per AS/NZS 3000 (separate neutral and protective earth conductors throughout the system).

The earthing electrode system shall comply with the requirements of AS/NZS 3000 and AS 2067. The step and touch potential requirements of AS 2067, AS/NZS 3000 and AS 60479 shall apply.

Allowance shall be made for seasonal variations in soil resistivity. An earth enhancing compound may be used to improve ground "contact" for earth stakes as required.

A separate earth system may be considered for electronic and instrument systems where common mode voltages are expected to cause operational problems.

The installation shall be tested on completion to confirm it meets the design requirements for step, touch and transfer potential. The test results shall be provided to the Owner or its representative.

10.6.2 Equipotential Bonding

Metallic structures and other extraneous conductive parts associated with the power station shall be bonded to the main earthing system as required by AS 2067 and AS/NZS 3000.

Step and touch potentials shall be within acceptable limits in accordance with the relevant Australian Standards. Particular attention shall be given to metallic services and fences connecting to plant outside of the power station that may transfer hazardous voltages in the event of a fault. Appropriate earthing and where required isolation of such items shall be employed to mitigate the transfer of hazardous voltages.

10.6.3 Connections to Steelwork

Bonding cables shall be installed across all valves, flow meters, etc.

All major earthing cable connections shall be made with a separate bolt for each cable so that one cable can be disconnected for testing without interference with other earthing circuits.

Grid flooring, stairs, ladders and all structural steel shall be bonded together and connected to a main earth bar. Bolted connections between items of steel work shall be considered satisfactorily bonded provided that unbolting any single removable element does not disconnect any other part of the steelwork from earth.

10.6.4 Prevention of Corrosion in Earthing Systems

Earth grading rings shall be of copper cable and earthing electrodes shall be copper clad. All major earthing cables shall be copper and shall be terminated with suitable clamps or compression fittings for above ground connections and by exothermic welding, e.g. Cadweld, for below ground connections.

Wherever practical, stainless steel bolts, nuts and washers shall be used for earth connections in locations exposed to the weather.

All bolted connections in earthing systems shall be above ground and accessible for inspection.

10.6.5 Lightning Protection

A lightning risk assessment shall be carried out in accordance with AS/NZS 1768. As a minimum requirement, lightning protection shall be provided where the assessment of risk indicates that protection is advisable. Lightning protection shall be designed and installed in accordance with the requirements of AS/NZS 1768.

The lightning protection system shall be interconnected and equipotentially bonded with the main power earthing system.

Special consideration shall be given to the effects of lightning on plant areas and structures such as hazardous areas, lightning and communications poles and other high structures.

For field mounted electronic equipment the power supplies and I/O shall be provided with surge protective devices to prevent lightning damage to the equipment. Communications signals run in copper cable from substations to the field shall have surge protective devices installed to prevent lightning damage to the equipment.

Indoor electronic equipment shall also be provided with surge protective devices where the equipment is connected to cables from and outdoor area.

10.7 Protection

The protection scheme shall comply with the Western Power Technical Rules and meet Western Power's requirements. All protective devices shall conform to the requirements of IEC 60255 as required in the Western Power Technical Requirements. In addition to complying with the Western Power Technical Rules, the scheme shall also comply with AS 2067 and AS/NZS 3000 and adequately protect personnel and the installed assets from damage due to faults.

Generator protection relays can be discreet or integrated with the controller. The network protection shall be provided by stand alone protection relays.

Protection settings shall be implemented to adequately grade with the Western Power circuit breaker and comply with any other protection requirements of Western Power. The Contractor shall submit its protection settings scheme to the Owner for review as part of the submission to Western Power. The protection scheme should describe how the Western Power requirements are to be met and also describe how the Owner's assets such as the Generators and Power Transformers will be protected. It is anticipated that as a minimum differential protection will be employed for both categories.

10.8 Metering of Export Power

The Contractor shall provide metering class VTs, CTs and a tariff meter to monitor and record power and VARs exported to the network independently of the Western Power metering system. The VT and CT class shall be the same as that required by Western Power for their metering requirements. The metering kWh and kVARh data shall be recorded in the high level control system data base in a format that allows it to be conveniently used to check export energy recorded against the Western Power meter reading data.

The metering shall also include power quality metering to monitor, as a minimum, the following:

- Current
- Voltage
- Real power
- Reactive power
- Frequency
- Power factor
- Harmonic distortion
- Transient events

The Contractor shall also provide metering class outdoor VTs and CTs for use by Western Power's tariff metering. These shall be separate from the Owner's VTs and CTs and meet the requirements of Western Power. Western Power tariff metering data shall also be logged by the control system to enable convenient comparison.

10.9 Auxiliary Supply & UPS

A power station auxiliary supply shall be provided from a transformer. The auxiliary power supply shall include;

- Low voltage switchboard or switchboards as necessary to supply all LV loads within the installation
- All associated LV power circuits for auxiliary services and building and site requirements

A UPS complete with maintenance free battery, capable of supplying all protection and controls within the installation for a minimum standby period of 8 hours in the event of supply failure or as per Western Power requirements.

The UPS shall display the following conditions and shall be monitored by the Power Station Control System:

a) Mains power failure

b) Low battery voltage

c) Inverter output over voltage/under voltage

d) Static bypass inhibited

e) UPS fault

The electrical output of the UPS shall be 240 V AC ± 10 V at 50 Hz. The output frequency shall be 50 Hz ± 1 Hz. Total harmonic distortion shall be less than 10%. The UPS shall provide high-frequency noise attenuation for common-mode and normal-mode, commencing at 10 kHz and exceeding 40 dB at 100 kHz and higher frequencies. Output overload protection (current limiting) shall be provided, capable of supplying a continuous short circuit.

Redundant 240 V AC and 50 V DC power supplies capable of supplying Western Power RTU plus the radio/Telstra modem and associated equipment for a period of at least 8 hours shall be provided. The Power supplies shall comply with the requirements of Western Power.

10.10 General Building and Site Services

The Contractor shall provide all building and site services (electricity, telephone, computer, local area network, fire detection and alarm, fire protection, security, interior lighting, site area lighting, socket outlets etc) required for the proper functioning of the plant. The Contractor shall ensure that all such services are readily accessible for maintenance and repair and adequate clearance is provided from main structural members and foundations. All relevant requirements of Australian Standards and the Building Code of Australia shall be complied with when designing and installing the services.

11 CONTROL AND INSTRUMENTATION

11.1 C&I Basis of Design

The power station shall be fully automated.

Each generating unit shall be provided with an individual closed loop control system capable of automatically starting, shutting down, synchronising, protecting, controlling voltage and frequency and responding to load changes.

A Power Station PLC based Control System will integrate and provide overall control of the generating units, switchboards and other plant.

A Supervisory, Control and Data Acquisition (SCADA) system shall monitor the power station subsystems and provide the operator with control and an integrated overview of the entire facility. Provision for remote monitoring and control of the power station shall also be available.

The Power Station shall be capable of remote despatch by the Network Operator and reporting of faults and status to the Network Operator via remote monitoring.

11.2 Control systems

11.2.1 Generator Unit Control

Each Generator shall have its own control and protection sub-system, providing functions such as AVR, frequency control, fuel management, alarm reporting, shutdown and metering.

11.2.2 Power Station PLC System

The Power Station PLC System shall provide the integrated control of the Plant, providing such functions as load management, load sharing, tie CB control, tie CB Synchronising Control, unit CB control, plant Shutdown and presentation of data to the SCADA system. It shall integrate information from the individual subsystems via hardwired signals or fibre optic network to provide overall plant control.

The Power Station Control System shall be a dual redundant system proving true automatic failover to a hot standby in case of a hardware fault. The PLC DC Power Supply shall also be dual redundant.

The Power Station Control System shall consist of separate functional areas for:

- Generator Control
- Electrical Transmission including switchboards and transformers

- Despatch to Network Operator
- Balance of Plant e.g. fuel systems, fire protection and air conditioning

11.2.3 SCADA System

The SCADA HMI shall display a single line view of the power station including each generator, Switchboard CB, transformers and fuel systems. The operator will be able to drill down to more detailed views of individual sub systems.

The SCADA system shall be installed in the control room and provided with an operator's workstation HMI, an engineering workstation, and a facility for the connection of a laptop computer for engineering and configuration. It shall also have a separate facility for the remote connection of one remote operating station and one remote engineering computer.

The SCADA system shall interface via a redundant fibre optic cable system to the Power Station PLC Control System.

The RTU and protection relays shall be synchronised via a GPS clock using a distributed IRIG B signal.

The Contractor shall negotiate the protocol for RTU communications with Western Power according to Western Power's design requirements. The protocol is typically HR6000 or DNP3.

The SCADA system shall monitor power station status, typically including but not limited to:

- Generator status
- Generator protection status
- Generator CB status
- DC Systems and battery status
- HV Switchboard CB status
- Station transformer status
- Step up transformer status
- Fuel system delivery status
- Access gates
- Tie CB
- Synchronisation status
- Availability
- Starting System Status

- Fire System Status
- Fuel volume
- Fuel pump status
- PLC status
- Underfrequency Load Shedding

The SCADA shall provide analogue indication, typically including but not limited to:

- Ambient conditions such as temperature, wind speed, and humidity
- Generator temperature
- Switchroom temperature
- Individual Generator output
- Overall Power station output
- Thermal efficiency
- Power Factor, Current, Frequency and Voltage
- Active, apparent and reactive Power
- Transformer Temperature

The SCADA System shall display and log alarms typically including but not limited to:

- Generator Protection operated
- CB Protection alarms
- Type of protection operated
- Trip Circuit Supervision
- Over temperature
- Oil Pressures
- Fuel pump faults
- Transformer protection alarms e.g. Bucholz, Earth Fault, Overcurrent etc
- Site Security Alarms

The SCADA System shall allow configurable trending of individual analogue, status and alarm signals including but not limited to:

- Generator output

- Station Output
- Frequency, Voltage, Current, Power, Power Factor, Unit temperature
- Alarms
- Fuel Usage

The SCADA System shall allow remote monitoring and control by the Network Operator including:

- Power Station Availability
- CB Status
- Available Capacity
- Despatch

11.2.4 Communications System

The communications system within the facility shall be Single Mode Fibre Optic in ring-topology, inherently dual redundant.

Power Station PLC System Communications Network shall be separated from the SCADA HMI Network.

Fibre Optic Break-Out Trays (FOBOTs) shall be employed throughout. Separate FOBOTs shall be provided for disparate functional areas.

All communications cables between buildings shall be Fibre Optic. Copper communications cable shall be used only within buildings.

A communications system shall be provided to the Network Operator's requirements that shall allow for their SCADA system to remotely view status and control despatch and to provide channels for any Network Operator required protection schemes such as differential or intertripping schemes.

The details of the communication system design shall be negotiated by the Contractor with the Network Operator.

Typically, the Network Operator will require:

- Two direct fibre optic cable connections from the nearest substation to the generating facility. The fibre optic cables should take separate physical paths. For example, one OPGW and one direct buried cable. Both SCADA and protection signals are carried on these cables.
- The fibre optic cables shall be terminated in FOBOTS.

Fibre optic cores shall be provided for Western Power SCADA communications. The Western Power SCADA communications system will typically connect to the Generating Facility using RS232 to single mode fibre optic converters. Fibre optic cores shall also be provided as required for differential protection of the transmission line to the Western Power Substation and for intertripping. Dual differential protection shall be provided on the transmission line. Protection 1 and 2 shall take separate physical paths.

11.2.5 Administrative LAN and Telephone

Provision shall be made for a high speed internet connection. Provision shall be made for a PABX style telephone system as appropriate.

Connection to the Telstra network shall comply with all TELSTRA EPR Isolation requirements including installation of any necessary EPR isolating equipment.

11.2.6 Uninterruptable Power Supply

An uninterruptible power supply (UPS) shall supply eight hours backup supply to:

- Generator control system
- Generator protection system
- Power station VESDA system
- Power station SCADA and PLC system

In addition, emergency evacuation illumination shall be supplied in accordance with the Building Code of Australia. Such emergency light fittings shall be powered via self contained batteries for a minimum duration of two hours.

11.2.7 PLC / SCADA System Redundancy

In addition to the Communications System redundancy, dual redundancy is required as follows:

- CPU's
- CPU chassis power supplies
- SCADA servers

12 CIVIL AND STRUCTURAL TECHNICAL REQUIREMENTS

12.1 Civil, Structural and Architectural

All civil, structural and architectural design and construction shall be carried out in accordance with the latest edition of the Building Code of Australia, other relevant codes, standards and all applicable statutory regulations and shall meet the requirements of the Local, State and Federal Authorities. The Contractor shall provide a power station layout that meets all site constraints and Authority requirements.

All designs shall be certified by a NPER registered professional engineer.

The Civil works shall include a 1.8 m high cyclone mesh fencing with 2 strands of barbed wire on the perimeter of the site, matching gates and security locks.

12.1.1 Site survey

The civil works required shall include all site investigations and data collection, as deemed necessary by the Contractor.

The Contractor shall provide the following site survey functions:

- Initial site survey including all services for design and planning purposes.
- Set out all components of the work.
- Carry out "As Constructed" surveys and provide final site drawings.

The Contractor shall be responsible for fully assessing the actual surface and sub-surface ground conditions applicable to the overall site, for the plant, by their own detailed site investigation. The Contractor shall be fully responsible for arranging a site survey, hydro geological, contamination and hydrological investigations which may be necessary to fully assess surface and sub-surface conditions on site.

12.1.2 Earthworks

The Contactor shall provide all earthworks necessary both for the establishment of the site and for the completion of all the Works under the Contract as approved by Authorities, including but not limited to:

- Levelling and filling of the site,
- All underground services,
- Site drainage and storm water run-off capability,

- Roads and paving, relocation and making good any roads and boundaries altered during the construction works and the provision, and removal on completion and making good, of any temporary services as required.
- A 25 mm layer of blue metal is to be applied across the entire site area with the exception of landscaped areas or as per Council Requirements.
- Internal areas trafficable by vehicles will be constructed using road base or crushed limestone then covered with 25 mm layer of blue metal or as per Council Requirements.
- The Contractor shall provide a layout design drawing showing the location of the access roads and all site equipment and buildings with internal driveways and street access shown. All nominated access driveways shall be designed to carry the vehicle and plant loads that are anticipated during construction and for the effective operation of the site. The design drawing is to be submitted for review by the Owner prior to development approval and works commencement.

12.1.3 Foundations and Concrete Works

The Contractor shall provide all plant foundations and substructure systems.

All concrete work shall be carried out in accordance with AS 3600. All concrete elements shall be designed in accordance with Australian standards for foundations, structural design, material selection and production. Concrete elements retaining liquids, or required to be watertight shall be designed in accordance with AS 3735.

All designs shall be certified by a NPER registered professional engineer.

Substructures, including basins, pits, and foundations for buildings, superstructures, machines and equipment shall be of a quality and rigidity fit for the intended service and environmental conditions.

The structures shall be founded in such a way that settlements are limited to meet equipment supplier's requirements.

The foundations and sub-structures shall be able to transfer all actual load combinations, including dynamic, horizontal and uplift forces, safely to the support soil material.

The Contractor shall analyse (including sub-soil reactions), design and construct the main machine foundation so that no vibration problems occur during operation. The main machine foundations shall be isolated from adjacent construction in order to minimise transmission of vibrations to surrounding structures either directly or through the soil. The design of the foundations for the diesel generator shall ensure that all criteria including vibration, thermal effects, short circuit torque forces and mechanical resonance and critical concrete tolerances are fully accommodated. The design of the foundations for the diesel generators and other plant foundations subject to dynamic loads shall be in accordance with DIN 4024: Part 1 (1988) "Machine Foundations" and CP2012: Part 1 "Foundations for Reciprocating Machines".

The transformer support substructures shall be designed to contain any escaping oil. Segregated ducts shall be provided for any cables installed within the substructures.

Each transformer compound shall comply with the requirements of AS 2067 and be provided with oil sump pumping out facilities for use of portable pumps when necessary. Note example of oil containment for transformer compounds are included in Figures 6.3 to 6.8 of AS 2067.

12.1.4 Engine Hall / Enclosures

An engine hall building or enclosures shall be installed to contain the generating units and auxiliary equipment required for operation of the plant. The engine hall or enclosures shall be designed to adequately protect the generators from the elements as well as include acoustic treatment to contain external noise to the levels required to meet the regulations.

OHS signage as per the relevant codes and standards shall be installed recommending PPE and caution when personnel are within the engine hall.

The layout of the engine hall or enclosures shall consider space requirements for construction and maintenance access. The engine hall or enclosures shall allow complete removal of the generator set.

Adequate ventilation shall be provided to limit the temperature rise within the engine hall or enclosures to 10℃ above ambient temperature.

Adequate lighting shall be provided for maintenance purposes. Permanent lifting equipment shall be installed as required to facilitate maintenance operations.

12.1.5 Other Buildings / Facilities

A workshop shall be provided on the site and shall consist of a 10 m x 20 m metal clad building. The design of the building shall meet the requirements of the BCA and be suitable for access with a forklift and other vehicles.

An ablutions facility shall be installed at the site in accordance with the BCA and local council requirements. The ablutions facility shall include hand washing facilities and a toilet.

13 CONSTRUCTION REQUIREMENTS

13.1 Construction Facilities, Services and Utilities

The Contractor shall purchase, expedite, inspect, and pay for, in Contractor's name (as an independent contractor and not as an agent of the Owner) all supervision, labour, materials, equipment, services, tools, machinery, utilities, transportation, buildings and other facilities and services necessary for the construction of the power plant, whether of a temporary or permanent nature, including, without limitation, facilities and services necessary for potable and service water, wastewater disposal (including sewage), waste disposal, communications, and electric power.

The Contractor shall secure applicable construction permits required for the construction Work as per the Scope of Work. The Contractor shall obtain the necessary data pertaining to existing underground and in-ground facilities and the proper clearances to excavate, prior to performing any excavation.

13.2 Materials and Techniques

All materials used for the construction of the equipment shall be new and shall be in accordance with the requirements of this Specification. Materials utilized for various components shall be those which are normally used in such applications.

All material used for equipment manufacture including casting and forging etc. shall be of tested quality as per relevant codes/standards. Details of results of the tests conducted to determine the mechanical properties; chemical analysis and details of heat treatment procedure recommended and actually followed shall be recorded on certificates and time temperature chart. Tests shall be carried out as per applicable material standards and/or agreed details.

No material shall be dispatched from the manufacturer's works before the same is accepted, subsequent to pre-dispatch final inspection including verification of records of all previous tests/inspections by Owner's Project Manager/Authorised representative and duly authorized for dispatch by issuance of Material Despatch Clearance Certificate (MDCC).

The Contractor shall submit a Field Welding Dossier including all supporting documents like welding procedures, heat treatment procedures, NDT procedures etc. to the Owner at least ninety (90) days before schedule start of erection work at site.

All welders and welding operators employed on any part of the contract either in Contractor's/sub-Contractor's works or at site or elsewhere shall be qualified as per AS 1796 or other equivalent standard approved by the Owner.

13.3 General and Specific Requirements

The Contractor's scope shall include, but not be limited to, supervision, labour, supplies, materials, equipment, tools, temporary facilities and equipment, transportation, security of equipment and materials, and all work required to perform the construction.

The Contractor shall plan, co-ordinate and supervise the delivery, installation, commissioning and testing of all supplied materials, components and equipment and shall provide all necessary experienced supervisory personnel to undertake the work.

The Contractor shall prepare and submit to the Owner for approval, a comprehensive HSE Management Plan for the execution of the Works. The Contractor shall nominate an individual who shall be responsible for the Health, Safety and Environmental (HSE) performance of the Works. A full time HSE site representative shall be provided by the Contractor during all construction, commissioning and testing phases of the Works.

The Contractor and all subcontractors shall have Quality Systems that meet the requirements of the IS09001 standard or equivalent. The Contractor shall prepare and submit to the Owner for approval, a Quality Assurance Plan which contains applicable procedures, design verification plans and inspection and test plans required for the Work.

The Contractor shall provide a suitably qualified and experienced "Liaison Manager" to be based in Perth WA, for the duration of the works.

13.4 Construction Environmental Management Plan

The proposed development will be constructed in accordance with the conditions listed within a Construction Environmental Management Plan (CEMP) as prepared by the Contractor and approved by the relevant environmental regulator and the Owner. As a minimum, the CEMP shall detail the following:

- Acid sulphate soil management.
- Air quality and dust management.
- Hydrocarbon management.
- Spills and contamination.
- Erosion and sediment control.
- Noise and operating hours.
- Waste management.
- Complaint handling.
- Environmental incidents and emergencies.

14 INSPECTION, TESTING AND COMMISSIONING

14.1 Inspection and Testing

During the course of manufacture, all work may be subject to progressive inspection and expediting by the Owner or his representative.

The Contractor shall give the Owner at least ten days advance written notice prior to testing to confirm if the Owner would like to be present to inspect or witness the testing.

Each item of equipment shall be subjected to and satisfactorily pass the routine tests specified in the relevant Australian Standard.

14.2 Commissioning

The Contractor shall submit a commissioning plan to the Owner for approval one month prior to the commencement of commissioning. The commissioning plan shall detail the inspections, tests and procedures for commissioning the power station and shall include a commissioning schedule.

14.3 Performance Testing

A performance test shall be conducted, as soon as practicable after full load commissioning to confirm that the actual performance complies with the specified and guaranteed performance. The Contractor shall supply a detailed performance testing plan, procedures and schedule for approval prior to commencing performance testing.

The performance tests shall be conducted in accordance with ASME PTC17 or ISO 8178.

Refer to Section 18 for further details of the performance testing requirements.

15 OPERATION

The power station shall be designed and set out for ease of operation and maintenance. All valves, instruments and isolations shall be operable from ground level where possible. Access stairs and platforms shall be installed in accordance with AS 1657 where ground level access is not possible.

It shall be possible to positively isolate and lock out all sources of energy to enable maintenance on plant components to be carried out safely. The balance of the plant shall remain available for operation.

The Contractor shall provide 36 months of operating spares (based on 500 hours per year). First fills of all lubricants, coolants and other fluids shall be provided by the Contractor except for diesel. All diesel for testing and operation will be supplied by the Owner.

The power station will be an unmanned facility that will be started and stopped remotely. Regular maintenance will be required to ensure the power station will operate reliably when required. The Contractor shall include 36 months of maintenance including the provision of all consumables and lubricants.

16 DOCUMENTATION

16.1 Contract Documentation

The Contractor shall supply contract documentation including design drawings, calculations, reports, equipment data, as-built drawings, MDRs, ITPs, ITRs, execution schedules and manuals for the installation commissioning, operation and maintenance of the power station, as required by the Owner.

All documentation shall be provided that proves compliance with all requirements of the statutory and regulatory bodies.

Final document submission list shall be mutually agreed between the Owner and the Contractor. All drawings shall be as built by the Contractor and be provided to the Owner in AutoCAD or Microstation format.

16.2 Quality

The Contractor shall demonstrate that it operates a quality system in accordance with an internationally recognised standard. The effectiveness of the quality system and the Contractor's compliance shall be subject to monitoring by the Owner and in addition, may be audited following an agreed period of notice.

The Contractor shall provide facilities for and cooperate with the Owner during manufacturing, assembly and testing.

Components shall be inspected and tested in accordance with quality control and assurance procedures nominated by the Contractor and approved by the Owner. The Contractor and Owner shall identify hold and witness points for access by the Owner.

Preference will be given to contractors who have gained and maintained a quality system certified to ISO 9001.

17 OPERATOR TRAINING

Prior to station handover the Contractor shall provide training for up to four people on the operation of the installation. The training shall cover all areas of operation of the plant, including but not limited to:

- Fuel systems.
- Generator operation.
- Control systems.
- Emergency procedures.
- Maintenance procedures.
- Western Power operational requirements.

18 GUARANTEES AND PERFORMANCE TESTING REQUIREMENTS

18.1 Power Plant Performance

18.1.1 Plant Operation Requirements

The peaking diesel power plant is intended to be able to deliver 60 MW reliably over the full range of operating conditions including extremely high ambient temperatures. It is anticipated that the power station will operate for less than 500 hours per year. The power plant shall meet minimum performance requirements set out in Table 1. The net power output shall be measured at the 132 kV switchgear when the power station is operating with all required auxiliaries.

Table 1 - Minimum Performance Requirements

Nominal Net Power Output	60 MW @ 41°C
Emissions (50% load to 100% load)	Refer to Section 6.1, Environmental Requirements
Noise Near Field (@1 m horizontal distance from enclosure, if installed outdoor and furnished with enclosure)	≤ 85 dB(A)
Noise Near Field (@1 m horizontal distance from DG set, if installed inside a generator building)	≤ 105 dB(A)
Noise at the power station boundary	≤ 65 dB(A)
Compliance with Regulatory Approvals	

18.1.2 Electricity Quality Requirements

In addition to above operation requirements, the power plant electricity output shall meet the requirements of Western Power's "Technical Rules For The Southwest Interconnected Network", especially those performance requirements detailed out in Section 3 of the Technical Rules.

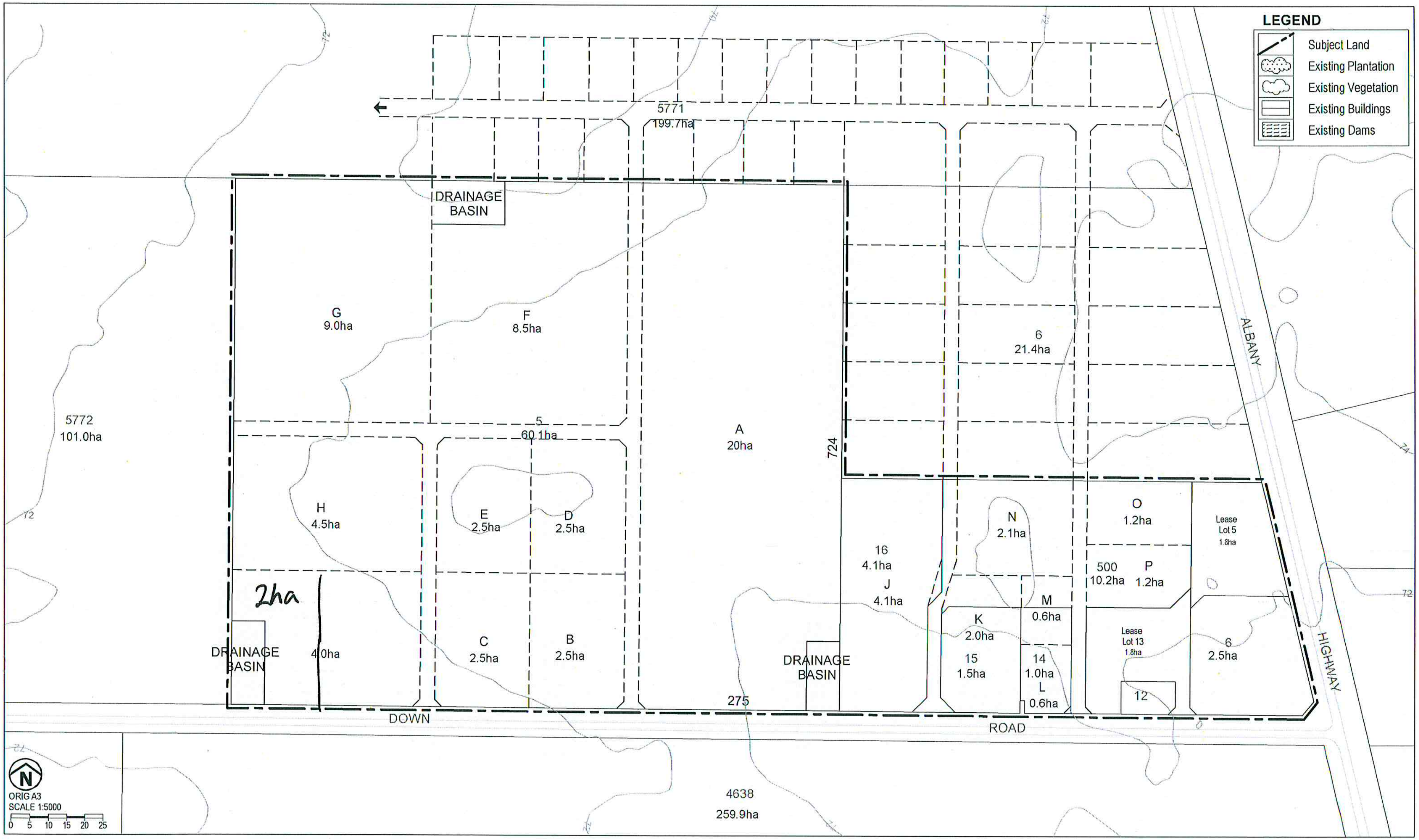
18.2 Performance Test Criteria

The net power output, net plant heat rate and plant emission tests shall be determined in accordance with ASME PTC 17 or ISO 8178 as required herein. Tests shall be completed based on diesel fuel supplied by the Owner.

Each performance test item shall meet criteria outlined in this specification.

The power station shall also meet technical requirements for network connection stipulated in Western Power's Technical Rules.

Appendix 1 Site Location



SUBDIVISON GUIDE PLAN
Mirambeena Special Industrial Area
Down Road
Drome, City of Albany

08-49-SGP(f) AUGUST 09

11 Duke Street
Albany WA 6330
Ph 9842 2304 Fax 9842 8494

Appendix 2 Geotechnical Data

Tesla Corporation
Albany Power Station
Soil Assessments

Prepared for:

Tesla Corporation Pty Ltd

April 2011

Prepared by:

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MBS ENVIRONMENTAL

TESLA CORPORATION
ALBANY POWER STATION
SOIL ASSESSMENTS
APRIL 2011

PREPARED FOR

TESLA CORPORATION PTY LTD

This report has been prepared for **Tesla Corporation Pty Ltd** on the basis of instructions and information provided by **Tesla Corporation Pty Ltd** and therefore may be subject to qualifications which are not expressed.

No other person other than those authorised in the report distribution record may use or rely on this report without confirmation in writing from MBS Environmental. MBS Environmental has no liability to any other person who acts or relies upon any information contained in this report without confirmation.

This report has been checked and released for transmittal to **Tesla Corporation Pty Ltd**.

PREPARED BY:
Kirsi Kauhanen
Environmental Scientist

Signature: K. Kauh Date: 08/04/11

CHECKED BY:
James Cumming
Senior Environmental Geoscientist

Signature: Cumming Date: 08/04/11

TESLA CORPORATION
ALBANY POWER STATION
SOIL ASSESSMENTS

APRIL 2011

PREPARED FOR

TESLA CORPORATION PTY LTD

BY

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environmental and water resource consultants

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1. INTRODUCTION

1.1 BACKGROUND

Tesla Corporation Pty Ltd (Tesla) propose to construct a diesel-fired, peak load power station in Drome (City of Albany) Western Australia. The station will comprise four, 2.5 megawatt diesel power generation units for a combined output of 9.9 megawatts. The station will generate peak load power which will be fed into the South-West Interconnected System (SWIS). The installation is intended to provide reserve capacity based on anticipated future power demands, as forecasted by the Independent Market Operator (IMO).

SWIS is the major interconnected electricity network in Western Australia. It supplies the bulk of the south-west region, extending to Geraldton in the north, Albany in the south, and the Kalgoorlie mining communities to the east.

1.2 SITE DETAILS

The site is located on Lot I of Lot 5 Diagram 72145 on Down Road in Drome approximately 15 kilometres north of Albany in Western Australia (Figure 1). The site forms part of the Mirambeena industrial estate. A legal description of the site is provided in Table 1.

Table 1: Site Details

Identification	Details
Coordinates (MGA94, Zone 50)	571024 metres east, 6135174 metres south
Street Address	Lot I of Lot 5 D 72145 Downs Road, Drome.
Property Description	Vacant land
Property Size	Approximately 4.0 hectares
Local Government	City of Albany
Current Land Use	Grazing (zoned for General Industry)
Proposed Land Use	General industry

1.3 SITE HISTORY

The proposed site is located on general industry zoned land (Mirambeena Industrial Estate) in an otherwise rural setting, approximately three kilometres northwest of the Albany Airport. The industrial area is currently under development by LandCorp and is designed to provide land for a range of industries, including timber, farm produce and fishing. The Mirambeena Industrial Estate covers a surface area of approximately 80 hectares. Prior to establishment of the Mirambeena Industrial Estate, the land was used for general farming purposes.

Industries established within the vicinity of site are detailed in Table 2. No known contaminated sites are located within or in the vicinity of the project site. The closest known contaminated sites are located in the Albany foreshore area, approximately 15 kilometres south of the project area.

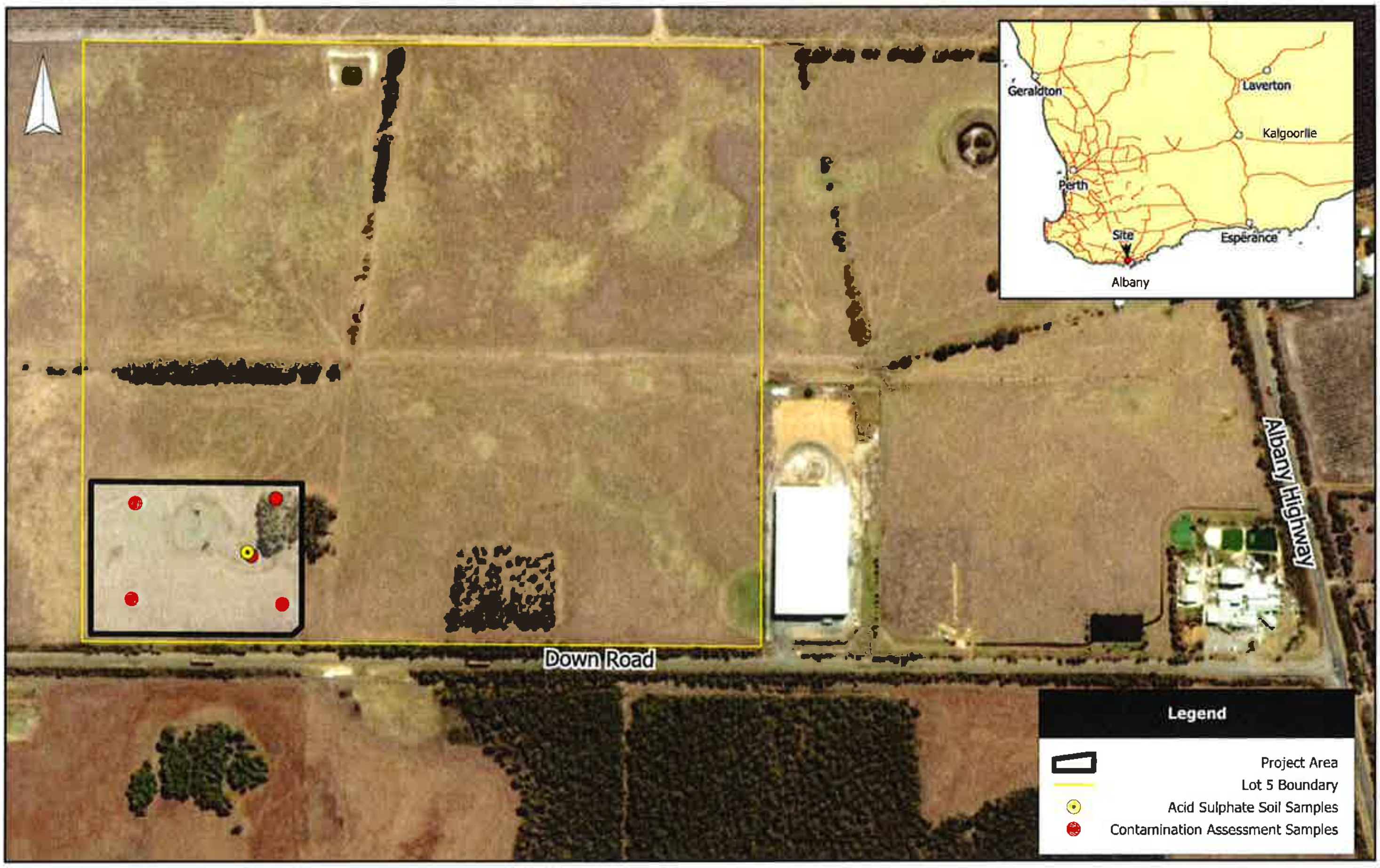
Table 2: Surrounding Industries

Name	Type/Description
Mt Romance Australia Pty Ltd.	Sandalwood processing factory, retail outlet, café.
Ravensdown Fertiliser Cooperative Ltd.	Fertiliser storage and distribution facility.
Unknown.	Grain processing facility.
Albany Plantation Export Company.	Timber processing facilities (woodchip mill).
BP Australia.	Bulk petroleum storage facility (at the airport).
Water Corporation.	Waste water treatment plant.

1.4 OBJECTIVES

The objectives of this soil assessment are:

- To determine whether or not the site has been contaminated by common organic and inorganic (acidity and metals) pollutants as a result of previous land use activities.
- To determine whether or not Acid Sulphate Soil (ASS) materials are present on the site to a depth of up to two metres below the existing ground surface.
- To determine basic engineering properties.



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Scale: 1:6000
Original Size: A4
Grid: MGA94(50)

0 200 m

Tesla Corporation
Albany Soil Assessment

Albany Generator Location

Figure 1

C:\Documents and Settings\kkauhanen\My Documents\Tesla\Albany\Albany SAP.map 18/03/2011 F1

2. SOIL ASSESSMENTS

2.1 ACID SULPHATE SOIL ASSESSMENT

2.1.1 Soil Sampling

A total of five soil samples were collected from a single sampling location during the site ASS assessment. Samples were collected in 250 millimetre intervals to a refusal depth of 1250 millimetres.

Samples were stored in sealed plastic bags and refrigerated prior to being transported to the laboratory in an esky filled with ice bricks. Each sample was screened by the laboratory for acid forming potential using pH_F and pH_{FOX}, with any potentially acid forming samples being further tested using the Suspension Peroxide Oxidation Combined Acidity and Sulphur test suite (SPOCAS).

2.1.2 Results and Discussion

Descriptions of each sample and results for the pH_F and pH_{FOX} tests are presented in Table 3. No visible indications of physical contamination were observed in any of the sampled material. The original laboratory reports are presented in Appendix 1.

Table 3: Albany ASS Sample Descriptions

Depth (metres)	Description	pH_F	pH_{FOX}	Reaction
0.00 – 0.25	Grey silty sand with organic matter and rootlets. Dry.	5.5	4.5	Moderate
0.25 – 0.50	Grey silty sand with organic matter and rootlets. Dry.	5.7	4.4	Moderate
0.50 – 0.75	Grey sandy clay. Moist.	5.3	3.2	Moderate
0.75 – 1.00	Grey silty sand. Moist.	5.9	1.8	High
1.00 – 1.25	Grey/brown clayey gravel, mottled. Moist.	5.9	2.3	Extreme

The results were interpreted in accordance with Department of Environment and Conservation (DEC) guidelines for identifying ASS (DEC 2009). On the basis of screening tests for pH_F, which ranged from pH 5.5 to 5.9, and pH_{FOX} which ranged from pH 1.8 to 4.5, it was concluded that whilst the results did not indicate Actual Acid Sulphate Soil (AASS), the two deepest samples (between 0.75-1.25 metres) indicated Potential Acid Sulphate Soil (PASS). The indication of PASS was also supported by the recorded rates of reaction with peroxide, being high and extreme in the two deepest samples. Due to early refusal at the site, MBS Environmental was unable to obtain deeper samples for assessment. The ASS risk map for the wider Albany area (DEC 2006) rates the project site as a 'no known risk of ASS'.

Due to the identification of PASS, further laboratory analysis was conducted on the two deepest soil samples. The additional testing comprised the SPOCAS suite and the results are presented as Appendix 2. Net acidity for 0.75-1.00 metre depth was 60 moles of H^+ per tonne and for 1.00-1.25 metre depth 62 moles of H^+ per tonne. These results confirm that the soil below 0.75 metres has potential to generate additional acidity when disturbed. The results exceed the action criteria set for net acidity (DEC 2009) and consequently an Acid Sulfate Soil Management Plan (ASSMP) will need to be developed and implemented for the site if soil disturbance is required.

2.2 CONTAMINATION ASSESSMENT

2.2.1 Soil Sampling

Five soil samples were collected across the project area from the surface to a sampling depth of 50 millimetres below existing ground levels. The samples were placed in pre-washed, laboratory-provided, 250 millilitre glass containers. The samples were then refrigerated prior to being placed in an esky with ice/cooling blocks and delivered to the laboratory.

2.2.2 Laboratory Results and Discussion

All samples were analysed by SGS Laboratories, which is accredited by NATA for all tests performed. The samples were tested for a range of potential organic and inorganic contaminants. A summary of results for major organic and inorganic contaminants are presented in Table 4 and Table 6 respectively. Measured concentrations are compared to Ecological Investigation Levels (EIL) listed in the National Environment Protection (Assessment of Site Contamination) Measure (NEPC 1999). The original laboratory reports are presented in Appendix 1.

Table 4: Organic Contaminant Analytical Results

Parameter	Units	EIL	A-1	A-2	A-3	A-4	A-5
Total Recoverable Hydrocarbons							
C_6-C_9	mg/kg	100	<20	<40	<20	<40	<20
C_{10}-C_{14}	mg/kg	500	<20	290	<20	<20	<20
C_{15}-C_{28}	mg/kg	-	73	2000	93	170	190
C_{29}-C_{35}	mg/kg	-	100	1300	190	290	240
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	1	<0.1	<0.2	<0.1	<0.2	<0.1
Toluene	mg/kg	3	<0.1	<0.2	<0.1	<0.2	<0.1
Ethyl benzene	mg/kg	5	<0.1	<0.2	<0.1	<0.2	<0.1
Xylenes	mg/kg	5	<0.4	<0.7	<0.4	<0.7	<0.4
Organochlorine Pesticides (OC)							
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlordane	mg/kg	0.5	<0.2	<0.2	<0.2	<0.2	<0.2
Heptachlor	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Total OCs	mg/kg	1	-	-	-	-	-

All results for Monocyclic Aromatic Hydrocarbons and Organochlorine Pesticides were below reporting limits for the specific methods.

Hydrocarbons were present across the site. Elevated concentrations of the heavier hydrocarbon fractions (C_{15}-C_{28} and C_{29}-C_{35}) were identified in all samples. While the majority of these concentrations may be attributable to naturally occurring aliphatic organic compounds within the soil, sample A-2 contained excessively high concentrations (2,000 milligrams per kilogram of the C_{15}-C_{28} hydrocarbon fraction and 1,300 milligrams per kilogram of the C_{29}-C_{36} hydrocarbon fraction), which suggests that the site has been impacted by historical land use. No EILs have been set for these heavier hydrocarbon fractions and it was necessary to undertake further testing to determine whether the material poses a risk to human health or the environment.

The additional analysis comprised the speciation of aliphatic and aromatic hydrocarbons in two of the heavier fractions (C_{16}-C_{28} and C_{28}-C_{35}) of sample A-2. The results and relevant Health Investigation Levels (HIL) are presented in Table 5. The original laboratory report is presented in Appendix 2.

Aliphatic hydrocarbon results did not exceed any of the HILs. Total aromatic hydrocarbons (>C_{16}-C_{35}) exceeded the HILs for residential and recreational land uses but remained under the HIL for commercial/industrial land use. As the subject land is zoned and proposed to be used for industrial purposes, the relevant HIL was not exceeded.

Although the relevant HIL was not exceeded, the results of this high level assessment indicate a degree of contamination. Whilst gross contamination of the site is unlikely to have occurred, it is recommended that further assessment of the area be undertaken to ensure that there is no other material containing aromatic hydrocarbons in excess of the HIL for industrial land use.

Table 5: Aliphatic and Aromatic Hydrocarbon Analysis Results for Sample A-2

Parameter	Units	HIL A*	HIL D*	HIL E*	HIL F*	A-2
Aliphatic						
Aliphatic >C_{16}-C_{28}	mg/kg	-	-	-	-	<45
Aliphatic >C_{28}-C_{35}	mg/kg	-	-	-	-	59
Aliphatic Total (>C_{16}-C_{35})	mg/kg	5,600	22,400	11,200	28,800	<90
Aliphatic >C_{35}-C_{40}	mg/kg	-	-	-	-	<100
Aromatic						
Aromatic >C_{16}-C_{28}	mg/kg	-	-	-	-	190
Aromatic > C_{28}-C_{35}	mg/kg	-	-	-	-	180
Aromatic Total (>C_{16}-C_{35})	mg/kg	90	360	180	450	370

*Health Investigation Levels: A= Standard residential, D= Residential with minimal soil exposure, E= Parkland/Recreational, D= Commercial/Industrial.

Table 6 shows the analytical results for metals. Cadmium, lead and nickel concentrations were found to be below the limit of reporting in all samples. All metal concentrations were below the reporting limit at site A-3. At the other four sites, A-1, A-2, A-4 and A-5, arsenic, chromium, copper, mercury and zinc were all present in low concentrations, well below the respective EIL and within the natural background range. These results confirm that heavy metal contamination from previous land use activities has not occurred on any of the sample sites.

Table 6: Inorganic Contaminant Analytical Results

Parameter	Units	EIL	A-1	A-2	A-3	A-4	A-5
Arsenic	mg/kg	20	8	3	<2	<2	2
Cadmium	mg/kg	3	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	400	23	11	<5	6	42
Copper	mg/kg	100	6	15	<5	6	8
Lead	mg/kg	600	<5	<5	<5	<5	<5
Mercury	mg/kg	1	<0.05	0.08	<0.05	<0.05	0.07
Nickel	mg/kg	60	<4	<4	<4	<4	<4
Zinc	mg/kg	200	6	51	<5	<5	25

2.3 GEOTECHNICAL ASSESSMENT

2.3.1 Soil Sampling

The soil was inspected by a suitably qualified environmental geoscientist and a single 20 kilogram bulk sample was collected for geotechnical testing from between 0 and 250 millimetres below existing ground level. Testing was undertaken in accordance with the relevant Australian Standard 1289 procedures and comprised:

- Particle size distribution (PSD) – AS 1289.3.6.1.
- Atterberg limits.
  - Liquid limit – AS 1289.3.9.2.
  - Plastic limit – AS 1289.3.2.1.
  - Plasticity index – AS 1289.3.3.2.
  - Linear shrinkage – AS 1289.3.4.1.

2.3.2 Analytical Results and Discussion

The sample was analysed by SGS Laboratories, which is accredited by NATA for all tests performed. A summary of results is provided in Table 7. The original laboratory report is provided in Appendix 3.

Table 7: Geotechnical Properties

Test Item		%
Particle Size Distribution	Gravel	14
	Sand	71
	Fines	15
Atterberg Limits	Liquid Limit	66
	Plastic Limit	52
	Plasticity Index	14
	Linear Shrinkage	8.0

Based on these results and in accordance with Australian Standard 1726-1993, the soils can be described as follows:

SILTY GRAVELLY SAND (SC). Grey, high plasticity, silty sand with gravel. COLLUVIUM.

This material was present to a depth of approximately 1.25 metres below existing ground levels. A layer of clayey gravel was encountered below this material, however due to sampling difficulties, a sample was not collected.

2.3.3 Recommendations

Site construction works should be preceded by appropriate preparation of the ground surface in the area of proposed development. Preparation should be undertaken in accordance with Australian Standard AS 3798-2007. In addition to AS 3798-2007, MBS Environmental recommends the following:

- Identification and diversion or protection of any buried services within the work areas.
- Clearing of surface objects (including building debris, old structures, footings or refuse).
- Grubbing of any tree roots.
- Removal of topsoil containing notable quantities of organic material (e.g. plant roots).
- Contouring/shaping of the ground surface to ensure any stormwater runoff drains from the site.
- Scarification and compaction of prepared surfaces prior to any engineering fill placement.

Slabs should be designed by a suitably qualified engineer as the site may experience moderate to high levels of ground movement with changes in soil moisture content.

3. CONCLUSIONS

3.1 CONTAMINATION ASSESSMENT

The assessment found no evidence to suggest that heavy metal contamination has occurred as a result of previous land use activities. Heavy metal concentrations of all samples were well below the respective Ecological Investigation Levels and in many cases below reporting limits for the specific method.

The assessment also did not find any evidence to suggest contamination by Monocyclic Aromatic Hydrocarbons or Organochlorine Pesticides. Concentrations of these substances in all samples were below reporting limits for the specific methods.

The assessment identified elevated concentrations of the heavier hydrocarbon fractions (C_{15}-C_{28} and C_{29}-C_{35}) in all samples. Additional testing of one sample found that concentrations of total aromatic hydrocarbons ($>C_{16}$-C_{35} fraction) exceeded Health Investigation Levels (HIL) for residential and recreational land uses while staying below the HIL for industrial land use. These results indicate that previous land use may have resulted in low degree hydrocarbon contamination. Further assessment of the area is recommended to ensure that there is no other material containing aromatic hydrocarbons in excess of the HIL for industrial land use.

3.2 ACID SULPHATE SOIL ASSESSMENT

Samples above the depth of 0.75 metres did not indicate presence of ASS. However, between depths of 0.75 and 1.25 metres, the soil was found to have potential to generate acidity when disturbed. Samples from below 1.25 metres were not collected due to early refusal with the hand auger. It is therefore unknown whether ASS materials exist below this depth. Net acidity of samples between 0.75 and 1.25 metres exceeded action criteria set by DEC (2009) and consequently an Acid Sulfate Soil Management Plan (ASSMP) will need to be developed and implemented for the site if subsoil disturbance is required.

3.3 GEOTECHNICAL ASSESSMENT

Soils at the Albany site comprise silty gravelly sands of high plasticity. These soils may be subject to moderately high ground movement with changes in soil moisture content (shrink/swell). The soil properties (Appendix 2) should be reviewed by a suitably qualified engineer to determine the appropriate construction requirements.

4. REFERENCES

Australian Standard AS 1726-1993. Geotechnical Site Investigations. Standards Australia.

Department of Environment and Conservation (DEC). 2009. *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes*. Acid Sulfate Soils Guideline Series. Government of Western Australia. May 2009.

National Environment Protection (Assessment of Site Contamination) Measure 1999. National Environment Protection Council (NEPC). December 1999.

MBS Environmental Report Distribution Record

Report Title: **Tesla Corporation**
Albany Power Station
Soil Assessments
April 2011

Project Code: **TESPOW**

Name/Title	Company	Copy No.	Date	Authorised By
Ben Tan Chief Executive Officer	Tesla Corporation	Electronic Only	08/04/2011	James Cumming

Approval Signature:

Cumming

These Technical Reports:

-
-

APPENDICES

APPENDIX 1:
LABORATORY REPORT
CONTAMINATION AND ACID SULPHATE SOILS

ANALYTICAL REPORT

NATA
WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS		LABORATORY DETAILS	
Contact	James Cumming	Manager	Said Hirad
Client	MBS ENVIRONMENTAL	Laboratory	SGS Newburn Environmental
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Telephone	08 9226 3166	Telephone	(08) 9373 3500
Facsimile	08 9226 3177	Facsimile	(08) 9373 3556
Email	jcumming@mbsenvironmental.com.au	Email	au.environmental.perth@sgs.com
Project	**TESPOW Albany Generator Site**	SGS Reference	PE055990 R0
Order Number	(Not specified)	Report Number	0000016160
Samples	10	Date Reported	14 Mar 2011
		Date Received	02 Mar 2011

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(898/20210).

BTEX and C6C9 (purge and trap) detection limits were raised for samples "A3 0mm" and "A4 0mm" due to the presence of surfactants in which dilution was required.

The matrix spike and matrix spike duplicate for Zn on 'Anonymous' sample failed due to high background of the target analytes.

SIGNATORIES

Dave Williams
National Organic Manager

Kurt Blackman
Inorganic Team Leader - Soils

Pamela Adams
Organic Team Leader

Said Hirad
Laboratory Manager

ANALYTICAL REPORT

PE055990 R0

Parameter	Units	LOR	Sample Number: PE055990.001 Sample Matrix: Soil Sample Date: 01 Mar 2011 Sample Name: A1 0mm	PE055990.002 Soil 01 Mar 2011 A2 0mm	PE055990.003 Soil 01 Mar 2011 A3 0mm	PE055990.004 Soil 01 Mar 2011 A4 0mm	PE055990.005 Soil 01 Mar 2011 A5 055

Moisture Content Method: AN234

Parameter	Units	LOR	A1 0mm	A2 0mm	A3 0mm	A4 0mm	A5 055
% Moisture	%	0.5	8.4	20	11	14	26

Metals in Soil by ICPOES Method: AN/320AN321

Parameter	Units	LOR	A1 0mm	A2 0mm	A3 0mm	A4 0mm	A5 055
Arsenic, As	mg/kg	2	8	3	<2	<2	2
Cadmium, Cd	mg/kg	0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium, Cr	mg/kg	5	23	11	<5	8	42
Copper, Cu	mg/kg	5	6	15	<5	6	8
Lead, Pb	mg/kg	5	<5	<5	<5	<5	<5
Nickel, Ni	mg/kg	4	<4	<4	<4	<4	<4
Zinc, Zn	mg/kg	5	6	51	<5	<5	25

Mercury in Soil Method: AN312

Parameter	Units	LOR	A1 0mm	A2 0mm	A3 0mm	A4 0mm	A5 055
Mercury	mg/kg	0.05	<0.05	0.08	<0.05	<0.05	0.07

Volatile Petroleum Hydocarbons in Soil Method: AN433/AN434

Parameter	Units	LOR	A1 0mm	A2 0mm	A3 0mm	A4 0mm	A5 055
TRH C6-C9	mg/kg	20	<20	<40↑	<20	<40↑	<20
Benzene	mg/kg	0.1	<0.1	<0.2↑	<0.1	<0.2↑	<0.1
Toluene	mg/kg	0.1	<0.1	<0.2↑	<0.1	<0.2↑	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.2↑	<0.1	<0.2↑	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.4↑	<0.2	<0.4↑	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.2↑	<0.1	<0.2↑	<0.1
MtBE(Methyl-tert-butyl ether)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Surrogates

Parameter	Units	LOR	A1 0mm	A2 0mm	A3 0mm	A4 0mm	A5 055
d4-1,2-dichloroethane (Surrogate)	%	-	109	108	116	104	101
d8-toluene (Surrogate)	%	-	115	110	120	108	103
Dibromofluoromethane (Surrogate)	%	-	109	102	118	106	101
Bromofluorobenzene (Surrogate)	%	-	111	112	116	106	97

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

Parameter	Units	LOR	A1 0mm	A2 0mm	A3 0mm	A4 0mm	A5 055
TRH C10-C14	mg/kg	20	<20	290	<20	<20	<20
TRH C15-C28	mg/kg	45	73	2000	93	170	190
TRH C29-C36	mg/kg	45	100	1300	190	290	240

Surrogates

Parameter	Units	LOR	A1 0mm	A2 0mm	A3 0mm	A4 0mm	A5 055
TRH (Surrogate)	%	-	100	115	100	95	98

OC Pesticides in Soil Method: AN400/AN420

Parameter	Units	LOR	A1 0mm	A2 0mm	A3 0mm	A4 0mm	A5 055
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HCB (Hexachlorobenzene)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Parameter	Units	LOR	Sample Number: PE055990.001 Sample Matrix: Soil Sample Date: 01 Mar 2011 Sample Name: A1 0mm	PE055990.002 Soil 01 Mar 2011 A2 0mm	PE055990.003 Soil 01 Mar 2011 A3 0mm	PE055990.004 Soil 01 Mar 2011 A4 0mm	PE055990.005 Soil 01 Mar 2011 A5 055

OC Pesticides in Soil Method: AN400/AN420 (continued)

p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Surrogates

d14-p-terphenyl (Surrogate)	%	-	112	114	120	118	118

OP Pesticides in Soil Method: AN400/AN420

Dichlorvos	mg/kg	1	<1	<1	<1	<1	<1
Dimethoate	mg/kg	1	<1	<1	<1	<1	<1
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Surrogates

d14-p-terphenyl (Surrogate)	%	-	112	114	120	118	118

Field pH for Acid Sulphate Soil Method: AN104

Reaction*	No unit	-	-	-	-	-	-
pH Difference*	pH Units	-	-	-	-	-	-
PHf	pH Units	-	-	-	-	-	-
PHfox	pH Units	-	-	-	-	-	-

Parameter	Units	LOR	PE055990.006	PE055990.007	PE055990.008	PE055990.009	PE055990.010
Sample Matrix			Soil	Soil	Soil	Soil	Soil
Sample Date			01 Mar 2011	01 Mar 2011	01 Mar 2011	01 Mar 2011	01 Mar 2011
Sample Name			ASS 1 0mm	ASS 2 250mm	ASS 3 500mm	ASS 4 750mm	ASS 5 1000mm

Moisture Content Method: AN234

% Moisture	%	0.5	-	-	-	-	-

Metals in Soil by ICPOES Method: AN/320AN321

Arsenic, As	mg/kg	2	-	-	-	-	-
Cadmium, Cd	mg/kg	0.4	-	-	-	-	-
Chromium, Cr	mg/kg	5	-	-	-	-	-
Copper, Cu	mg/kg	5	-	-	-	-	-
Lead, Pb	mg/kg	5	-	-	-	-	-
Nickel, Ni	mg/kg	4	-	-	-	-	-
Zinc, Zn	mg/kg	5	-	-	-	-	-

Mercury in Soil Method: AN312

Mercury	mg/kg	0.05	-	-	-	-	-

Volatile Petroleum Hydocarbons in Soil Method: AN433/AN434

TRH C6-C9	mg/kg	20	-	-	-	-	-
Benzene	mg/kg	0.1	-	-	-	-	-
Toluene	mg/kg	0.1	-	-	-	-	-
Ethylbenzene	mg/kg	0.1	-	-	-	-	-
m/p-xylene	mg/kg	0.2	-	-	-	-	-
o-xylene	mg/kg	0.1	-	-	-	-	-
MtBE(Methyl-tert-butyl ether)	mg/kg	0.5	-	-	-	-	-

Surrogates

d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-	-
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-	-

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

TRH C10-C14	mg/kg	20	-	-	-	-	-
TRH C15-C28	mg/kg	45	-	-	-	-	-
TRH C29-C36	mg/kg	45	-	-	-	-	-

Surrogates

TRH (Surrogate)	%	-	-	-	-	-	-

OC Pesticides in Soil Method: AN400/AN420

Alpha BHC	mg/kg	0.1	-	-	-	-	-
HCB (Hexachlorobenzene)	mg/kg	0.1	-	-	-	-	-
Beta BHC	mg/kg	0.1	-	-	-	-	-
Lindane	mg/kg	0.1	-	-	-	-	-
Delta BHC	mg/kg	0.1	-	-	-	-	-
Heptachlor	mg/kg	0.1	-	-	-	-	-
Aldrin	mg/kg	0.1	-	-	-	-	-
Heptachlor epoxide	mg/kg	0.1	-	-	-	-	-
Isodrin	mg/kg	0.1	-	-	-	-	-
Gamma Chlordane	mg/kg	0.1	-	-	-	-	-
Alpha Chlordane	mg/kg	0.1	-	-	-	-	-
Alpha Endosulfan	mg/kg	0.2	-	-	-	-	-
p,p'-DDE	mg/kg	0.1	-	-	-	-	-
Dieldrin	mg/kg	0.2	-	-	-	-	-
Endrin	mg/kg	0.2	-	-	-	-	-
Beta Endosulfan	mg/kg	0.2	-	-	-	-	-
p,p'-DDD	mg/kg	0.1	-	-	-	-	-
Endosulfan sulphate	mg/kg	0.1	-	-	-	-	-

Parameter	Units	LOR	PE055990.006 Soil 01 Mar 2011 ASS 1 0mm	PE055990.007 Soil 01 Mar 2011 ASS 2 250mm	PE055990.008 Soil 01 Mar 2011 ASS 3 500mm	PE055990.009 Soil 01 Mar 2011 ASS 4 750mm	PE055990.010 Soil 01 Mar 2011 ASS 5 1000mm

Row labels for the header: Sample Number, Sample Matrix, Sample Date, Sample Name.

OC Pesticides in Soil Method: AN400/AN420 (continued)

Parameter	Units	LOR	PE055990.006	PE055990.007	PE055990.008	PE055990.009	PE055990.010
p,p'-DDT	mg/kg	0.1	-	-	-	-	-
Endrin Ketone	mg/kg	0.1	-	-	-	-	-
Methoxychlor	mg/kg	0.1	-	-	-	-	-
Mirex	mg/kg	0.1	-	-	-	-	-

Surrogates

Parameter	Units	LOR	PE055990.006	PE055990.007	PE055990.008	PE055990.009	PE055990.010
d14-p-terphenyl (Surrogate)	%	-	-	-	-	-	-

OP Pesticides in Soil Method: AN400/AN420

Parameter	Units	LOR	PE055990.006	PE055990.007	PE055990.008	PE055990.009	PE055990.010
Dichlorvos	mg/kg	1	-	-	-	-	-
Dimethoate	mg/kg	1	-	-	-	-	-
Diazinon (Dimpylate)	mg/kg	0.5	-	-	-	-	-
Fenitrothion	mg/kg	0.2	-	-	-	-	-
Malathion	mg/kg	0.2	-	-	-	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	-	-	-	-	-
Parathion-ethyl (Parathion)	mg/kg	0.2	-	-	-	-	-
Bromophos Ethyl	mg/kg	0.2	-	-	-	-	-
Methidathion	mg/kg	0.5	-	-	-	-	-
Ethion	mg/kg	0.2	-	-	-	-	-
Azinphos-methyl (Guthion)	mg/kg	0.2	-	-	-	-	-

Surrogates

Parameter	Units	LOR	PE055990.006	PE055990.007	PE055990.008	PE055990.009	PE055990.010
d14-p-terphenyl (Surrogate)	%	-	-	-	-	-	-

Field pH for Acid Sulphate Soil Method: AN104

Parameter	Units	LOR	PE055990.006	PE055990.007	PE055990.008	PE055990.009	PE055990.010
Reaction*	No unit	-	moderate	moderate	moderate	high	extreme
pH Difference*	pH Units	-	1.0	1.3	2.1	4.1	3.6
PHf	pH Units	-	5.5	5.7	5.3	5.9	5.9
PHfox	pH Units	-	4.5	4.4	3.2	1.8	2.3

SGS

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Field pH for Acid Sulphate Soil Method: ME-(AU)-[ENV]AN104

Parameter	QC Reference	Units	LOR	MB	DUP %RPD
PHf	LB015117	pH Units	-	4.8	3%
PHfox	LB015117	pH Units	-	5.8	8%

Mercury in Soil Method: ME-(AU)-[ENV]AN312

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Mercury	LB015133	mg/kg	0.05	<0.05	0%	NA	117%	2%

Metals in Soil by ICPOES Method: ME-(AU)-[ENV]AN/320AN321

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Arsenic, As	LB015133	mg/kg	2	<2	0%	95%	81%	14%
Cadmium, Cd	LB015133	mg/kg	0.4	<0.4	0%	92%	86%	12%
Chromium, Cr	LB015133	mg/kg	5	<5	0 - 19%	91%	89%	15%
Copper, Cu	LB015133	mg/kg	5	<5	0 - 14%	98%	88%	12%
Lead, Pb	LB015133	mg/kg	5	<5	0 - 13%	99%	74%	41%
Nickel, Ni	LB015133	mg/kg	4	<4	0%	88%	85%	9%
Zinc, Zn	LB015133	mg/kg	5	<5	0 - 40%	93%	6%	119%

Moisture Content Method: ME-(AU)-[ENV]AN234

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB015162	%	0.5	1 - 7%

OC Pesticides in Soil Method: ME-(AU)-[ENV]AN400/AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Alpha BHC	LB015209	mg/kg	0.1	<0.1	0%			
HCB (Hexachlorobenzene)	LB015209	mg/kg	0.1	<0.1	0%			
Beta BHC	LB015209	mg/kg	0.1	<0.1	0%			
Lindane	LB015209	mg/kg	0.1	<0.1	0%	86%	72%	5%
Delta BHC	LB015209	mg/kg	0.1	<0.1	0%			
Heptachlor	LB015209	mg/kg	0.1	<0.1	0%	95%	74%	6%
Aldrin	LB015209	mg/kg	0.1	<0.1	0%	89%	85%	0%
Heptachlor epoxide	LB015209	mg/kg	0.1	<0.1	0%			
Isodrin	LB015209	mg/kg	0.1	<0.1	0%	97%	83%	0%
Gamma Chlordane	LB015209	mg/kg	0.1	<0.1	0%	94%	81%	4%
Alpha Chlordane	LB015209	mg/kg	0.1	<0.1	0%			
Alpha Endosulfan	LB015209	mg/kg	0.2	<0.2	0%			
p,p'-DDE	LB015209	mg/kg	0.1	<0.1	0%	100%	82%	4%
Dieldrin	LB015209	mg/kg	0.2	<0.2	0%	94%	80%	6%
Endrin	LB015209	mg/kg	0.2	<0.2	0%	101%	78%	12%
Beta Endosulfan	LB015209	mg/kg	0.2	<0.2	0%			
p,p'-DDD	LB015209	mg/kg	0.1	<0.1	0%			
Endosulfan sulphate	LB015209	mg/kg	0.1	<0.1	0%			
p,p'-DDT	LB015209	mg/kg	0.1	<0.1	0%			
Endrin Ketone	LB015209	mg/kg	0.1	<0.1	0%			
Methoxychlor	LB015209	mg/kg	0.1	<0.1	0%			
Mirex	LB015209	mg/kg	0.1	<0.1	0%	83%	74%	11%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
d14-p-terphenyl (Surrogate)	LB015209	%	-	100%	2%	102%	108%	2%

QC SUMMARY

PE055990 R0

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

OP Pesticides in Soil   Method: ME-(AU)-[ENV]AN400/AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Dichlorvos	LB015209	mg/kg	1	<1	0%			
Dimethoate	LB015209	mg/kg	1	<1	0%			
Diazinon (Dimpylate)	LB015209	mg/kg	0.5	<0.5	0%	91%	73%	1%
Fenitrothion	LB015209	mg/kg	0.2	<0.2	0%			
Malathion	LB015209	mg/kg	0.2	<0.2	0%			
Chlorpyrifos (Chlorpyrifos Ethyl)	LB015209	mg/kg	0.2	<0.2	0%	86%	74%	6%
Parathion-ethyl (Parathion)	LB015209	mg/kg	0.2	<0.2	0%	94%	75%	5%
Bromophos Ethyl	LB015209	mg/kg	0.2	<0.2	0%			
Methidathion	LB015209	mg/kg	0.5	<0.5	0%	91%	112%	34%
Ethion	LB015209	mg/kg	0.2	<0.2	0%			
Azinphos-methyl (Guthion)	LB015209	mg/kg	0.2	<0.2	0%			

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
d14-p-terphenyl (Surrogate)	LB015209	%	-	100%	2%	102%	108%	2%

TRH (Total Recoverable Hydrocarbons) in Soil   Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
TRH C10-C14	LB015209	mg/kg	20	<20	0%	97%	98%	1%
TRH C15-C28	LB015209	mg/kg	45	<45	9%	112%	112%	0%
TRH C29-C36	LB015209	mg/kg	45	<45	2%	114%	96%	2%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
TRH (Surrogate)	LB015209	%	-	103%	2%	102%	95%	1%

Volatile Petroleum Hydocarbons in Soil   Method: ME-(AU)-[ENV]AN433/AN434

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
TRH C6-C9	LB015123	mg/kg	20	<20	0%	102%	91%	4%
Benzene	LB015123	mg/kg	0.1	<0.2	0%	103%	102%	1%
Toluene	LB015123	mg/kg	0.1	<0.5	0%	103%	105%	3%
Ethylbenzene	LB015123	mg/kg	0.1	<0.5	0%	104%	96%	1%
m/p-xylene	LB015123	mg/kg	0.2	<1.0	0%			
o-xylene	LB015123	mg/kg	0.1	<0.5	0%			
MtBE(Methyl-tert-butyl ether)	LB015123	mg/kg	0.5	<0.5	0%	NA		

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
d4-1,2-dichloroethane (Surrogate)	LB015123	%	-	115%	14%	126%	108%	2%
d8-toluene (Surrogate)	LB015123	%	-	115%	14%	120%	111%	2%
Dibromofluoromethane (Surrogate)	LB015123	%	-	119%	12%	125%	108%	1%
Bromofluorobenzene (Surrogate)	LB015123	%	-	122%	13%	130%	119%	2%

METHOD	METHODOLOGY SUMMARY
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analsysis by ASS or ICP as per USEPA Method 200.8.
AN045	A portion of sample is digested with Nitric acid and Hydrogen Peroxide over time and then with Hydrochloric acid through several heating and cooling cycles. It provides a strong oxidising medium for bringing metal analytes into solution according to USEPA3050, after filtration the solution is presented for analysis on AAS or ICP.
AN088	Orbital rolling for Organic pollutants are extracted from soil/sediment by transferring an appropriate mass of sample to a clear soil jar and extracting with 1:1 Dichloromethane/Acetone. Orbital Rolling method is intended for the extraction of semi-volatile organic compounds from soil/sediment samples, and is based somewhat on USEPA method 3570 (Micro Organic extraction and sample preparation). Method 3700.
AN104	pHF is determined on an extract of approximately 2g of as received sample in approximately 10 mL of deionised water with pH determined after standing 30 minutes.
AN104	pHFox is determined on an extract of approximately 2g of as received sample with a few mLs of 30% hydrogen peroxide (adjusted to pH 4.5 to 5.5) with the extract reaction being rated from slight to extreme, with pH determined after reaction is complete and extract has cooled. Referenced to ASS Laboratory Methods Guidelines, method 23Af-Bf, 2004.
AN234	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN320/AN321	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components.
AN320/AN321	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with diffential polarity of the elluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependant on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433/AN434	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

IS	Insufficient sample for analysis.	QFH	QC result is above the upper tolerance
LNR	Sample listed, but not received.	QFL	QC result is below the lower tolerance
*	This analysis is not covered by the scope of accreditation.	-	The sample was not analysed for this analyte
^	Performed by outside laboratory.		
LOR	Limit of Reporting		
↑↓	Raised or Lowered Limit of Reporting		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

APPENDIX 2:
ADDITIONAL LABORATORY REPORT
CONTAMINATION AND ACID SULPHATE SOILS

ANALYTICAL REPORT

CLIENT DETAILS

Contact	James Cumming
Client	MBS ENVIRONMENTAL
Address	4, Cook Street West Perth WA 6005
Telephone	08 9226 3166
Facsimile	08 9226 3177
Email	jcumming@mbsenvironmental.com.au
Project	**TESPOW Albany Generator Site**
Order Number	(Not specified)
Samples	3

LABORATORY DETAILS

Manager	Said Hirad
Laboratory	SGS Newburn Environmental
Address	10 Reid Rd Newburn WA 6105
Telephone	(08) 9373 3500
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Email	au.environmental.perth@sgs.com
SGS Reference	PE055990B R0
Report Number	0000017602
Date Reported	01 Apr 2011
Date Received	21 Mar 2011

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(898/20210).

Liming rate calculated using a Fineness factor of 1.5 (which is equivalent to finely divided Ag Lime <0.5mm) and Neutralising Value (NV) of 100%.

If using Liming Material <100% NV, then Liming Rate can be adusted as follows:
Actual Liming Rate equals Calculated Liming Rate times 100 divided by NV of actual Liming Material Bulk Density of Material of 1g/cm3 assumed.

If Bulk Density differs from 1g/cm3 then Liming rate can be adjusted as follows:
Actual Liming Rate equals Calculated Liming Rate times Actual Bulk Density

Sample "A2 0mm" has a low aliphatic / aromatic result compared to the TRH result.
This is due to the fact that polar compounds stick to the silica gel cartridge. The sample was re-extracted to confirm the TRH results.

SIGNATORIES

Dave Williams National Organic Manager	Kurt Blackman Inorganic Team Leader - Soils	Said Hirad Laboratory Manager

ANALYTICAL REPORT

PE055990B R0

Parameter	Units	LOR	Sample Number: PE055990B.002 Sample Matrix: Soil Sample Date: 01 Mar 2011 Sample Name: A2 0mm

Moisture Content   Method: AN234

% Moisture	%	0.5	20

TRH Aliphatic Aromatic Hydrocarbons in Soil   Method: AN403

Aliphatic >C16-C28	mg/kg	45	<45
Aliphatic >C28-C35	mg/kg	45	59
Aliphatic Total (>C16-C35)	mg/kg	90	<90
Aliphatic >C35-C40	mg/kg	100	<100
Aromatic >C16-C28	mg/kg	45	190
Aromatic >C28-C35	mg/kg	45	180
Aromatic Total (>C16-C35)	mg/kg	90	370

Surrogates

TRH (Surrogate)	%	-	107

TAA SPOCAS   Method: AN219

pH KCl*	pH Units	-	-
Titratable Actual Acidity	kg H2SO4/T	0.25	-
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5	-
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01	-
Sulphur (SKCl)	%w/w	0.005	-
Calcium (CaKCl)	%w/w	0.005	-
Magnesium (MgKCl)	%w/w	0.005	-

TPA ANC SPOCAS   Method: AN218

Peroxide pH (pH Ox)	pH Units	-	-
TPA as kg H_2SO_4/tonne	kg H2SO4/T	0.25	-
TPA as moles H+/tonne	moles H+/T	5	-
TPA as S % W/W	%w/w S	0.01	-
Titratable Sulfidic Acidity as moles H+/tonne	moles H+/T	5	-
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	kg H2SO4/T	0.25	-
Titratable Sulfidic Acidity as S % W/W	%w/w S	0.01	-
ANCE as % $CaCO_3$	% CaCO3	0.01	-
ANCE as moles H+/tonne	moles H+/T	5	-
ANCE as S % W/W	%w/w S	0.01	-
Peroxide Oxidisable Sulphur (Spos)*	%w/w	0.005	-
Peroxide Oxidisable Sulphur as moles H+/tonne*	moles H+/T	5	-
Sulphur (Sp)	%w/w	0.005	-
Calcium (Cap)	%w/w	0.005	-
Reacted Calcium (CaA)*	%w/w	0.005	-
Reacted Calcium (CaA)*	moles H+/T	5	-
Magnesium (Mgp)	%w/w	0.005	-
Reacted Magnesium (MgA)*	%w/w	0.005	-
Reacted Magnesium (MgA)*	moles H+/T	5	-
Net Acid Soluble Sulphur as % w/w*	%w/w	0.005	-
Net Acid Soluble Sulphur as moles H+/tonne*	moles H+/T	5	-

Net Acidity Calculations   Method: AN220

s-Net Acidity	%w/w S	0.01	-
a-Net Acidity	moles H+/T	5	-
Liming Rate*	kg CaCO3/T	0.1	-
Verification s-Net Acidity*	%w/w S	0.01	-
a-Net Acidity without ANCE*	moles H+/T	5	-
Liming Rate without ANCE*	kg CaCO3/T	0.1	-

ANALYTICAL REPORT

PE055990B R0

Parameter	Units	LOR	PE055990B.009	PE055990B.010
Sample Number			PE055990B.009	PE055990B.010
Sample Matrix			Soil	Soil
Sample Date			01 Mar 2011	01 Mar 2011
Sample Name			ASS 4 750mm	ASS 5 1000mm
Moisture Content Method: AN234				
% Moisture	%	0.5	-	-
TRH Aliphatic Aromatic Hydrocarbons in Soil Method: AN403				
Aliphatic >C16-C28	mg/kg	45	-	-
Aliphatic >C28-C35	mg/kg	45	-	-
Aliphatic Total (>C16-C35)	mg/kg	90	-	-
Aliphatic >C35-C40	mg/kg	100	-	-
Aromatic >C16-C28	mg/kg	45	-	-
Aromatic >C28-C35	mg/kg	45	-	-
Aromatic Total (>C16-C35)	mg/kg	90	-	-
Surrogates				
TRH (Surrogate)	%	-	-	-
TAA SPOCAS Method: AN219				
pH KCl*	pH Units	-	5.5	5.7
Titratable Actual Acidity	kg H2SO4/T	0.25	1.3	0.91
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5	26	19
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01	0.04	0.03
Sulphur (SKCl)	%w/w	0.005	<0.005	0.10
Calcium (CaKCl)	%w/w	0.005	0.021	0.019
Magnesium (MgKCl)	%w/w	0.005	0.015	0.015
TPA ANC SPOCAS Method: AN218				
Peroxide pH (pH Ox)	pH Units	-	3.6	4.3
TPA as kg H_2SO_4/tonne	kg H2SO4/T	0.25	1.9	2.8
TPA as moles H+/tonne	moles H+/T	5	38	58
TPA as S % W/W	%w/w S	0.01	0.06	0.09
Titratable Sulfidic Acidity as moles H+/tonne	moles H+/T	5	12	39
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	kg H2SO4/T	0.25	0.61	1.9
Titratable Sulfidic Acidity as S % W/W	%w/w S	0.01	0.02	0.06
ANCE as % $CaCO_3$	% CaCO3	0.01	<0.01	<0.01
ANCE as moles H+/tonne	moles H+/T	5	<5	<5
ANCE as S % W/W	%w/w S	0.01	<0.01	<0.01
Peroxide Oxidisable Sulphur (Spos)*	%w/w	0.005	0.054	0.069
Peroxide Oxidisable Sulphur as moles H+/tonne*	moles H+/T	5	34	43
Sulphur (Sp)	%w/w	0.005	0.060	0.070
Calcium (Cap)	%w/w	0.005	0.023	0.019
Reacted Calcium (CaA)*	%w/w	0.005	<0.005	<0.005
Reacted Calcium (CaA)*	moles H+/T	5	<5	<5
Magnesium (Mgp)	%w/w	0.005	0.019	0.016
Reacted Magnesium (MgA)*	%w/w	0.005	<0.005	<0.005
Reacted Magnesium (MgA)*	moles H+/T	5	<5	<5
Net Acid Soluble Sulphur as % w/w*	%w/w	0.005	-	-
Net Acid Soluble Sulphur as moles H+/tonne*	moles H+/T	5	-	-
Net Acidity Calculations Method: AN220				
s-Net Acidity	%w/w S	0.01	0.10	0.10
a-Net Acidity	moles H+/T	5	60	62
Liming Rate*	kg CaCO3/T	0.1	4.5	4.6
Verification s-Net Acidity*	%w/w S	0.01	0.02	0.02
a-Net Acidity without ANCE*	moles H+/T	5	60	62
Liming Rate without ANCE*	kg CaCO3/T	0.1	4.5	4.6

SGS

QC SUMMARY

PE055990B R0

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Moisture Content **Method: ME-(AU)-[ENV]AN234**

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB016288	%	0.5	3 - 11%

TAA SPOCAS **Method: ME-(AU)-[ENV]AN219**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
pH KCl*	LB016424	pH Units	-	5.1	0%	96%
Titratable Actual Acidity	LB016424	kg	0.25	<0.25	0%	NA
Titratable Actual Acidity (TAA) moles H+/tonne	LB016424	moles	5	<5	1%	102%
Titratable Actual Acidity (TAA) S%w/w	LB016424	%w/w S	0.01	<0.01	0%	102%
Sulphur (SKCl)	LB016424	%w/w	0.005	<0.005	0%	87%
Calcium (CaKCl)	LB016424	%w/w	0.005	<0.005	5%	91%
Magnesium (MgKCl)	LB016424	%w/w	0.005	<0.005	0%	87%

TPA ANC SPOCAS **Method: ME-(AU)-[ENV]AN218**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Peroxide pH (pH Ox)	LB016425	pH Units	-	6.6	0%	97%
TPA as kg H_2SO_4/tonne	LB016425	kg	0.25	<0.25	5%	95%
TPA as moles H+/tonne	LB016425	moles	5	<5	5%	95%
TPA as S % W/W	LB016425	%w/w S	0.01	<0.01	5%	95%
Titratable Sulfidic Acidity as moles H+/tonne	LB016425	moles	5	<5	7%	95%
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	LB016425	kg	0.25	<0.25	7%	NA
Titratable Sulfidic Acidity as S % W/W	LB016425	%w/w S	0.01	<0.01	7%	95%
ANCE as % $CaCO_3$	LB016425	% CaCO3	0.01	<0.01	0%	NA
ANCE as moles H+/tonne	LB016425	moles	5	<5	0%	NA
ANCE as S % W/W	LB016425	%w/w S	0.01	<0.01	0%	NA
Peroxide Oxidisable Sulphur (Spos)*	LB016425	%w/w	0.005	<0.005	1%	85%
Peroxide Oxidisable Sulphur as moles H+/tonne*	LB016425	moles	5	<5	1%	96%
Sulphur (Sp)	LB016425	%w/w	0.005	<0.005	0%	93%
Calcium (Cap)	LB016425	%w/w	0.005	<0.005	5%	94%
Reacted Calcium (CaA)*	LB016425	%w/w	0.005	<0.005		
Reacted Calcium (CaA)*	LB016425	moles	5	<5		
Magnesium (Mgp)	LB016425	%w/w	0.005	<0.005	0%	92%
Reacted Magnesium (MgA)*	LB016425	%w/w	0.005	<0.005		
Reacted Magnesium (MgA)*	LB016425	moles	5	<5		

TRH Aliphatic Aromatic Hydrocarbons in Soil **Method: ME-(AU)-[ENV]AN403**

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Aliphatic >C16-C28	LB016377	mg/kg	45	<45	88%
Aliphatic >C28-C35	LB016377	mg/kg	45	<45	84%
Aliphatic Total (>C16-C35)	LB016377	mg/kg	90	<90	
Aliphatic >C35-C40	LB016377	mg/kg	100	<100	
Aromatic >C16-C28	LB016377	mg/kg	45	<45	92%
Aromatic >C28-C35	LB016377	mg/kg	45	<45	96%
Aromatic Total (>C16-C35)	LB016377	mg/kg	90	<90	

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
TRH (Surrogate)	LB016377	%	-	88%	94%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN004	Soils, sediments and sludges are pulverised using an LM2 ringmill. The dry sample is pulverised to a particle size of >90% passing through a -75µm sieve.
AN218	Soil samples are subjected to extreme oxidising conditions using hydrogen peroxide. Continuous application of heat and peroxide ensure all sulphide is converted to sulphuric acid. Excess peroxide is broken down by a copper catalyst prior to titration for acidity. Calcium, magnesium, and sulphur are determined by ICP-OES. Also included is a carbonate modification step which, depending on pH after the initial oxidation, gives a measure of ANC.
AN219	Dried pulped sample is extracted for 4 hours in a 1 M KCl solution. The ratio of sample to solution is 1:40. The extract is titrated for acidity. Calcium, magnesium, and sulphur are determined by ICP-AES.
AN234	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with diffential polarity of the elluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependant on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.

FOOTNOTES

IS	Insufficient sample for analysis.	QFH	QC result is above the upper tolerance
LNR	Sample listed, but not received.	QFL	QC result is below the lower tolerance
*	This analysis is not covered by the scope of accreditation.	-	The sample was not analysed for this analyte
^	Performed by outside laboratory.		
LOR	Limit of Reporting		
↑↓	Raised or Lowered Limit of Reporting		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

Appendix 3:
Laboratory Report
Geotechnical Soil Assessments

SGS

TEST CERTIFICATE

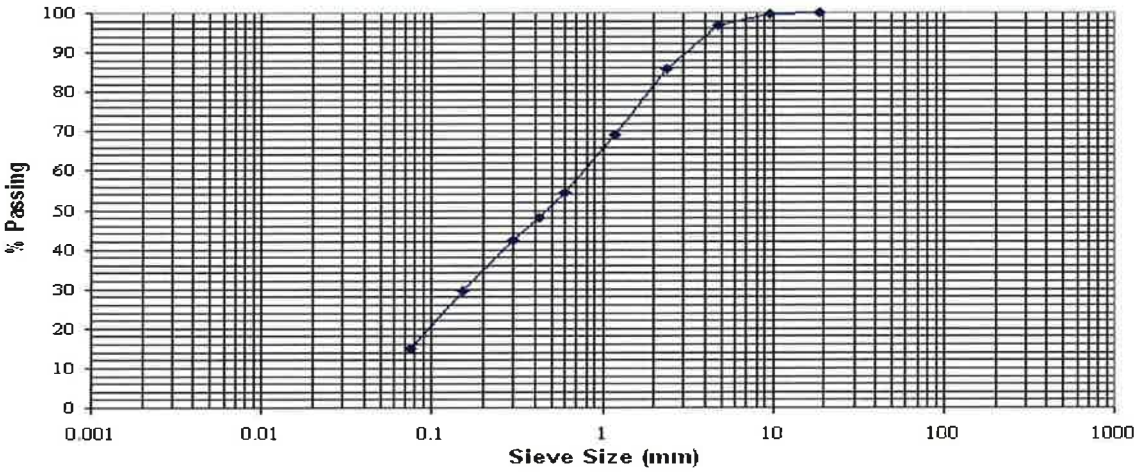
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	SGS - Australian Enviromental Laboratories	Client Job No:	55990A-1
Order No:		Project:	52421B
Tested Date:	4/03/2011	Location:	
SGS Job Number:	11-01-320	Sample No:	11-MT-1967
Lab:	Welshpool	Sample ID:	A620kg 1/3/2011 0mm

PARTICLE SIZE DISTRIBUTION

AS1289.3.6.1



Sieve Size (mm)	% Passing	Sieve Size (mm)	% Passing
		2.36	86
		1.18	69
		0.600	54
		0.425	48
19.0	100	0.300	42
9.5	100	0.150	30
4.75	97	0.075	15

Note: Sample supplied by client.

Approved Signatory: (Mark .Matthews) Date: 15/03/2011

ilac-MRA NATA

This document is issued in accordance with NATA's accreditation requirements

Accreditation No.: 2418 Form No.PF-(AU)-[IND(MTE)]-TE-S301.LCER/A/01.01.2009

Site No.: 2411
Cert No.: 11-MT-1967-S301

Client Address: 467 McKnoe Drive MARANGUP WA 6083

SGS

ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	SGS - Australian Enviromental Laboratories	Client Job No:	55990A-1
Order No:		Project:	52421B
Tested Date:	14/03/2011	Location:	
SGS Job Number:	11-01-320	Sample No:	11-MT-1967
Lab:	Welshpool	Sample ID:	A620kg 1/3/2011 0mm

PLASTICITY INDEX

AS 1289.3.9.2(Single Point Cone Method), 3.2.1(Plastic Limit), 3.3.2(Plasticity Index), 3.4.1(Linear Shrinkage)

AS 1289.3.9.2
Liquid Limit (%) **66**

AS 1289.3.2.1
Plastic Limit (%) **52**

AS 1289.3.3.2
Plasticity Index (%) **14**

AS 1289.3.4.1
Linear Shrinkage (%) **8.0**

History of Sample	Oven Dried at <50ºC
Method of preparation	Dry Sieved
Nature of Shrinkage	Flat
Length of mould (mm)	127

Note: Sample supplied by client.

Approved Signatory: (Mark .Matthews) Date: 15/03/2011

NATA

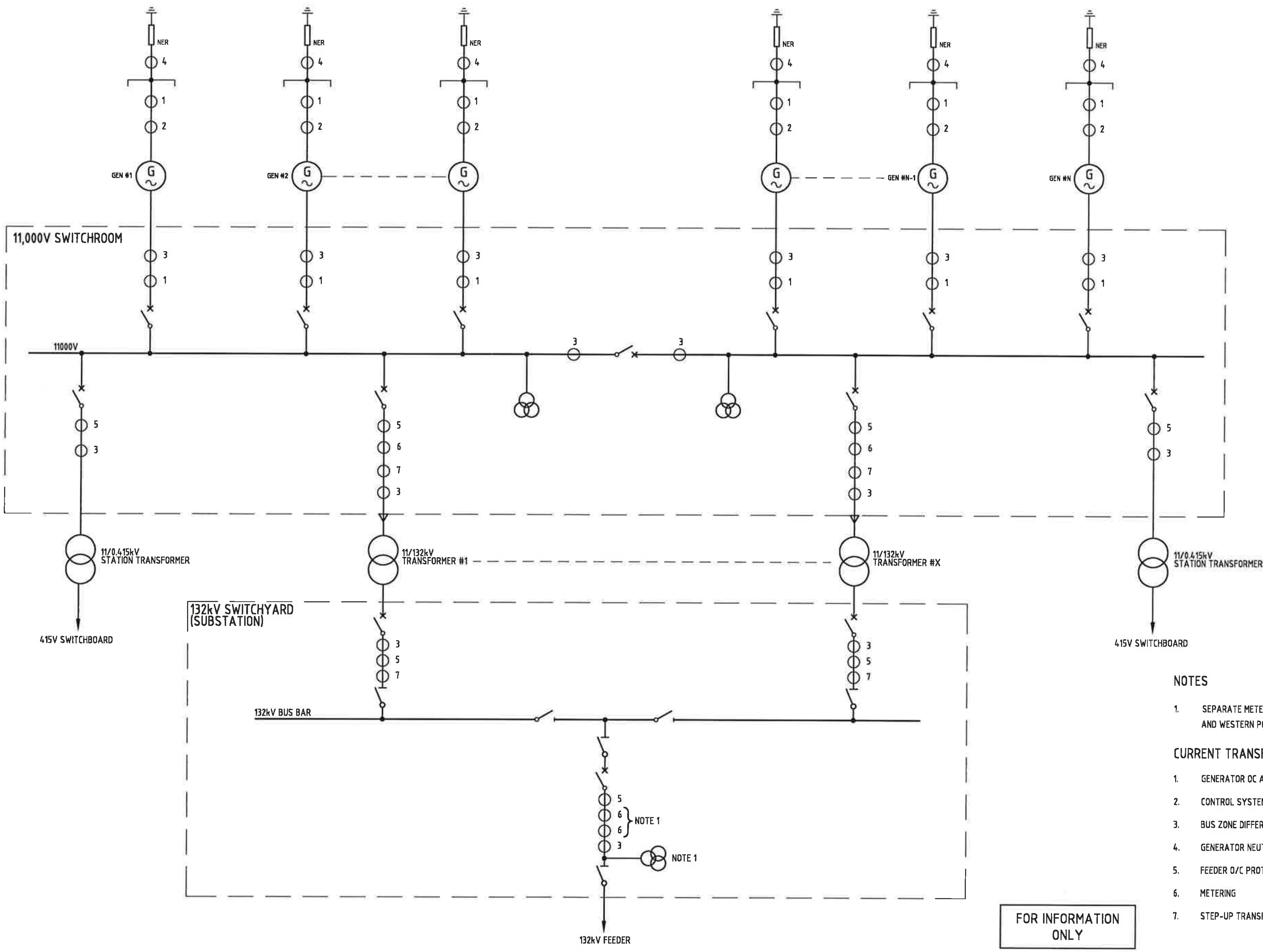
This document is issued in accordance with NATA's accreditation requirements

Accreditation No.: 2418 Form No.PF-(AU)-[IND(MTE)]-TE-S324.LCER/D/02.09.09

Site No.: 2411
Cert No.: 11-MT-1967-S324

Client Address: 467 McKnoe Drive MARANGUP WA 6083

Appendix 3 Generic Single Line Diagram



FOR INFORMATION ONLY

NOTES

1. SEPARATE METERING CT'S + VT'S FOR USE BY OWNER AND WESTERN POWER.

CURRENT TRANSFORMER DETAILS

1. GENERATOR OC AND DIFFERENTIAL PROTECTION
2. CONTROL SYSTEM (AVR AND SYNCH).
3. BUS ZONE DIFFERENTIAL PROTECTION.
4. GENERATOR NEUTRAL
5. FEEDER O/C PROTECTION
6. METERING
7. STEP-UP TRANSFORMER DIFFERENTIAL PROTECTION

REV	DATE	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER
0	12.04.2011	ISSUED FOR USE	JTB	PA	KM		SH	
A	08.04.2011	ISSUED FOR REVIEW	JTB	PA	KM	IC		

REF DRAWING No	REFERENCE DRAWING TITLE

A1 SHEET SCALE N.T.S.

OneWay™ to zero harm

WORLEYPARSONS PROJECT No. 101012-00304

WorleyParsons resources & energy

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CUSTOMER: TESLA CORPORATION

60 MW POWER STATION
GENERIC SINGLE LINE DIAGRAM

DRG No 101012-00304-EL-DSL-0001 REV 0

DATE & TIME: 12/04/2011 01:42:06 PM USER NAME: john.baister LOCATION: Y:_DRAWINGS_Worley Drawings\101012-00304 - 60MW Power Station Specification\4_Engineering\EL-Electrical\101012-00304-EL-DSL-0001.dwg

APPENDIX B

Land Use Agreement

LANDCORP

Enquiries Doug Stirling – 9482 7445

Ben Tan
Tesla Holdings Pty Ltd
Level 3. Exchange House
68 St Georges Terrace
PERTH WA 6000

Dear Ben,

Option to Lease – Pt Lot 5 Down Road, MIRAMBEENA (Albany)

We confirm that LandCorp has granted Tesla Holdings Pty Ltd an Option to Lease over a notional 4 hectare site within Part Lot 5 Down Road Mirambeena (Albany) being the Mirambeena Special Industrial Area. The Option term is from January 2013 to January 2015.

The Option is in respect to a potential Lease for a term of 13 years with a 10 year option to extend. The final land area, configuration, and rental level of the lease is to be determined.

LandCorp understands Tesla's intended use of the lease land is for a power station. We support that use in principle, subject to Telsa achieving the requisite government approvals for the project.

Yours sincerely

Doug Stirling
Project Manager - Operations

5 June 2013

Western Australian Land Authority ABN 34 868 192 835
Level 6, Wesfarmers House, 40 The Esplanade, Perth Western Australia 6000
Locked Bag 5, Perth Business Centre, Perth Western Australia 6849
T 08 9482 7499 F 08 9481 0861
E landcorp@landcorp.com.au
landcorp.com.au

APPENDIX C

MBS Environmental Soil Assessment

TESLA CORPORATION
ALBANY POWER STATION
SOIL ASSESSMENTS

APRIL 2011

PREPARED FOR

TESLA CORPORATION PTY LTD

BY

MBS ENVIRONMENTAL

4 Cook Street
West Perth WA 6005
Australia

Telephone: (618) 9226 3166
Facsimile: (618) 9226 3177
Email: info@mbsenvironmental.com.au

MARTINICK BOSCH SELL PTY LTD

ABN 80 102 814 478

MBS ENVIRONMENTAL

environmental and water resource consultants

TABLE OF CONTENTS

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FIGURES

APPENDICES

1. INTRODUCTION

1.1 BACKGROUND

Tesla Corporation Pty Ltd (Tesla) propose to construct a diesel-fired, peak load power station in Drome (City of Albany) Western Australia. The station will comprise four, 2.5 megawatt diesel power generation units for a combined output of 9.9 megawatts. The station will generate peak load power which will be fed into the South-West Interconnected System (SWIS). The installation is intended to provide reserve capacity based on anticipated future power demands, as forecasted by the Independent Market Operator (IMO).

SWIS is the major interconnected electricity network in Western Australia. It supplies the bulk of the south-west region, extending to Geraldton in the north, Albany in the south, and the Kalgoorlie mining communities to the east.

1.2 SITE DETAILS

The site is located on Lot I of Lot 5 Diagram 72145 on Down Road in Drome approximately 15 kilometres north of Albany in Western Australia (Figure 1). The site forms part of the Mirambeena industrial estate. A legal description of the site is provided in Table 1.

Table 1: Site Details

Identification	Details
Coordinates (MGA94, Zone 50)	571024 metres east, 6135174 metres south
Street Address	Lot I of Lot 5 D 72145 Downs Road, Drome.
Property Description	Vacant land
Property Size	Approximately 4.0 hectares
Local Government	City of Albany
Current Land Use	Grazing (zoned for General Industry)
Proposed Land Use	General industry

1.3 SITE HISTORY

The proposed site is located on general industry zoned land (Mirambeena Industrial Estate) in an otherwise rural setting, approximately three kilometres northwest of the Albany Airport. The industrial area is currently under development by LandCorp and is designed to provide land for a range of industries, including timber, farm produce and fishing. The Mirambeena Industrial Estate covers a surface area of approximately 80 hectares. Prior to establishment of the Mirambeena Industrial Estate, the land was used for general farming purposes.

Industries established within the vicinity of site are detailed in Table 2. No known contaminated sites are located within or in the vicinity of the project site. The closest known contaminated sites are located in the Albany foreshore area, approximately 15 kilometres south of the project area.

Table 2: Surrounding Industries

Name	Type/Description
Mt Romance Australia Pty Ltd.	Sandalwood processing factory, retail outlet, café.
Ravensdown Fertiliser Cooperative Ltd.	Fertiliser storage and distribution facility.
Unknown.	Grain processing facility.
Albany Plantation Export Company.	Timber processing facilities (woodchip mill).
BP Australia.	Bulk petroleum storage facility (at the airport).
Water Corporation.	Waste water treatment plant.

1.4 OBJECTIVES

The objectives of this soil assessment are:

- To determine whether or not the site has been contaminated by common organic and inorganic (acidity and metals) pollutants as a result of previous land use activities.
- To determine whether or not Acid Sulphate Soil (ASS) materials are present on the site to a depth of up to two metres below the existing ground surface.
- To determine basic engineering properties.

Environmental + Water Resource Consultants
4 Cook St
West Perth WA 6005
Telephone: + 618 9226 3166
Facsimile: + 618 9226 3177
info@mbsenvironmental.com.au

Scale: 1:6000
Original Size: A4
Grid: MGA94(50)

0 200 m

Tesla Corporation
Albany Soil Assessment

Albany Generator Location

Figure 1

C:\Documents and Settings\kkauhanen\My Documents\Tesla\Albany\Albany SAP.map 18/03/2011 F1

2. SOIL ASSESSMENTS

2.1 ACID SULPHATE SOIL ASSESSMENT

2.1.1 Soil Sampling

A total of five soil samples were collected from a single sampling location during the site ASS assessment. Samples were collected in 250 millimetre intervals to a refusal depth of 1250 millimetres.

Samples were stored in sealed plastic bags and refrigerated prior to being transported to the laboratory in an esky filled with ice bricks. Each sample was screened by the laboratory for acid forming potential using pH_F and pH_{FOX}, with any potentially acid forming samples being further tested using the Suspension Peroxide Oxidation Combined Acidity and Sulphur test suite (SPOCAS).

2.1.2 Results and Discussion

Descriptions of each sample and results for the pH_F and pH_{FOX} tests are presented in Table 3. No visible indications of physical contamination were observed in any of the sampled material. The original laboratory reports are presented in Appendix 1.

Table 3: Albany ASS Sample Descriptions

Depth (metres)	Description	pH_F	pH_{FOX}	Reaction
0.00 – 0.25	Grey silty sand with organic matter and rootlets. Dry.	5.5	4.5	Moderate
0.25 – 0.50	Grey silty sand with organic matter and rootlets. Dry.	5.7	4.4	Moderate
0.50 – 0.75	Grey sandy clay. Moist.	5.3	3.2	Moderate
0.75 – 1.00	Grey silty sand. Moist.	5.9	1.8	High
1.00 – 1.25	Grey/brown clayey gravel, mottled. Moist.	5.9	2.3	Extreme

The results were interpreted in accordance with Department of Environment and Conservation (DEC) guidelines for identifying ASS (DEC 2009). On the basis of screening tests for pH_F, which ranged from pH 5.5 to 5.9, and pH_{FOX} which ranged from pH 1.8 to 4.5, it was concluded that whilst the results did not indicate Actual Acid Sulphate Soil (AASS), the two deepest samples (between 0.75-1.25 metres) indicated Potential Acid Sulphate Soil (PASS). The indication of PASS was also supported by the recorded rates of reaction with peroxide, being high and extreme in the two deepest samples. Due to early refusal at the site, MBS Environmental was unable to obtain deeper samples for assessment. The ASS risk map for the wider Albany area (DEC 2006) rates the project site as a 'no known risk of ASS'.

Due to the identification of PASS, further laboratory analysis was conducted on the two deepest soil samples. The additional testing comprised the SPOCAS suite and the results are presented as Appendix 2. Net acidity for 0.75-1.00 metre depth was 60 moles of H^+ per tonne and for 1.00-1.25 metre depth 62 moles of H^+ per tonne. These results confirm that the soil below 0.75 metres has potential to generate additional acidity when disturbed. The results exceed the action criteria set for net acidity (DEC 2009) and consequently an Acid Sulfate Soil Management Plan (ASSMP) will need to be developed and implemented for the site if soil disturbance is required.

2.2 CONTAMINATION ASSESSMENT

2.2.1 Soil Sampling

Five soil samples were collected across the project area from the surface to a sampling depth of 50 millimetres below existing ground levels. The samples were placed in pre-washed, laboratory-provided, 250 millilitre glass containers. The samples were then refrigerated prior to being placed in an esky with ice/cooling blocks and delivered to the laboratory.

2.2.2 Laboratory Results and Discussion

All samples were analysed by SGS Laboratories, which is accredited by NATA for all tests performed. The samples were tested for a range of potential organic and inorganic contaminants. A summary of results for major organic and inorganic contaminants are presented in Table 4 and Table 6 respectively. Measured concentrations are compared to Ecological Investigation Levels (EIL) listed in the National Environment Protection (Assessment of Site Contamination) Measure (NEPC 1999). The original laboratory reports are presented in Appendix 1.

Table 4: Organic Contaminant Analytical Results

Parameter	Units	EIL	A-1	A-2	A-3	A-4	A-5
Total Recoverable Hydrocarbons							
C_6-C_9	mg/kg	100	<20	<40	<20	<40	<20
C_{10}-C_{14}	mg/kg	500	<20	290	<20	<20	<20
C_{15}-C_{28}	mg/kg	-	73	2000	93	170	190
C_{29}-C_{35}	mg/kg	-	100	1300	190	290	240
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	1	<0.1	<0.2	<0.1	<0.2	<0.1
Toluene	mg/kg	3	<0.1	<0.2	<0.1	<0.2	<0.1
Ethyl benzene	mg/kg	5	<0.1	<0.2	<0.1	<0.2	<0.1
Xylenes	mg/kg	5	<0.4	<0.7	<0.4	<0.7	<0.4
Organochlorine Pesticides (OC)							
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlordane	mg/kg	0.5	<0.2	<0.2	<0.2	<0.2	<0.2
Heptachlor	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Total OCs	mg/kg	1	-	-	-	-	-

All results for Monocyclic Aromatic Hydrocarbons and Organochlorine Pesticides were below reporting limits for the specific methods.

Hydrocarbons were present across the site. Elevated concentrations of the heavier hydrocarbon fractions (C_{15}-C_{28} and C_{29}-C_{35}) were identified in all samples. While the majority of these concentrations may be attributable to naturally occurring aliphatic organic compounds within the soil, sample A-2 contained excessively high concentrations (2,000 milligrams per kilogram of the C_{15}-C_{28} hydrocarbon fraction and 1,300 milligrams per kilogram of the C_{29}-C_{36} hydrocarbon fraction), which suggests that the site has been impacted by historical land use. No EILs have been set for these heavier hydrocarbon fractions and it was necessary to undertake further testing to determine whether the material poses a risk to human health or the environment.

The additional analysis comprised the speciation of aliphatic and aromatic hydrocarbons in two of the heavier fractions (C_{16}-C_{28} and C_{28}-C_{35}) of sample A-2. The results and relevant Health Investigation Levels (HIL) are presented in Table 5. The original laboratory report is presented in Appendix 2.

Aliphatic hydrocarbon results did not exceed any of the HILs. Total aromatic hydrocarbons (>C_{16}-C_{35}) exceeded the HILs for residential and recreational land uses but remained under the HIL for commercial/industrial land use. As the subject land is zoned and proposed to be used for industrial purposes, the relevant HIL was not exceeded.

Although the relevant HIL was not exceeded, the results of this high level assessment indicate a degree of contamination. Whilst gross contamination of the site is unlikely to have occurred, it is recommended that further assessment of the area be undertaken to ensure that there is no other material containing aromatic hydrocarbons in excess of the HIL for industrial land use.

Table 5: Aliphatic and Aromatic Hydrocarbon Analysis Results for Sample A-2

Parameter	Units	HIL A*	HIL D*	HIL E*	HIL F*	A-2
Aliphatic						
Aliphatic >C_{16}-C_{28}	mg/kg	-	-	-	-	<45
Aliphatic >C_{28}-C_{35}	mg/kg	-	-	-	-	59
Aliphatic Total (>C_{16}-C_{35})	mg/kg	5,600	22,400	11,200	28,800	<90
Aliphatic >C_{35}-C_{40}	mg/kg	-	-	-	-	<100
Aromatic						
Aromatic >C_{16}-C_{28}	mg/kg	-	-	-	-	190
Aromatic > C_{28}-C_{35}	mg/kg	-	-	-	-	180
Aromatic Total (>C_{16}-C_{35})	mg/kg	90	360	180	450	370

*Health Investigation Levels: A= Standard residential, D= Residential with minimal soil exposure, E= Parkland/Recreational, D= Commercial/Industrial.

Table 6 shows the analytical results for metals. Cadmium, lead and nickel concentrations were found to be below the limit of reporting in all samples. All metal concentrations were below the reporting limit at site A-3. At the other four sites, A-1, A-2, A-4 and A-5, arsenic, chromium, copper, mercury and zinc were all present in low concentrations, well below the respective EIL and within the natural background range. These results confirm that heavy metal contamination from previous land use activities has not occurred on any of the sample sites.

Table 6: Inorganic Contaminant Analytical Results

Parameter	Units	EIL	A-1	A-2	A-3	A-4	A-5
Arsenic	mg/kg	20	8	3	<2	<2	2
Cadmium	mg/kg	3	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	400	23	11	<5	6	42
Copper	mg/kg	100	6	15	<5	6	8
Lead	mg/kg	600	<5	<5	<5	<5	<5
Mercury	mg/kg	1	<0.05	0.08	<0.05	<0.05	0.07
Nickel	mg/kg	60	<4	<4	<4	<4	<4
Zinc	mg/kg	200	6	51	<5	<5	25

2.3 GEOTECHNICAL ASSESSMENT

2.3.1 Soil Sampling

The soil was inspected by a suitably qualified environmental geoscientist and a single 20 kilogram bulk sample was collected for geotechnical testing from between 0 and 250 millimetres below existing ground level. Testing was undertaken in accordance with the relevant Australian Standard 1289 procedures and comprised:

- Particle size distribution (PSD) – AS 1289.3.6.1.
- Atterberg limits.
  - Liquid limit – AS 1289.3.9.2.
  - Plastic limit – AS 1289.3.2.1.
  - Plasticity index – AS 1289.3.3.2.
  - Linear shrinkage – AS 1289.3.4.1.

2.3.2 Analytical Results and Discussion

The sample was analysed by SGS Laboratories, which is accredited by NATA for all tests performed. A summary of results is provided in Table 7. The original laboratory report is provided in Appendix 3.

Table 7: Geotechnical Properties

Test Item		%
Particle Size Distribution	Gravel	14
	Sand	71
	Fines	15
Atterberg Limits	Liquid Limit	66
	Plastic Limit	52
	Plasticity Index	14
	Linear Shrinkage	8.0

Based on these results and in accordance with Australian Standard 1726-1993, the soils can be described as follows:

SILTY GRAVELLY SAND (SC). Grey, high plasticity, silty sand with gravel. COLLUVIUM.

This material was present to a depth of approximately 1.25 metres below existing ground levels. A layer of clayey gravel was encountered below this material, however due to sampling difficulties, a sample was not collected.

2.3.3 Recommendations

Site construction works should be preceded by appropriate preparation of the ground surface in the area of proposed development. Preparation should be undertaken in accordance with Australian Standard AS 3798-2007. In addition to AS 3798-2007, MBS Environmental recommends the following:

- Identification and diversion or protection of any buried services within the work areas.
- Clearing of surface objects (including building debris, old structures, footings or refuse).
- Grubbing of any tree roots.
- Removal of topsoil containing notable quantities of organic material (e.g. plant roots).
- Contouring/shaping of the ground surface to ensure any stormwater runoff drains from the site.
- Scarification and compaction of prepared surfaces prior to any engineering fill placement.

Slabs should be designed by a suitably qualified engineer as the site may experience moderate to high levels of ground movement with changes in soil moisture content.

3. CONCLUSIONS

3.1 CONTAMINATION ASSESSMENT

The assessment found no evidence to suggest that heavy metal contamination has occurred as a result of previous land use activities. Heavy metal concentrations of all samples were well below the respective Ecological Investigation Levels and in many cases below reporting limits for the specific method.

The assessment also did not find any evidence to suggest contamination by Monocyclic Aromatic Hydrocarbons or Organochlorine Pesticides. Concentrations of these substances in all samples were below reporting limits for the specific methods.

The assessment identified elevated concentrations of the heavier hydrocarbon fractions (C_{15}-C_{28} and C_{29}-C_{35}) in all samples. Additional testing of one sample found that concentrations of total aromatic hydrocarbons (>C_{16}-C_{35} fraction) exceeded Health Investigation Levels (HIL) for residential and recreational land uses while staying below the HIL for industrial land use. These results indicate that previous land use may have resulted in low degree hydrocarbon contamination. Further assessment of the area is recommended to ensure that there is no other material containing aromatic hydrocarbons in excess of the HIL for industrial land use.

3.2 ACID SULPHATE SOIL ASSESSMENT

Samples above the depth of 0.75 metres did not indicate presence of ASS. However, between depths of 0.75 and 1.25 metres, the soil was found to have potential to generate acidity when disturbed. Samples from below 1.25 metres were not collected due to early refusal with the hand auger. It is therefore unknown whether ASS materials exist below this depth. Net acidity of samples between 0.75 and 1.25 metres exceeded action criteria set by DEC (2009) and consequently an Acid Sulfate Soil Management Plan (ASSMP) will need to be developed and implemented for the site if subsoil disturbance is required.

3.3 GEOTECHNICAL ASSESSMENT

Soils at the Albany site comprise silty gravelly sands of high plasticity. These soils may be subject to moderately high ground movement with changes in soil moisture content (shrink/swell). The soil properties (Appendix 2) should be reviewed by a suitably qualified engineer to determine the appropriate construction requirements.

4. REFERENCES

Australian Standard AS 1726-1993. Geotechnical Site Investigations. Standards Australia.

Department of Environment and Conservation (DEC). 2009. *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes.* Acid Sulfate Soils Guideline Series. Government of Western Australia. May 2009.

National Environment Protection (Assessment of Site Contamination) Measure 1999. National Environment Protection Council (NEPC). December 1999.

MBS Environmental Report Distribution Record

Report Title: **Tesla Corporation**
Albany Power Station
Soil Assessments
April 2011

Project Code: **TESPOW**

Name/Title	Company	Copy No.	Date	Authorised By
Ben Tan Chief Executive Officer	Tesla Corporation	Electronic Only	08/04/2011	James Cumming

Approval Signature:

APPENDICES

APPENDIX 1:
LABORATORY REPORT
CONTAMINATION AND ACID SULPHATE SOILS

ANALYTICAL REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	James Cumming	Manager	Said Hirad
Client	MBS ENVIRONMENTAL	Laboratory	SGS Newburn Environmental
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Facsimile	08 9226 3177	Facsimile	(08) 9373 3556
Email	jcumming@mbsenvironmental.com.au	Email	au.environmental.perth@sgs.com
Project	**TESPOW Albany Generator Site**	SGS Reference	PE055990 R0
Order Number	(Not specified)	Report Number	0000016160
Samples	10	Date Reported	14 Mar 2011
		Date Received	02 Mar 2011

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(898/20210).

BTEX and C6C9 (purge and trap) detection limits were raised for samples "A3 0mm" and "A4 0mm" due to the presence of surfactants in which dilution was required.

The matrix spike and matrix spike duplicate for Zn on 'Anonymous' sample failed due to high background of the target analytes.

SIGNATORIES

Dave Williams
National Organic Manager

Kurt Blackman
Inorganic Team Leader - Soils

Pamela Adams
Organic Team Leader

Said Hirad
Laboratory Manager

Parameter	Units	LOR	PE055990.001 Soil 01 Mar 2011 A1 0mm	PE055990.002 Soil 01 Mar 2011 A2 0mm	PE055990.003 Soil 01 Mar 2011 A3 0mm	PE055990.004 Soil 01 Mar 2011 A4 0mm	PE055990.005 Soil 01 Mar 2011 A5 055

Moisture Content Method: AN234

% Moisture	%	0.5	8.4	20	11	14	28

Metals in Soil by ICPOES Method: AN/320AN321

Arsenic, As	mg/kg	2	8	3	<2	<2	2
Cadmium, Cd	mg/kg	0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium, Cr	mg/kg	5	23	11	<5	8	42
Copper, Cu	mg/kg	5	6	16	<5	6	8
Lead, Pb	mg/kg	5	<5	<5	<5	<5	<5
Nickel, Ni	mg/kg	4	<4	<4	<4	<4	<4
Zinc, Zn	mg/kg	5	6	51	<5	<5	25

Mercury in Soil Method: AN312

Mercury	mg/kg	0.05	<0.05	0.08	<0.05	<0.05	0.07

Volatile Petroleum Hydocarbons in Soil Method: AN433/AN434

TRH C6-C9	mg/kg	20	<20	<40↑	<20	<40↑	<20
Benzene	mg/kg	0.1	<0.1	<0.2↑	<0.1	<0.2↑	<0.1
Toluene	mg/kg	0.1	<0.1	<0.2↑	<0.1	<0.2↑	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.2↑	<0.1	<0.2↑	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.4↑	<0.2	<0.4↑	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.2↑	<0.1	<0.2↑	<0.1
MtBE(Methyl-tert-butyl ether)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Surrogates

d4-1,2-dichloroethane (Surrogate)	%	-	109	108	116	104	101
d8-toluene (Surrogate)	%	-	115	110	120	108	103
Dibromofluoromethane (Surrogate)	%	-	109	102	118	106	101
Bromofluorobenzene (Surrogate)	%	-	111	112	116	106	97

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

TRH C10-C14	mg/kg	20	<20	290	<20	<20	<20
TRH C15-C28	mg/kg	45	73	2000	83	170	190
TRH C29-C36	mg/kg	45	100	1300	190	290	240

Surrogates

TRH (Surrogate)	%	-	100	115	100	95	98

OC Pesticides in Soil Method: AN400/AN420

Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HCB (Hexachlorobenzene)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Parameter	Units	LOR	Sample Number: PE055990.001 Sample Matrix: Soil Sample Date: 01 Mar 2011 Sample Name: A1 0mm	PE055990.002 Soil 01 Mar 2011 A2 0mm	PE055990.003 Soil 01 Mar 2011 A3 0mm	PE055990.004 Soil 01 Mar 2011 A4 0mm	PE055990.005 Soil 01 Mar 2011 A5 055

OC Pesticides in Soil   Method: AN400/AN420 (continued)

p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Surrogates

d14-p-terphenyl (Surrogate)	%	-	112	114	120	118	118

OP Pesticides in Soil   Method: AN400/AN420

Dichlorvos	mg/kg	1	<1	<1	<1	<1	<1
Dimethoate	mg/kg	1	<1	<1	<1	<1	<1
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Surrogates

d14-p-terphenyl (Surrogate)	%	-	112	114	120	118	118

Field pH for Acid Sulphate Soil   Method: AN104

Reaction*	No unit	-	-	-	-	-	-
pH Difference*	pH Units	-	-	-	-	-	-
PHf	pH Units	-	-	-	-	-	-
PHfox	pH Units	-	-	-	-	-	-

Parameter	Units	LOR	PE055990.006 Soil 01 Mar 2011 ASS 1 0mm	PE055990.007 Soil 01 Mar 2011 ASS 2 250mm	PE055990.008 Soil 01 Mar 2011 ASS 3 500mm	PE055990.009 Soil 01 Mar 2011 ASS 4 750mm	PE055990.010 Soil 01 Mar 2011 ASS 5 1000mm
Moisture Content Method: AN234							
% Moisture	%	0.5	-	-	-	-	-
Metals in Soil by ICPOES Method: AN/320AN321							
Arsenic, As	mg/kg	2	-	-	-	-	-
Cadmium, Cd	mg/kg	0.4	-	-	-	-	-
Chromium, Cr	mg/kg	5	-	-	-	-	-
Copper, Cu	mg/kg	5	-	-	-	-	-
Lead, Pb	mg/kg	5	-	-	-	-	-
Nickel, Ni	mg/kg	4	-	-	-	-	-
Zinc, Zn	mg/kg	5	-	-	-	-	-
Mercury in Soil Method: AN312							
Mercury	mg/kg	0.05	-	-	-	-	-
Volatile Petroleum Hydocarbons in Soil Method: AN433/AN434							
TRH C6-C9	mg/kg	20	-	-	-	-	-
Benzene	mg/kg	0.1	-	-	-	-	-
Toluene	mg/kg	0.1	-	-	-	-	-
Ethylbenzene	mg/kg	0.1	-	-	-	-	-
m/p-xylene	mg/kg	0.2	-	-	-	-	-
o-xylene	mg/kg	0.1	-	-	-	-	-
MtBE(Methyl-tert-butyl ether)	mg/kg	0.5	-	-	-	-	-
Surrogates							
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-	-
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-	-
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403							
TRH C10-C14	mg/kg	20	-	-	-	-	-
TRH C15-C28	mg/kg	45	-	-	-	-	-
TRH C29-C36	mg/kg	45	-	-	-	-	-
Surrogates							
TRH (Surrogate)	%	-	-	-	-	-	-
OC Pesticides in Soil Method: AN400/AN420							
Alpha BHC	mg/kg	0.1	-	-	-	-	-
HCB (Hexachlorobenzene)	mg/kg	0.1	-	-	-	-	-
Beta BHC	mg/kg	0.1	-	-	-	-	-
Lindane	mg/kg	0.1	-	-	-	-	-
Delta BHC	mg/kg	0.1	-	-	-	-	-
Heptachlor	mg/kg	0.1	-	-	-	-	-
Aldrin	mg/kg	0.1	-	-	-	-	-
Heptachlor epoxide	mg/kg	0.1	-	-	-	-	-
Isodrin	mg/kg	0.1	-	-	-	-	-
Gamma Chlordane	mg/kg	0.1	-	-	-	-	-
Alpha Chlordane	mg/kg	0.1	-	-	-	-	-
Alpha Endosulfan	mg/kg	0.2	-	-	-	-	-
p,p'-DDE	mg/kg	0.1	-	-	-	-	-
Dieldrin	mg/kg	0.2	-	-	-	-	-
Endrin	mg/kg	0.2	-	-	-	-	-
Beta Endosulfan	mg/kg	0.2	-	-	-	-	-
p,p'-DDD	mg/kg	0.1	-	-	-	-	-
Endosulfan sulphate	mg/kg	0.1	-	-	-	-	-

Parameter	Units	LOR	Sample Number: PE055990.006 Sample Matrix: Soil Sample Date: 01 Mar 2011 Sample Name: ASS 1 0mm	PE055990.007 Soil 01 Mar 2011 ASS 2 250mm	PE055990.008 Soil 01 Mar 2011 ASS 3 500mm	PE055990.009 Soil 01 Mar 2011 ASS 4 750mm	PE055990.010 Soil 01 Mar 2011 ASS 5 1000mm

OC Pesticides in Soil Method: AN400/AN420 (continued)

Parameter	Units	LOR	PE055990.006	PE055990.007	PE055990.008	PE055990.009	PE055990.010
p,p'-DDT	mg/kg	0.1	-	-	-	-	-
Endrin Ketone	mg/kg	0.1	-	-	-	-	-
Methoxychlor	mg/kg	0.1	-	-	-	-	-
Mirex	mg/kg	0.1	-	-	-	-	-

Surrogates

Parameter	Units	LOR	PE055990.006	PE055990.007	PE055990.008	PE055990.009	PE055990.010
d14-p-terphenyl (Surrogate)	%	-	-	-	-	-	-

OP Pesticides in Soil Method: AN400/AN420

Parameter	Units	LOR	PE055990.006	PE055990.007	PE055990.008	PE055990.009	PE055990.010
Dichlorvos	mg/kg	1	-	-	-	-	-
Dimethoate	mg/kg	1	-	-	-	-	-
Diazinon (Dimpylate)	mg/kg	0.5	-	-	-	-	-
Fenitrothion	mg/kg	0.2	-	-	-	-	-
Malathion	mg/kg	0.2	-	-	-	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	-	-	-	-	-
Parathion-ethyl (Parathion)	mg/kg	0.2	-	-	-	-	-
Bromophos Ethyl	mg/kg	0.2	-	-	-	-	-
Methidathion	mg/kg	0.5	-	-	-	-	-
Ethion	mg/kg	0.2	-	-	-	-	-
Azinphos-methyl (Guthion)	mg/kg	0.2	-	-	-	-	-

Surrogates

Parameter	Units	LOR	PE055990.006	PE055990.007	PE055990.008	PE055990.009	PE055990.010
d14-p-terphenyl (Surrogate)	%	-	-	-	-	-	-

Field pH for Acid Sulphate Soil Method: AN104

Parameter	Units	LOR	PE055990.006	PE055990.007	PE055990.008	PE055990.009	PE055990.010
Reaction*	No unit	-	moderate	moderate	moderate	high	extreme
pH Difference*	pH Units	-	1.0	1.3	2.1	4.1	3.6
PHf	pH Units	-	5.5	5.7	5.3	5.9	5.9
PHfox	pH Units	-	4.5	4.4	3.2	1.8	2.3

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Field pH for Acid Sulphate Soil **Method: ME-(AU)-[ENV]AN104**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD
PHf	LB015117	pH Units	-	4.8	3%
PHfox	LB015117	pH Units	-	5.8	8%

Mercury in Soil **Method: ME-(AU)-[ENV]AN312**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Mercury	LB015133	mg/kg	0.05	<0.05	0%	NA	117%	2%

Metals in Soil by ICPOES **Method: ME-(AU)-[ENV]AN/320AN321**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Arsenic, As	LB015133	mg/kg	2	<2	0%	95%	81%	14%
Cadmium, Cd	LB015133	mg/kg	0.4	<0.4	0%	92%	86%	12%
Chromium, Cr	LB015133	mg/kg	5	<5	0 - 19%	91%	89%	15%
Copper, Cu	LB015133	mg/kg	5	<5	0 - 14%	98%	86%	12%
Lead, Pb	LB015133	mg/kg	5	<5	0 - 13%	99%	74%	41%
Nickel, Ni	LB015133	mg/kg	4	<4	0%	88%	85%	9%
Zinc, Zn	LB015133	mg/kg	5	<5	0 - 40%	93%	6%	119%

Moisture Content **Method: ME-(AU)-[ENV]AN234**

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB015162	%	0.5	1 - 7%

OC Pesticides in Soil **Method: ME-(AU)-[ENV]AN400/AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Alpha BHC	LB015209	mg/kg	0.1	<0.1	0%			
HCB (Hexachlorobenzene)	LB015209	mg/kg	0.1	<0.1	0%			
Beta BHC	LB015209	mg/kg	0.1	<0.1	0%			
Lindane	LB015209	mg/kg	0.1	<0.1	0%	86%	72%	5%
Delta BHC	LB015209	mg/kg	0.1	<0.1	0%			
Heptachlor	LB015209	mg/kg	0.1	<0.1	0%	95%	74%	6%
Aldrin	LB015209	mg/kg	0.1	<0.1	0%	89%	85%	0%
Heptachlor epoxide	LB015209	mg/kg	0.1	<0.1	0%			
Isodrin	LB015209	mg/kg	0.1	<0.1	0%	97%	83%	0%
Gamma Chlordane	LB015209	mg/kg	0.1	<0.1	0%	94%	81%	4%
Alpha Chlordane	LB015209	mg/kg	0.1	<0.1	0%			
Alpha Endosulfan	LB015209	mg/kg	0.2	<0.2	0%			
p,p'-DDE	LB015209	mg/kg	0.1	<0.1	0%	100%	82%	4%
Dieldrin	LB015209	mg/kg	0.2	<0.2	0%	94%	80%	6%
Endrin	LB015209	mg/kg	0.2	<0.2	0%	101%	78%	12%
Beta Endosulfan	LB015209	mg/kg	0.2	<0.2	0%			
p,p'-DDD	LB015209	mg/kg	0.1	<0.1	0%			
Endosulfan sulphate	LB015209	mg/kg	0.1	<0.1	0%			
p,p'-DDT	LB015209	mg/kg	0.1	<0.1	0%			
Endrin Ketone	LB015209	mg/kg	0.1	<0.1	0%			
Methoxychlor	LB015209	mg/kg	0.1	<0.1	0%			
Mirex	LB015209	mg/kg	0.1	<0.1	0%	83%	74%	11%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
d14-p-terphenyl (Surrogate)	LB015209	%	-	100%	2%	102%	108%	2%

SGS

QC SUMMARY

PE055990 R0

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

OP Pesticides in Soil   Method: ME-(AU)-[ENV]AN400/AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Dichlorvos	LB015209	mg/kg	1	<1	0%			
Dimethoate	LB015209	mg/kg	1	<1	0%			
Diazinon (Dimpylate)	LB015209	mg/kg	0.5	<0.5	0%	91%	73%	1%
Fenitrothion	LB015209	mg/kg	0.2	<0.2	0%			
Malathion	LB015209	mg/kg	0.2	<0.2	0%			
Chlorpyrifos (Chlorpyrifos Ethyl)	LB015209	mg/kg	0.2	<0.2	0%	86%	74%	6%
Parathion-ethyl (Parathion)	LB015209	mg/kg	0.2	<0.2	0%	94%	75%	5%
Bromophos Ethyl	LB015209	mg/kg	0.2	<0.2	0%			
Methidathion	LB015209	mg/kg	0.5	<0.5	0%	91%	112%	34%
Ethion	LB015209	mg/kg	0.2	<0.2	0%			
Azinphos-methyl (Guthion)	LB015209	mg/kg	0.2	<0.2	0%			

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
d14-p-terphenyl (Surrogate)	LB015209	%	-	100%	2%	102%	108%	2%

TRH (Total Recoverable Hydrocarbons) in Soil   Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
TRH C10-C14	LB015209	mg/kg	20	<20	0%	97%	98%	1%
TRH C15-C28	LB015209	mg/kg	45	<45	9%	112%	112%	0%
TRH C29-C36	LB015209	mg/kg	45	<45	2%	114%	96%	2%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
TRH (Surrogate)	LB015209	%	-	103%	2%	102%	95%	1%

Volatile Petroleum Hydocarbons in Soil   Method: ME-(AU)-[ENV]AN433/AN434

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
TRH C6-C9	LB015123	mg/kg	20	<20	0%	102%	91%	4%
Benzene	LB015123	mg/kg	0.1	<0.2	0%	103%	102%	1%
Toluene	LB015123	mg/kg	0.1	<0.5	0%	103%	105%	3%
Ethylbenzene	LB015123	mg/kg	0.1	<0.5	0%	104%	96%	1%
m/p-xylene	LB015123	mg/kg	0.2	<1.0	0%			
o-xylene	LB015123	mg/kg	0.1	<0.5	0%			
MtBE(Methyl-tert-butyl ether)	LB015123	mg/kg	0.5	<0.5	0%	NA		

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
d4-1,2-dichloroethane (Surrogate)	LB015123	%	-	115%	14%	126%	108%	2%
d8-toluene (Surrogate)	LB015123	%	-	115%	14%	120%	111%	2%
Dibromofluoromethane (Surrogate)	LB015123	%	-	119%	12%	125%	108%	1%
Bromofluorobenzene (Surrogate)	LB015123	%	-	122%	13%	130%	119%	2%

METHOD	METHODOLOGY SUMMARY
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analsysis by ASS or ICP as per USEPA Method 200.8.
AN045	A portion of sample is digested with Nitric acid and Hydrogen Peroxide over time and then with Hydrochloric acid through several heating and cooling cycles. It provides a strong oxidising medium for bringing metal analytes into solution according to USEPA3050, after filtration the solution is presented for analysis on AAS or ICP.
AN088	Orbital rolling for Organic pollutants are extracted from soil/sediment by transferring an appropriate mass of sample to a clear soil jar and extracting with 1:1 Dichloromethane/Acetone. Orbital Rolling method is intended for the extraction of semi-volatile organic compounds from soil/sediment samples, and is based somewhat on USEPA method 3570 (Micro Organic extraction and sample preparation). Method 3700.
AN104	pHF is determined on an extract of approximately 2g of as received sample in approximately 10 mL of deionised water with pH determined after standing 30 minutes.
AN104	pHFox is determined on an extract of approximately 2g of as received sample with a few mLs of 30% hydrogen peroxide (adjusted to pH 4.5 to 5.5) with the extract reaction being rated from slight to extreme, with pH determined after reaction is complete and extract has cooled. Referenced to ASS Laboratory Methods Guidelines, method 23Af-Bf, 2004.
AN234	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN320/AN321	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components.
AN320/AN321	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with diffential polarity of the elluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependant on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433/AN434	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

IS	Insufficient sample for analysis.	QFH	QC result is above the upper tolerance
LNR	Sample listed, but not received.	QFL	QC result is below the lower tolerance
*	This analysis is not covered by the scope of accreditation.	-	The sample was not analysed for this analyte
^	Performed by outside laboratory.		
LOR	Limit of Reporting		
↑↓	Raised or Lowered Limit of Reporting		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

Appendix 2: Additional Laboratory Report Contamination and Acid Sulphate Soils

ANALYTICAL REPORT

CLIENT DETAILS

Contact	James Cumming
Client	MBS ENVIRONMENTAL
Address	4, Cook Street West Perth WA 6005
Telephone	08 9226 3166
Facsimile	08 9226 3177
Email	jcumming@mbsenvironmental.com.au
Project	**TESPOW Albany Generator Site**
Order Number	(Not specified)
Samples	3

LABORATORY DETAILS

Manager	Said Hirad
Laboratory	SGS Newburn Environmental
Address	10 Reid Rd Newburn WA 6105
Telephone	(08) 9373 3500
Facsimile	(08) 9373 3556
Email	au.environmental.perth@sgs.com
SGS Reference	PE055990B R0
Report Number	0000017602
Date Reported	01 Apr 2011
Date Received	21 Mar 2011

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(898/20210).

Liming rate calculated using a Fineness factor of 1.5 (which is equivalent to finely divided Ag Lime <0.5mm) and Neutralising Value (NV) of 100%.

If using Liming Material <100% NV, then Liming Rate can be adusted as follows:
Actual Liming Rate equals Calculated Liming Rate times 100 divided by NV of actual Liming Material Bulk Density of Material of 1g/cm3 assumed.

If Bulk Density differs from 1g/cm3 then Liming rate can be adjusted as follows:
Actual Liming Rate equals Calculated Liming Rate times Actual Bulk Density

Sample "A2 0mm" has a low aliphatic / aromatic result compared to the TRH result.
This is due to the fact that polar compounds stick to the silica gel cartridge. The sample was re-extracted to confirm the TRH results.

SIGNATORIES

Dave Williams National Organic Manager	Kurt Blackman Inorganic Team Leader - Soils	Said Hirad Laboratory Manager

ANALYTICAL REPORT

PE055990B R0

Parameter	Units	LOR	Sample Number: PE055990B.002 Sample Matrix: Soil Sample Date: 01 Mar 2011 Sample Name: A2 0mm

Moisture Content   Method: AN234

% Moisture	%	0.5	20

TRH Aliphatic Aromatic Hydrocarbons in Soil   Method: AN403

Aliphatic >C16-C28	mg/kg	45	<45
Aliphatic >C28-C35	mg/kg	45	59
Aliphatic Total (>C16-C35)	mg/kg	90	<90
Aliphatic >C35-C40	mg/kg	100	<100
Aromatic >C16-C28	mg/kg	45	190
Aromatic >C28-C35	mg/kg	45	180
Aromatic Total (>C16-C35)	mg/kg	90	370

Surrogates

TRH (Surrogate)	%	-	107

TAA SPOCAS   Method: AN219

pH KCl*	pH Units	-	-
Titratable Actual Acidity	kg H2SO4/T	0.25	-
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5	-
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01	-
Sulphur (SKCl)	%w/w	0.005	-
Calcium (CaKCl)	%w/w	0.005	-
Magnesium (MgKCl)	%w/w	0.005	-

TPA ANC SPOCAS   Method: AN218

Peroxide pH (pH Ox)	pH Units	-	-
TPA as kg H_2SO_4/tonne	kg H2SO4/T	0.25	-
TPA as moles H+/tonne	moles H+/T	5	-
TPA as S % W/W	%w/w S	0.01	-
Titratable Sulfidic Acidity as moles H+/tonne	moles H+/T	5	-
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	kg H2SO4/T	0.25	-
Titratable Sulfidic Acidity as S % W/W	%w/w S	0.01	-
ANCE as % $CaCO_3$	% CaCO3	0.01	-
ANCE as moles H+/tonne	moles H+/T	5	-
ANCE as S % W/W	%w/w S	0.01	-
Peroxide Oxidisable Sulphur (Spos)*	%w/w	0.005	-
Peroxide Oxidisable Sulphur as moles H+/tonne*	moles H+/T	5	-
Sulphur (Sp)	%w/w	0.005	-
Calcium (Cap)	%w/w	0.005	-
Reacted Calcium (CaA)*	%w/w	0.005	-
Reacted Calcium (CaA)*	moles H+/T	5	-
Magnesium (Mgp)	%w/w	0.005	-
Reacted Magnesium (MgA)*	%w/w	0.005	-
Reacted Magnesium (MgA)*	moles H+/T	5	-
Net Acid Soluble Sulphur as % w/w*	%w/w	0.005	-
Net Acid Soluble Sulphur as moles H+/tonne*	moles H+/T	5	-

Net Acidity Calculations   Method: AN220

s-Net Acidity	%w/w S	0.01	-
a-Net Acidity	moles H+/T	5	-
Liming Rate*	kg CaCO3/T	0.1	-
Verification s-Net Acidity*	%w/w S	0.01	-
a-Net Acidity without ANCE*	moles H+/T	5	-
Liming Rate without ANCE*	kg CaCO3/T	0.1	-

ANALYTICAL REPORT

PE055990B R0

Parameter	Units	LOR	PE055990B.009	PE055990B.010
Sample Number			PE055990B.009	PE055990B.010
Sample Matrix			Soil	Soil
Sample Date			01 Mar 2011	01 Mar 2011
Sample Name			ASS 4 750mm	ASS 5 1000mm

Moisture Content Method: AN234

% Moisture	%	0.5	-	-

TRH Aliphatic Aromatic Hydrocarbons in Soil Method: AN403

Aliphatic >C16-C28	mg/kg	45	-	-
Aliphatic >C28-C35	mg/kg	45	-	-
Aliphatic Total (>C16-C35)	mg/kg	90	-	-
Aliphatic >C35-C40	mg/kg	100	-	-
Aromatic >C16-C28	mg/kg	45	-	-
Aromatic >C28-C35	mg/kg	45	-	-
Aromatic Total (>C16-C35)	mg/kg	90	-	-

Surrogates

TRH (Surrogate)	%	-	-	-

TAA SPOCAS Method: AN219

pH KCl*	pH Units	-	5.5	5.7
Titratable Actual Acidity	kg H2SO4/T	0.25	1.3	0.91
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5	26	19
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01	0.04	0.03
Sulphur (SKCl)	%w/w	0.005	<0.005	0.10
Calcium (CaKCl)	%w/w	0.005	0.021	0.019
Magnesium (MgKCl)	%w/w	0.005	0.015	0.015

TPA ANC SPOCAS Method: AN218

Peroxide pH (pH Ox)	pH Units	-	3.6	4.3
TPA as kg H_2SO_4/tonne	kg H2SO4/T	0.25	1.9	2.8
TPA as moles H+/tonne	moles H+/T	5	38	56
TPA as S % W/W	%w/w S	0.01	0.06	0.09
Titratable Sulfidic Acidity as moles H+/tonne	moles H+/T	5	12	39
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	kg H2SO4/T	0.25	0.61	1.9
Titratable Sulfidic Acidity as S % W/W	%w/w S	0.01	0.02	0.06
ANCE as % $CaCO_3$	% CaCO3	0.01	<0.01	<0.01
ANCE as moles H+/tonne	moles H+/T	5	<5	<5
ANCE as S % W/W	%w/w S	0.01	<0.01	<0.01
Peroxide Oxidisable Sulphur (Spos)*	%w/w	0.005	0.054	0.069
Peroxide Oxidisable Sulphur as moles H+/tonne*	moles H+/T	5	34	43
Sulphur (Sp)	%w/w	0.005	0.060	0.070
Calcium (Cap)	%w/w	0.005	0.023	0.019
Reacted Calcium (CaA)*	%w/w	0.005	<0.005	<0.005
Reacted Calcium (CaA)*	moles H+/T	5	<5	<5
Magnesium (Mgp)	%w/w	0.005	0.019	0.016
Reacted Magnesium (MgA)*	%w/w	0.005	<0.005	<0.005
Reacted Magnesium (MgA)*	moles H+/T	5	<5	<5
Net Acid Soluble Sulphur as % w/w*	%w/w	0.005	-	-
Net Acid Soluble Sulphur as moles H+/tonne*	moles H+/T	5	-	-

Net Acidity Calculations Method: AN220

s-Net Acidity	%w/w S	0.01	0.10	0.10
a-Net Acidity	moles H+/T	5	60	62
Liming Rate*	kg CaCO3/T	0.1	4.5	4.6
Verification s-Net Acidity*	%w/w S	0.01	0.02	0.02
a-Net Acidity without ANCE*	moles H+/T	5	60	62
Liming Rate without ANCE*	kg CaCO3/T	0.1	4.5	4.6

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Moisture Content Method: ME-(AU)-[ENV]AN234

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB016288	%	0.5	3 - 11%

TAA SPOCAS Method: ME-(AU)-[ENV]AN219

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
pH KCl*	LB016424	pH Units	-	5.1	0%	96%
Titratable Actual Acidity	LB016424	kg	0.25	<0.25	0%	NA
Titratable Actual Acidity (TAA) moles H+/tonne	LB016424	moles	5	<5	1%	102%
Titratable Actual Acidity (TAA) S%w/w	LB016424	%w/w S	0.01	<0.01	0%	102%
Sulphur (SKCl)	LB016424	%w/w	0.005	<0.005	0%	87%
Calcium (CaKCl)	LB016424	%w/w	0.005	<0.005	5%	91%
Magnesium (MgKCl)	LB016424	%w/w	0.005	<0.005	0%	87%

TPA ANC SPOCAS Method: ME-(AU)-[ENV]AN218

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Peroxide pH (pH Ox)	LB016425	pH Units	-	6.6	0%	97%
TPA as kg H_2SO_4/tonne	LB016425	kg	0.25	<0.25	5%	95%
TPA as moles H+/tonne	LB016425	moles	5	<5	5%	95%
TPA as S % W/W	LB016425	%w/w S	0.01	<0.01	5%	95%
Titratable Sulfidic Acidity as moles H+/tonne	LB016425	moles	5	<5	7%	95%
Titratable Sulfidic Acidity as kg H_2SO_4/tonne	LB016425	kg	0.25	<0.25	7%	NA
Titratable Sulfidic Acidity as S % W/W	LB016425	%w/w S	0.01	<0.01	7%	95%
ANCE as % $CaCO_3$	LB016425	% CaCO3	0.01	<0.01	0%	NA
ANCE as moles H+/tonne	LB016425	moles	5	<5	0%	NA
ANCE as S % W/W	LB016425	%w/w S	0.01	<0.01	0%	NA
Peroxide Oxidisable Sulphur (Spos)*	LB016425	%w/w	0.005	<0.005	1%	85%
Peroxide Oxidisable Sulphur as moles H+/tonne*	LB016425	moles	5	<5	1%	96%
Sulphur (Sp)	LB016425	%w/w	0.005	<0.005	0%	93%
Calcium (Cap)	LB016425	%w/w	0.005	<0.005	5%	94%
Reacted Calcium (CaA)*	LB016425	%w/w	0.005	<0.005		
Reacted Calcium (CaA)*	LB016425	moles	5	<5		
Magnesium (Mgp)	LB016425	%w/w	0.005	<0.005	0%	92%
Reacted Magnesium (MgA)*	LB016425	%w/w	0.005	<0.005		
Reacted Magnesium (MgA)*	LB016425	moles	5	<5		

TRH Aliphatic Aromatic Hydrocarbons in Soil Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Aliphatic >C16-C28	LB016377	mg/kg	45	<45	88%
Aliphatic >C28-C35	LB016377	mg/kg	45	<45	84%
Aliphatic Total (>C16-C35)	LB016377	mg/kg	90	<90	
Aliphatic >C35-C40	LB016377	mg/kg	100	<100	
Aromatic >C16-C28	LB016377	mg/kg	45	<45	92%
Aromatic >C28-C35	LB016377	mg/kg	45	<45	96%
Aromatic Total (>C16-C35)	LB016377	mg/kg	90	<90	

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
TRH (Surrogate)	LB016377	%	-	88%	94%

METHOD	METHODOLOGY SUMMARY
AN004	Soils, sediments and sludges are pulverised using an LM2 ringmill. The dry sample is pulverised to a particle size of >90% passing through a -75µm sieve.
AN218	Soil samples are subjected to extreme oxidising conditions using hydrogen peroxide. Continuous application of heat and peroxide ensure all sulphide is converted to sulphuric acid. Excess peroxide is broken down by a copper catalyst prior to titration for acidity. Calcium, magnesium, and sulphur are determined by ICP-OES. Also included is a carbonate modification step which, depending on pH after the initial oxidation, gives a measure of ANC.
AN219	Dried pulped sample is extracted for 4 hours in a 1 M KCl solution. The ratio of sample to solution is 1:40. The extract is titrated for acidity. Calcium, magnesium, and sulphur are determined by ICP-AES.
AN234	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with diffential polarity of the elluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependant on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.

FOOTNOTES

IS	Insufficient sample for analysis.	QFH	QC result is above the upper tolerance
LNR	Sample listed, but not received.	QFL	QC result is below the lower tolerance
*	This analysis is not covered by the scope of accreditation.	-	The sample was not analysed for this analyte
^	Performed by outside laboratory.		
LOR	Limit of Reporting		
↑↓	Raised or Lowered Limit of Reporting		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

APPENDIX 3:
LABORATORY REPORT
GEOTECHNICAL SOIL ASSESSMENTS

TEST CERTIFICATE

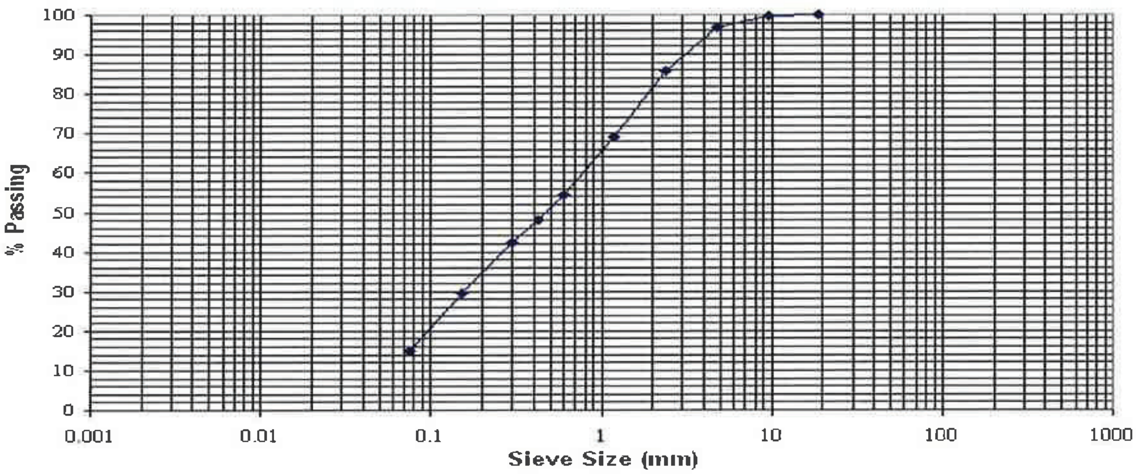
SGS
ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	SGS - Australian Enviromental Laboratories	Client Job No:	55990A-1
Order No:		Project:	52421B
Tested Date:	4/03/2011	Location:	
SGS Job Number:	11-01-320	Sample No:	11-MT-1967
Lab:	Welshpool	Sample ID:	A620kg 1/3/2011 0mm

PARTICLE SIZE DISTRIBUTION

AS1289.3.6.1



Sieve Size (mm)	% Passing	Sieve Size (mm)	% Passing
		2.36	86
		1.18	69
		0.600	54
		0.425	48
19.0	100	0.300	42
9.5	100	0.150	30
4.75	97	0.075	15

Note: Sample supplied by client.

Approved Signatory: (Mark .Matthews) Date: 15/03/2011

ilac-MRA NATA

This document is issued in accordance with NATA's accreditation requirements

Site No.: 2411
Cert No.: 11-MT-1967-S301

Accreditation No.: 2418 Form No.PF-(AU)-[IND(MTE)]-TE-S301.LCER/A/01.01.2009
Client Address: 467 McKnoe Drive MARANGUP WA 6083

SGS

ABN: 44 000 964 278
ph: 1300 781 744
fx: (08) 9458 3700

TEST CERTIFICATE

SGS Australia Pty Ltd
PO Box 219 Bentley WA 6982
36 Railway Parade
Welshpool WA 6106

Client:	SGS - Australian Enviromental Laboratories	Client Job No:	55990A-1
Order No:		Project:	52421B
Tested Date:	14/03/2011	Location:	
SGS Job Number:	11-01-320	Sample No:	11-MT-1967
Lab:	Welshpool	Sample ID:	A620kg 1/3/2011 0mm

PLASTICITY INDEX

AS 1289.3.9.2(Single Point Cone Method), 3.2.1(Plastic Limit), 3.3.2(Plasticity Index), 3.4.1(Linear Shrinkage)

AS 1289.3.9.2	
Liquid Limit (%)	**66**
AS 1289.3.2.1	
Plastic Limit (%)	**52**
AS 1289.3.3.2	
Plasticity Index (%)	**14**
AS 1289.3.4.1	
Linear Shrinkage (%)	**8.0**
History of Sample	Oven Dried at <50°C
Method of preparation	Dry Sieved
Nature of Shrinkage	Flat
Length of mould (mm)	127

Note: Sample supplied by client.

Approved Signatory: (Mark .Matthews) Date: 15/03/2011

This document is issued in accordance with NATA's accreditation requirements

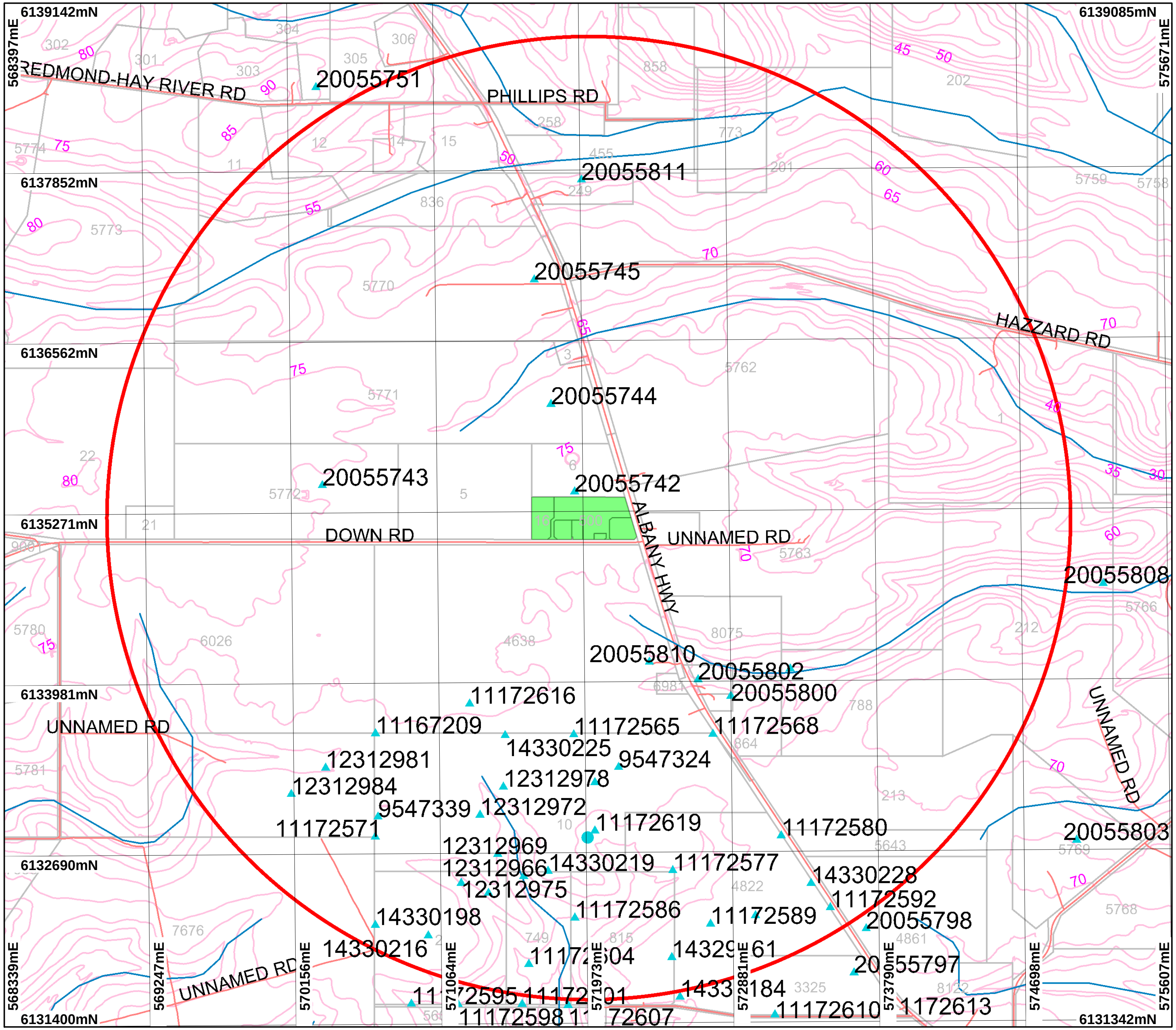
Accreditation No.: 2418 Form No.PF-(AU)-[IND(MTE)]-TE-S324.LCER/D/02.09.09
Client Address: 467 McKnoe Drive MARANGUP WA 6083

Site No.: 2411
Cert No.: 11-MT-1967-S324

APPENDIX D

Water Information Network (WIN) Database Search Results

Crn Albany Hwy & Down Rd, Drome - 3km radius



LEGEND

- Topographic Contours, Statewide - Landgate
- Cadastre for labelling - DLI
- Road Centrelines - Landgate
- Hydrography, linear (medium scale, 250k GA)
- WIN Groundwater Sites, Monitoring - non DoW
- WIN Groundwater Sites, Other - DoW
- WIN Groundwater Sites, Other - non DoW_1
- WIN Groundwater Sites, Monitoring - DoW
- WA Coastline - DoE
- Pastoral Leases - DA

N

0 ~1 km

Scale 1:38407
(Approximate when reproduced at A4)

Geocentric Datum Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Prepared by: lerchr
Prepared for:
Date: 2/08/2011 9:30:35 AM

Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.

Government of Western Australia
Department of Water

APPENDIX E

Protected Matters Database Search Results

Australian Government

Department of Sustainability, Environment, Water, Population and Communities

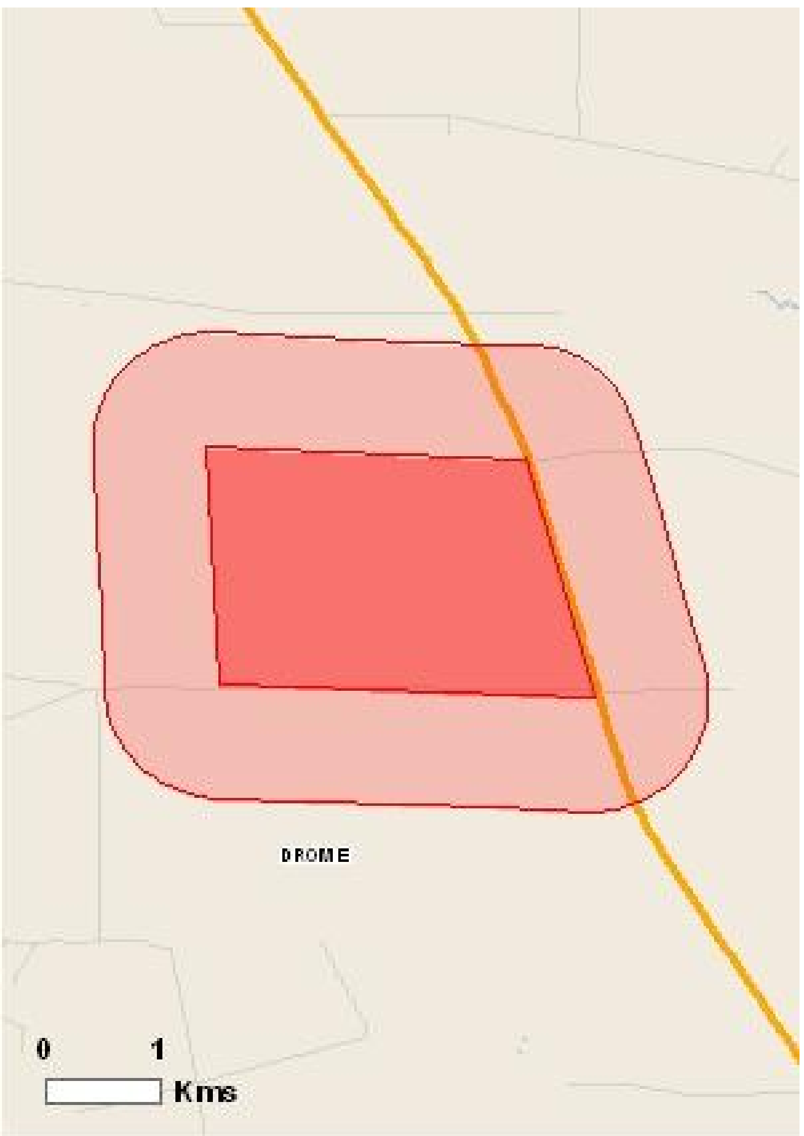
EPBC Act Protected Matters Report

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.

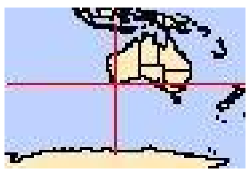
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 06/03/13 14:09:03



Coordinates

Buffer: 1.0Km



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 Areas:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	17
Listed Migratory Species:	6

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 and the heritage values of a place on the Register of the National Estate.

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.

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:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	4
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

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

Place on the RNE:	None
State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	12
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		
Atrichornis clamosus		
Noisy Scrub-bird [654]	Vulnerable	Species or species habitat likely to occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calyptorhynchus banksii naso		
Forest Red-tailed Black-Cockatoo [67034]	Vulnerable	Species or species habitat may occur within area
Calyptorhynchus baudinii		
Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Breeding likely to occur within area
Calyptorhynchus latirostris		
Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Galaxias truttaceus hesperius		
Spotted Galaxias (western subspecies), Western Spotted Galaxias, Western Trout Galaxias [81282]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Dasyurus geoffroii		
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Pseudocheirus occidentalis		
Western Ringtail Possum [25911]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Setonix brachyurus		
Quokka [229]	Vulnerable	Species or species habitat may occur within area
Plants		
Banksia brownii		
Brown's Banksia, Feather-leaved Banksia [8277]	Endangered	Species or species habitat known to occur within area
Centrolepis caespitosa		
[6393]	Endangered	Species or species habitat likely to occur within area
Chordifex abortivus		
Manypeaks Rush [64868]	Endangered	Species or species habitat may occur within area
Conostylis misera		
Grass Conostylis [21320]	Endangered	Species or species habitat likely to occur within area
Drakaea elastica		
Glossy-leaved Hammer-orchid, Praying Virgin [16753]	Endangered	Species or species habitat may occur within area
Drosera fimbriata		
Manypeaks Sundew [18749]	Vulnerable	Species or species habitat likely to occur within area
Isopogon uncinatus		
Hook-leaf Isopogon [20871]	Endangered	Species or species habitat likely to 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
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -

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		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area

Extra Information

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		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Coordinates

-34.90641 117.786233,-34.906258 117.786385,-34.925293 117.791868,-34.924227 117.761867,-34.905344 117.760954,-34.90641 117.786233

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 Heritage and Register of National Estate properties, Wetlands of International 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.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

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.

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:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA 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, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-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.

Department of Sustainability, Environment, Water, Population and Communities
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

APPENDIX F

Aboriginal Heritage Database Search Results

Search Criteria

6 surveys in a search box. The box is formed by these diagonally opposed corner points:

MGA Zone 50	
Northing	Easting
6133180	568188
6138495	574608

Disclaimer

Heritage Surveys have been mapped using information from the reports and / or other relevant data sources. Heritage Surveys consisting of small discrete areas may not be visible except at large scales. Reports shown may not be held at DIA. Please consult report holder for more information. Refer to www.dia.wa.gov.au/heritage for information on requesting reports held by DIA.

Copyright

Legend

Access

Some reports are restricted. The type of restriction is shown as a code in brackets following the catalogue number. No code indicates an unrestricted report.

[CLOSED]	Closed
[OWE]	Open with exception
[TBD]	To be determined
[RESTRICTED PENDING]	Restricted pending

Survey 2077

Project	Waste water treatment plant at Albany.
Start Date	05 Jan 2002
Proponents	WA Water Corporation
Consultants	Australian Interaction Consultants
Survey Types	Archaeological and Ethnographic
Aboriginal People Consulted?	Yes
Related Reports	

Report ID	Catalogue Number	Title	Recorders	Held At
106481	HSR SW 2002 PAR	Site avoidance survey under the Aboriginal Heritage Act (1972) of a Waste Water Treatment Plant at Albany, Western Australia : volume1 of 2 - The Wom - Ber People	Paul Greenfeld Ronald T. Parker	DIA

Survey 2080

Project	Waste water treatment plant Albany
Start Date	04 Jan 2002
Proponents	WA Water Corporation
Consultants	Australian Interaction Consultants
Survey Types	Archaeological and Ethnographic
Aboriginal People Consulted?	Yes
Related Reports	

Report ID	Catalogue Number	Title	Recorders	Held At
106480	HSR SW 2002 PAR	Site avoidance survey under the Aboriginal Heritage Act (1972) of a Waste Water Treatment Plant at Albany, Western Australia : volume 2 of 2 - Wagyl Kaip	Paul Greenfeld Ronald T. Parker	DIA

Survey 2034

Project	Down Road West Industrial Project, Albany
Start Date	22 Apr 2000
Proponents	LandCorp
Consultants	Australian Interaction Consultants
Survey Types	Archaeological and Ethnographic
Aboriginal People Consulted?	Yes
Related Reports	

Report ID	Catalogue Number	Title	Recorders	Held At
18379	HSR SW 2000 PAR	Site identification survey under the Aboriginal Heritage Act (1972)	Donald Lantzke Ronald T. Parker	DIA

Survey 2050

Project	Proposed Down Road East industrial project, Albany
Start Date	22 Apr 2000
Proponents	LandCorp
Consultants	Australian Interaction Consultants
Survey Types	Archaeological and Ethnographic
Aboriginal People Consulted?	Yes
Related Reports	

Report ID	Catalogue Number	Title	Recorders	Held At
18380	HSR SW 2000 PAR	Site identification survey under the Aboriginal Heritage Act (1972) of the proposed Down Road East Industrial Project in Albany WA	Donald Lantzke Ron Parker	DIA

Survey 1961

Project	Kulikup to Kojonup and Mount Barker to Albany sections of the Telecom optic fibre cable route.
Start Date	01 Jan 1995
Proponents	Telecom Australia
Consultants	Quartermaine Consultants
Survey Types	Archaeological
Aboriginal People Consulted?	No
Related Reports	

Report ID	Catalogue Number	Title	Recorders	Held At
102171	HSR SW 1995 QUA	Report on an Archaeological Survey for Aboriginal Sites Kulikup to Kojonup and Mount Barker to Albany Sections of the Telecom Optic Fibre Cable Route. February 1995.	Gary Quartermaine Julie Quartermaine	DIA

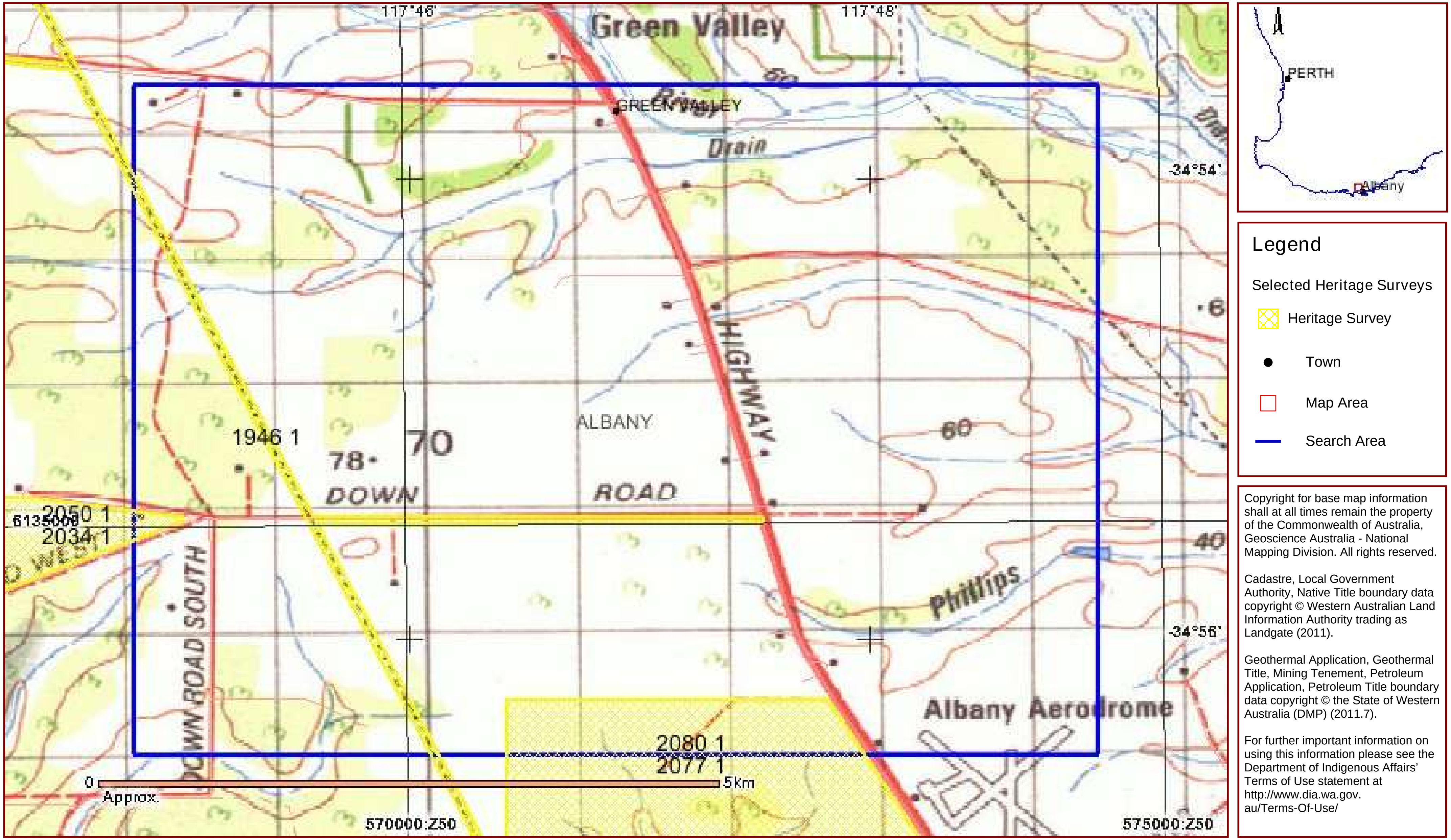
Survey 1946

Project	Telecom optic fibre cable routes in the Kojonup, Mount Barker and Albany area
Start Date	01 Dec 1994
Proponents	Telecom Australia
Consultants	R. O'Connor
Survey Types	Ethnographic
Aboriginal People Consulted?	Yes
Related Reports	

Report ID	Catalogue Number	Title	Recorders	Held At
104192	HSR SW 1995 OCO	Report on an Ethnographic Survey of Telecom Australia Optic Fibre Cable Routes in the Kojonup, Mount Barker and Albany Area. January 1995.	Rory O'Connor	DIA

Aboriginal Heritage Inquiry System

Heritage Survey Database



Legend

Selected Heritage Surveys

- Heritage Survey
- Town
- Map Area
- Search Area

Search Criteria

2 sites in a search box. The box is formed by these diagonally opposed corner points:

MGA Zone 50	
Northing	Easting
6133180	568112
6138510	574608

Disclaimer

Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist. Consultation with Aboriginal communities is on-going to identify additional sites. The AHA protects all Aboriginal sites in Western Australia whether or not they are registered.

Copyright

Legend

Restriction

N	No restriction
M	Male access only
F	Female access

Access

C	Closed
O	Open
V	Vulnerable

Coordinate Accuracy

Accuracy is shown as a code in brackets following the site coordinates.

[Reliable]	The spatial information recorded in the site file is deemed to be reliable, due to methods of capture.
[Unreliable]	The spatial information recorded in the site file is deemed to be unreliable due to errors of spatial data capture and/or quality of spatial information reported.

Status

L - Lodged		IA - Information Assessed		ACMC Decision Made
Information lodged, awaiting assessment	→	Information Awaiting ACMC Decision Assessment Only	→	R - Registered Site I - Insufficient information S - Stored Data

*Explanation of Assessment

Sites lodged with the Department are assessed under the direction of the Registrar of Aboriginal Sites. These are not the final assessment.

Final assessment and decisions will be determined by the Aboriginal Cultural Material Committee (ACMC).

Spatial Accuracy

Index coordinates are indicative locations and may not necessarily represent the centre of sites, especially for sites with an access code “closed” or “vulnerable”. Map coordinates (Lat/Long) and (Easting/Northing) are based on the GDA 94 datum. The Easting / Northing map grid can be across one or more zones. The zone is indicated for each Easting on the map, i.e. '5000000:Z50' means Easting=5000000, Zone=50.

Sites Shown on Maps

Site boundaries may not appear on maps at low zoom levels

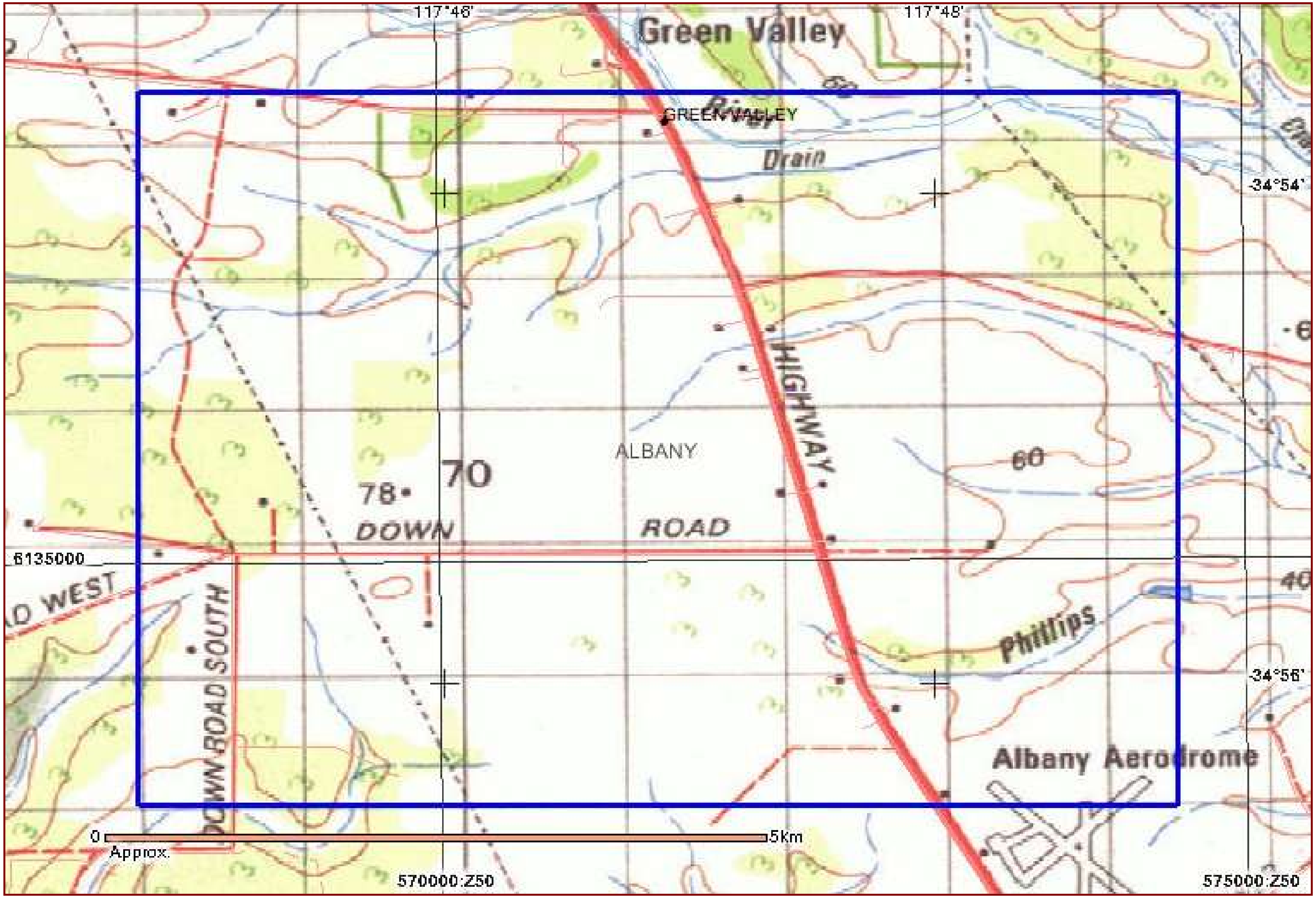
List of Registered Aboriginal Sites with Map

No results

Government of **Western Australia**
Department of **Indigenous Affairs**

Aboriginal Heritage Inquiry System

Aboriginal Sites Database



Legend

Selected Heritage Sites

Registered Sites

Town

Map Area

Search Area

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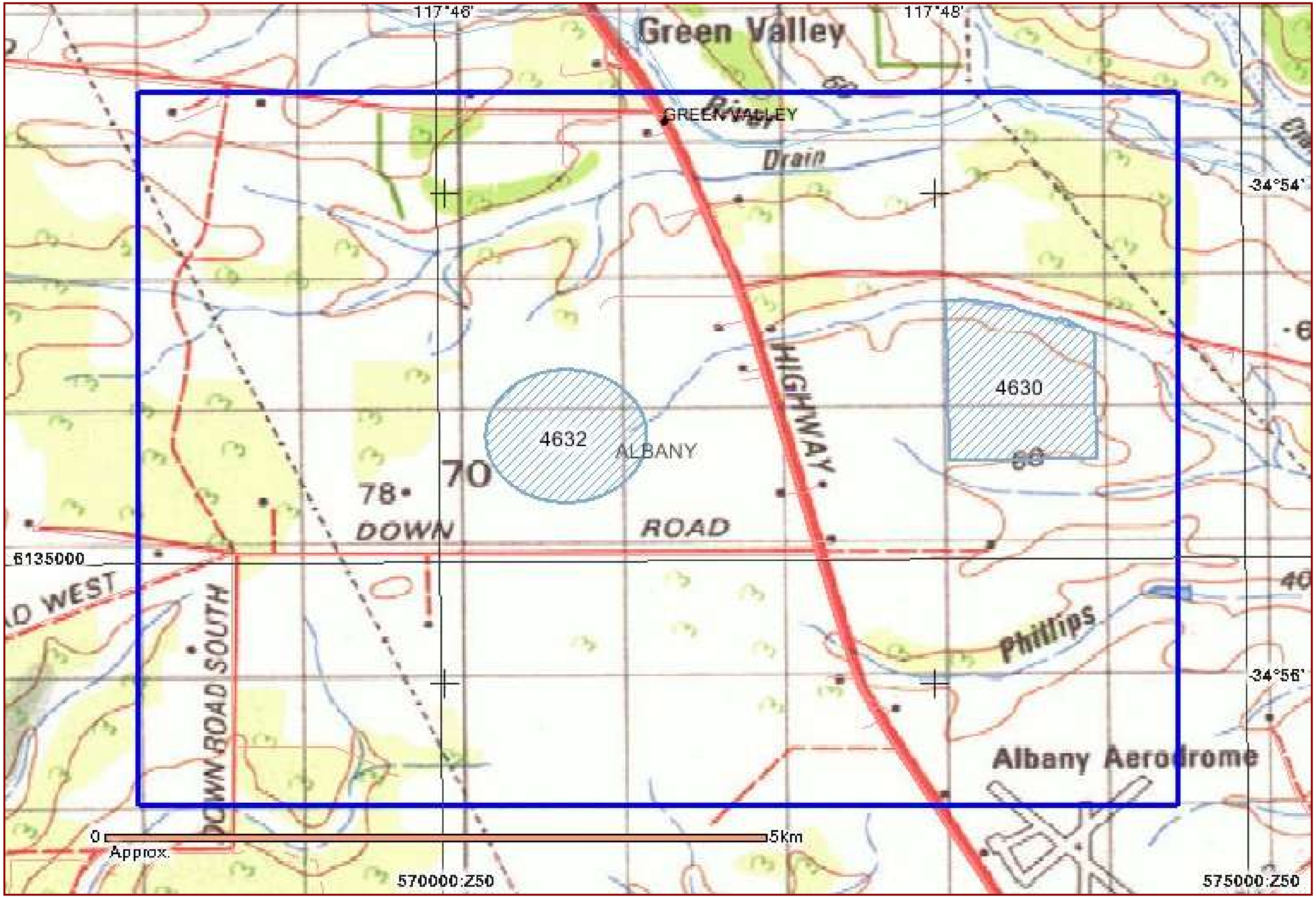
List of 2 Other Heritage Places with Map

Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
4630	I	O	N	King River.		Camp		573601mE 6136309mN Zone 50 [Unreliable]	S02365
4632	S	O	N	Downe Road, Albany	Artefacts / Scatter			570790mE 6135947mN Zone 50 [Unreliable]	S02368

Government of **Western Australia**
Department of **Indigenous Affairs**

Aboriginal Heritage Inquiry System

Aboriginal Sites Database



Legend

Selected Heritage Sites

- Other Heritage Places
- Town
- Map Area
- Search Area

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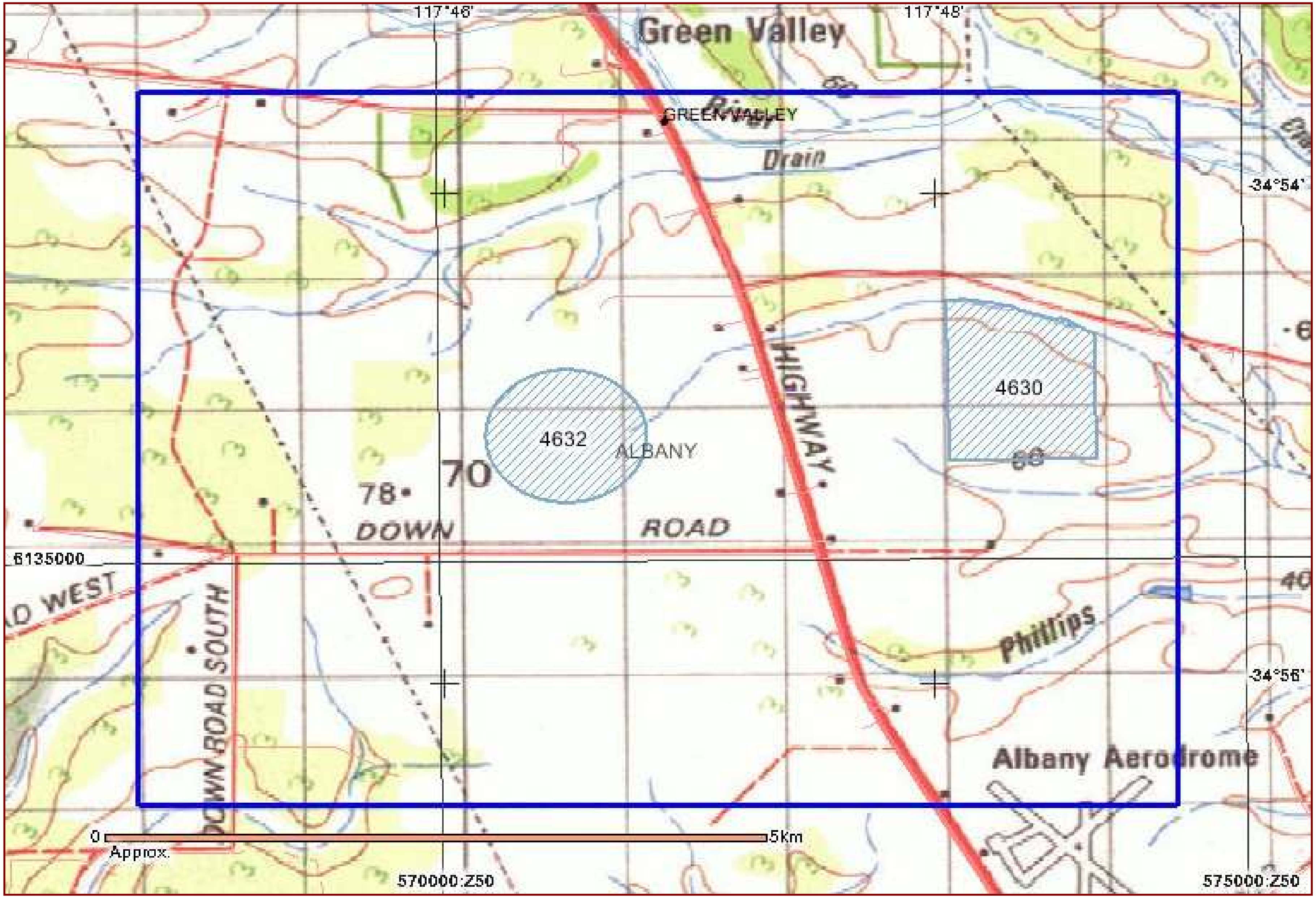
Map Showing Registered Aboriginal Sites and Other Heritage Places

Aboriginal Heritage Inquiry System

Aboriginal Sites Database



Legend

Selected Heritage Sites

- Registered Sites
- Other Heritage Places
- Town
- Map Area
- Search Area

For further important information on using this information please see the Department of Indigenous Affairs' Terms of Use statement at http://www.dia.wa.gov.au/Terms-Of-Use/

APPENDIX G

Air Quality Modelling Report

Final report: Air quality modelling for the power stations in Kemerton and Albany, Western Australia

for

Tesla Holdings Pty Ltd

4 April 2013

Final report: Air quality modelling for the power stations in Kemerton and Albany, Western Australia

For

Tesla Holdings Pty Ltd

Report version	Date	Authored by	Checked by
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Executive Summary

Tesla Holdings (Tesla), has requested that Synergetics Environmental Engineering (Synergetics) undertake an air quality assessment of emissions from two peak load power stations which are to be constructed in Kemerton and Albany, Western Australia.

Each power stations consist of 40 electrical generators powered by diesel engines with a nominal electrical power output of 60MW-e. The power stations are expected to be operated at no more than 500 hours in any calendar year.

Individual generators are to have their individual exhaust ducts combined into a single ten ducted flanged stack above the central generator unit in each engine group.

An air quality assessment of emissions from the four ten-duct exhaust stacks of the power station was undertaken using the regulatory approved model, Ausplume v6.0.

Worst case conditions and conservative assumptions were used in the assessment of the cumulative impact from the emissions from the power stations. All emitted substances were found to be below the relevant assessment criteria.

1 Introduction

Tesla Holdings Pty Ltd (Tesla) has retained Synergetics to undertake an air quality assessment of emissions from two proposed power stations which are to be constructed on two sites in Kemerton and Albany, WA.

- Kemerton site: Lot 5107 Marriott Road, Wellesley.
- Albany site: Lot 5 Down Road, Albany.

This document provides details and the results of the air quality assessment undertaken. The results are based on information supplied by the Tesla Holdings through email and personal communications with Synergetics (Tesla, 2010a).

2 Assessment criteria

2.1 National air quality regulations

In Australia, the National body that generates regulations applying to air quality is the National Environment Protection Council (NEPC). The NEPC's primary task is to create National Environment Protection Measures (NEPMs). Standards, advisory reporting standards, goals and monitoring investigation levels specified in the NEPMs do not apply directly in the various States and Territories. Rather, it is the responsibility of each State to implement the NEPM by means of local regulation.

The Air Quality NEPM (AQ NEPM) was originally produced in 1998 and provided a list of standards and goals for carbon monoxide, nitrogen dioxide, ozone, sulphur dioxide, Lead and PM_{10} (refer to Table 1). The AQ NEPM was subsequently amended in 2003 to also include advisory reporting standards for $PM_{2.5}$ (refer to Table 2). In the AQ NEPM, standards and goals are defined as follows;

- Standard - quantifiable characteristics of the air against which ambient air quality can be assessed.
- Advisory reporting standard - a health-based standard to assess the results of monitoring for particles such as $PM_{2.5}$. A timeframe for compliance is not stipulated.
- Goal - a goal that relates to desired environmental outcomes, and guides the formulation of strategies for the management of human activities that may affect the environment.

Table 1 - Standards and goals for the key ambient air pollutants (excluding $PM_{2.5}$) as specified in NEPC (1998)

Pollutant	Averaging period	Standard	Goal within 10 years Maximum allowable exceedances
Carbon monoxide (CO)	8-hour	9.0 ppm	1 day a year
Nitrogen dioxide (NO_2)	1-hour	0.12 ppm	1 day a year
	1-year	0.03 ppm	none
Photochemical oxidants (as ozone)	1-hour	0.10 ppm	1 day a year
	4-hour	0.08 ppm	1 day a year
Sulphur dioxide (SO_2)	1-hour	0.20 ppm	1 day a year
	1-day	0.08 ppm	1 day a year
	1-year	0.02 ppm	None
Lead (Pb)	1-year	0.50 µg/m^3	None
Particulate less than 10 µm diameter (PM_{10})	1-day	50 µg/m^3	5 days a year

Table 2 - Standards and goals for $PM_{2.5}$ as specified in the variation to the original NEPM (NEPC 2003)

Pollutant	Averaging period	Advisory reporting standard	Goal
Particulate less than 2.5 µm diameter ($PM_{2.5}$)	1 day	25 µg/m^3	Goal is to gather sufficient data nationally to facilitate a review of the standard as part of the review of this Measure scheduled to commence in 2005
	1 year	8 µg/m^3	

A recent discussion paper has also been released by NEPC (2010), providing the outcomes of a thorough review of the AQ NEPM. The review may lead to a modification of air quality regulation in Australia in the next few years, as summarised below.

- The literature consistently demonstrates that PM_{10} and $PM_{2.5}$ in particular, but also NO_2, CO and SO_2, exert consistent, measureable adverse health effects on humans even below the current limits. The NEPM discussion paper states that for these pollutants "the standards have been adopted with the acknowledgement that there is a level of residual risk associated with those standards".
- There appears to be a linear relationship between exposure to NEPM pollutants and adverse health effects, and any increase in air pollution levels (even within the standards) will lead to an increase in risk to the health of the population. It is very likely that the allowable exceedances specified in Table 1 will be gradually phased out.
- Benzene and polyaromatic hydrocarbons (PAHs) were also included in this discussion paper, along with a thorough review of their health impacts. They are currently covered in Australia by the Air Toxics NEPM. Benzene and PAHs have not yet been moved from the Air toxics NEPM to AAQ NEPM, but it seems likely in the future. This does not have implications for States such as Victoria, where benzene and PAHs are already regulated.

2.2 State air quality regulations

Western Australia effectively implemented the National air quality regulations listed above in the Draft WA State Environment (Ambient Air Policy) (2009) (WAG 2009), where environmental quality criteria were defined as the pollutant concentrations listed in AQ NEPM and AT NEPM.

In addition, a guidance document from the Western Australia Department of Environment (DoE 2004) indicates that additional air quality guidelines may be adopted from other jurisdictions and applied in WA to complement the currently existing regulations where appropriate. Based on this, regulatory values were sourced from NSW DEC (2005) for the various volatile organic compound pollutants.

2.3 Assessment criteria employed in this assessment

The air quality assessment criteria used in this study are detailed in Table 3. These criteria were obtained by taking the most stringent value from appropriate National, State and international criteria. A description of the regulatory context for the various regulations employed, as well as an explanation of why these were selected as the most relevant criteria, is provided in the following sections.

VOCs (volatile organic compounds) do not have a regulatory criterion in any jurisdiction. For the purposes of the present assessment, VOCs were conservatively assumed to consist of benzene, one of the more hazardous VOCs that may be a product of combustion, with the NSW DEC (DEC NSW 2005) impact assessment criteria applied.

Table 3 - List of assessment criteria used in the present assessment and their source.

Pollutant	Averaging time	Percentile	Assessment Criteria Employed (mg/m^3)	Source
CO	15-min	100	100	WHO (2000)
	1-hour	100	30	WHO (2000)
	8-hour	100	10	NEPC (1998)
NO_2	1-hour	100	0.246	NEPC (1998)
	1-year	100	0.062	NEPC (1998)
PM_{10}	24-hour	100	0.05	NEPC (1998)
	1-year	100	0.03	NEPC (1998)
$PM_{2.5}$	24-hours	100	0.025*	NEPC (2003)
	1-year	100	0.008*	NEPC (2003)
SO_2	1-hour	100	0.52	NEPC (1998)
	24-hour	100	0.21	NEPC (1998)
	1-year	100	0.06	NEPC (1998)
Acetaldehyde	1-hour	100	0.042	NSW DEC2005
Benzene	1-hour	100	0.029	NSW DEC2005
Formaldehyde	1-hour	100	0.02	NSW DEC2005
PAHs	1-hour	100	0.0004	NSW DEC2005
Toluene	1-hour	100	0.36	NSW DEC2005
Xylenes	1-hour	100	0.19	NSW DEC2005

* Advisory limit only.

3 Surrounding environment

3.1 Site descriptions

The approximate locations of the two sites are shown in Figure 1. The Kemerton site lies along the flat coastal plain between the Indian Ocean and the Darling ranges. The Albany site is located on the rainbow coast of southern WA approximately 20 km inland of the city of Albany.

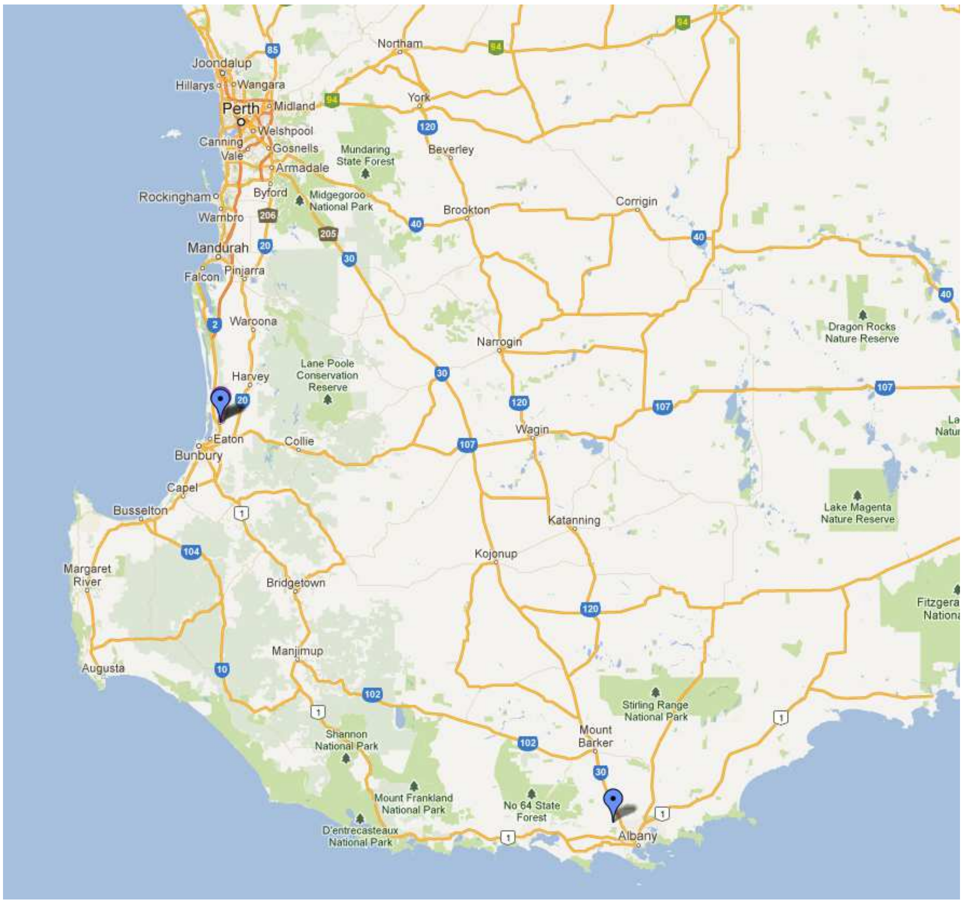


Figure 1 - Locations of the Kemerton and Albany sites with respect to Perth.

An aerial photograph providing some information about the surrounding land use of the Kemerton and Albany sites are provided in Figure 2 and Figure 3 respectively. The Kemerton site is located in semi-rural industrial zone north of Bunbury and the Albany site is located inland and on a pocket of industrial land surrounded by a rural/agricultural setting. None of the sites are close to any significant residential areas.

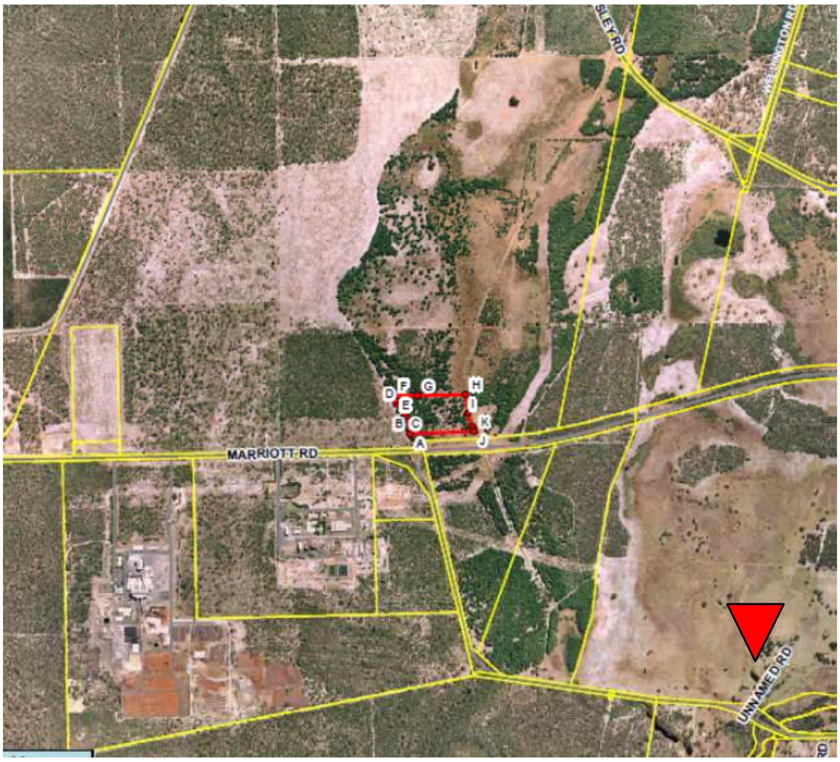


Figure 2 – Aerial photograph of the Kemerton site with nearest receptor indicated by red triangle. Scale is approximately 1:20,000.

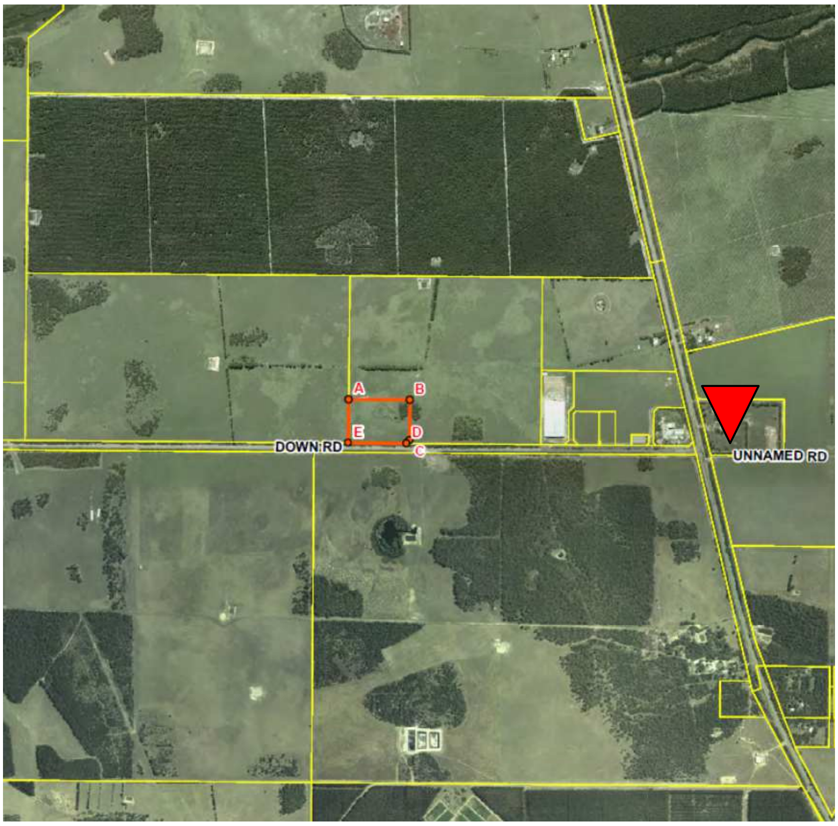


Figure 3 – Aerial photograph of the Albany site with nearest receptor indicated by red triangle. Scale is approximately 1:20,000.

3.2 Background pollutant concentrations

Background pollutant concentrations are required to be included into the concentration estimates for the pollutants CO, NO_2, SO_2, PM_{10} and $PM_{2.5}$. The Western Australia Department of Environment and Conservation collects air quality data from a number of monitoring stations throughout the Perth, Kwinana, Southwest, Kalgoorlie and Midwest regions of the state (DEC 2010). Each monitoring station only monitors a small number of pollutants as summarized in Table 4, so that collating background pollutant information necessarily requires the use of data from various sites.

In the present assessment, a hierarchical approach was used whereby preference was given initially to using available background pollutant information from a nearby site deemed to be representative of each study site. As shown in Table 5, available data for Bunbury was used for the Kemerton site, and Albany airport for the Albany site (displayed as green cells in Table 6). The National Pollutant Inventory (NPI) database was then searched to identify any emitters of pollutants from the area near each study site. These data were used to classify whether the pollutant was likely to be present at significant concentrations at the site (marked as red text in Table 5), or no significant local source was identified (blue text in Table 5).

In the event of a pollutant being deemed to be a significant component of ambient air, ambient concentrations from the worst-case monitoring station was employed (marked as red cells in Table 6). For pollutants unlikely to be significant in the ambient air, concentrations were obtained from the least polluted (best case) monitoring station (blue cells in Table 6).

Table 4 - Air parameters measured at DEC monitoring stations (DEC 2010). A tick represents stations where each pollutant is currently monitored, while a cross indicated sites where historical data is available but measurements are no longer taken.

Monitoring site	CO	O_3	NO_2	SO_2	Pb	PM_{10}	$PM_{2.5}$
Albany						✓	
Bunbury	×					✓	✓
Busselton							✓
Caversham	✓	✓	✓			✓	✓
Collie						✓	
Duncraig	✓		✓			✓	✓
Geraldton						✓	
Quinns Rock		✓	✓				✓
Rockingham		✓	✓	✓			
Rolling Green		✓	✓				
South Lake	✓	✓	✓	✓		✓	✓
Swanbourne	×	✓	✓				×
Wattleup				✓			

Table 5 - Location of nearest air quality monitoring stations and NPI-reporting emission sources (www.npi.gov.au). Total pollutant emissions from nearby emission sources are also reported and labelled based on whether they are significant (red) or insignificant (blue).

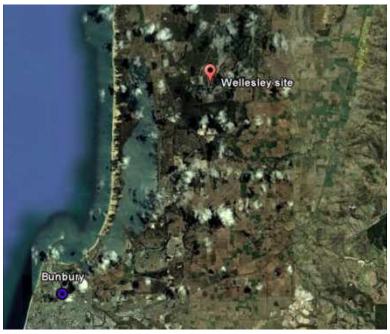
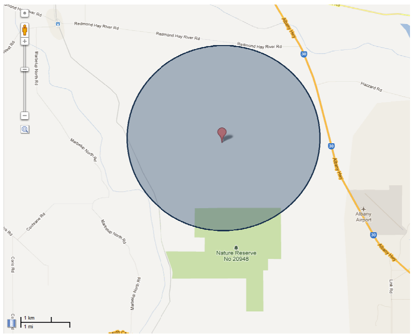
	Kemerton (Wellesley) site	**Albany site**
Location relative to AQ station	 Nearest AQ station: Bunbury Distance: 16.6 km Data collected: PM_{10}, $PM_{2.5}$	 Nearest AQ station: Albany airport Distance: 4.5 km Data collected: PM_{10}
Nearby emission sources		
Emissions	CO: 10,070 tonnes p.a. SO_2: 132 tonnes p.a. NO_2: 380 tonnes p.a. PM: no local sources Other pollutants include VOCs.	CO: no local sources SO_2: no local sources NO_2: no local sources PM: no local sources
Emission sources	• Meter station. • Chemical manufacturing - Conversion of synthetic rutile into titanium dioxide slurry. • Silicon production. • Manufacture of chlorine, caustic soda, hydrochloric acid and sodium hypochlorite via membrane technology electrolysis of sodium chloride Chlor Alkali Plant.	• Airport is the only industrial site listed on NPI database within 5 km. • Industrial activities include at airport concsist of fuel storage (BPP Australia) Listed as only emmitting VOCs • No industrial activities emitting CO, SO_2 NO_2 or PM.

Table 6 - Background pollutant concentrations (all concentrations are given in mg/m^3).

Pollutant	Averaging time	Kemerton site		Albany site	
		Conc.	Source	Conc.	Source
CO	15-min	0.89	Scaled from 1 hour average	0.43	Scaled from 1 hour average
	1-hour	0.67	Scaled from 8 hour average	0.33	Scaled from 8 hour average
	8-hour	0.47	DEC 2010 for Duncraig	0.23	DEC 2010 for Duncraig
NO_2	1-hour	0.055	DEC 2010 for South Lake	0.030	DEC 2010 for Rolling Green
	1-year	0.004	Scaled from 1 hour average	0.002	Scaled from 1 hour average
PM_{10}	24-hour	0.025	DEC 2010 for Bunbury	0.022	DEC 2010 for Albany
	1-year	0.005	Scaled from 1 hour average	0.0044	Scaled from 1 hour average
$PM_{2.5}$	24-hour	0.013	DEC 2010 for Bunbury	0.010	DEC 2010 for Quinns Rocks
	1-year	0.003	Scaled from 1 hour average	0.002	Scaled from 1 hour average
SO_2	10-min	0.084	Scaled from 1 hour average	0.027	Scaled from 1 hour average
	1-hour	0.059	DEC 2010 for Wattleup	0.019	DEC 2010 for Rockingham
	24-hour	0.013	DEC 2010 for Wattleup	0.008	DEC 2010 for Rockingham
	1-year	0.001	Scaled from 24 hr average	0.002	Scaled from 24 hr average

Please note:

- Scaling from hourly averages to less than hourly averages was done using the relationship $C_1 = C_0[t_0/t_1]^{0.2}$ (Vic EPA, 2000);
- Scaling from hourly averages to 24-hour averages was done using a multiplier of 0.4, from hourly to annual using 0.08 and from 24-hour to annual using 0.2 (OEHHA 2003).
- Cells in **GREEN** represent background concentrations that are directly relevant to the site (i.e. from a nearby applicable monitoring station).
- Cells in **RED** represent background concentrations from the worst-case available monitoring data (selected due to the presence of significant nearby pollution sources).
- Cells in **BLUE** represent background concentrations from the best-case available monitoring data (selected due to the absence of significant nearby pollution sources).

3.3 Meteorology

3.3.1 Kemerton

The south-western regions of Western Australia experience a Mediterranean climate, characterised by hot, dry summers and mild, wet winters. These seasons extend into the autumn and spring months, which are transitional periods between the main seasons. The climate of the region is strongly influenced by the position of the axis of the band of high pressure known as the sub-tropical ridge, and in the warmer months by the development in the easterlies to the north of the ridge of a trough of low pressure near the West Coast (the 'West Coast Trough'). For much of the year the ridge is located to the south allowing easterly and south-easterly winds to prevail. During the cooler months the ridge periodically moves to the north allowing cold fronts to pass over the west coast and deliver much of the annual rainfall. Sometimes these fronts interact with tropical cloud bands from the north-west and this can increase rainfall.

Kemerton is located less than 10 km from the coast and experiences mainly southerly to south-easterly winds as affected by the West Coast Trough, but also westerly afternoon sea breezes that are associated with the bulk of the rainfall (Figure 4, Table 7 and Table 8).

For the purpose of the present assessment, data from the Bunbury Bureau of Meteorological (BoM) station were used to represent the Kemerton site which is approximately 15 km away and likely to experience very similar weather patterns.

3.3.2 Albany

Albany experiences a Mediterranean-type climate, experiencing mild summers and cool, wet winters. The city is situated on the southern coast of Western Australia and experiences seasonal extremes in weather, from hot summer days when north-easterly winds arrive from the interior of the State, to cold, wet, windy winter days as cold fronts from the Southern Ocean and move through the region (Figure 5, Table 9 and Table 10).

The wind climatology at Albany is strongly dominated by the effects of the land-sea interface where North-Westerly offshore land breezes are common in the morning, whilst afternoon South-Westerly sea breezes are common.

The present assessment used meteorological data from the Albany Airport as representative of the study site, which was located approximately 4 km away.

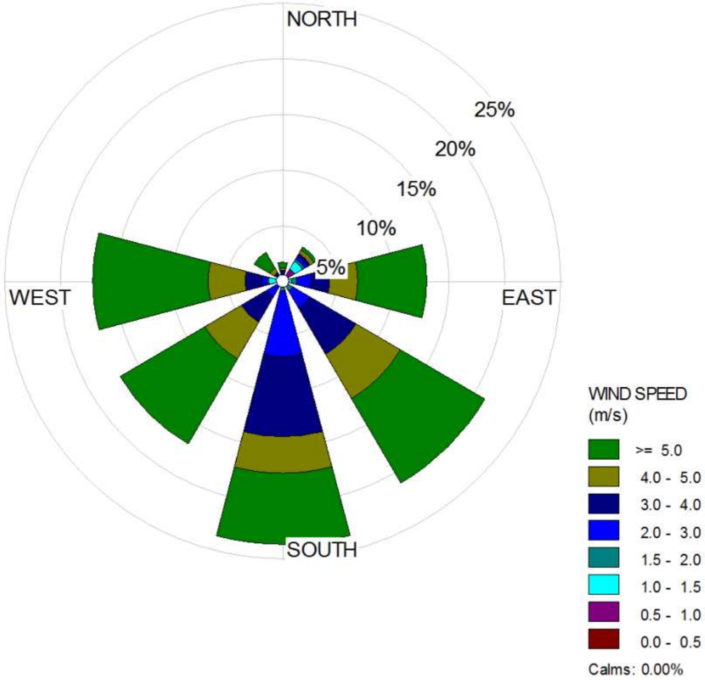


Figure 4 - Annual wind rose for Kemerton.

Table 7 - Frequency distribution of wind speeds by wind direction for Kemerton.

Wind speed (m/s)	N	NE	E	SE	S	SW	W	NW
0-2	1%	4%	3%	1%	2%	1%	2%	1%
2-4	2%	3%	4%	6%	9%	4%	2%	2%
4-6	2%	1%	4%	5%	3%	5%	6%	3%
6-8	1%	0%	2%	2%	2%	3%	6%	3%
8-10	0%	0%	0%	0%	0%	1%	2%	1%
10-12	0%	0%	0%	0%	0%	0%	1%	0%
12-14	0%	0%	0%	0%	0%	0%	0%	0%

Table 8 - Stability class statistics for the Kemerton meteorological file.

Pasquil Gifford stability class	**Frequency (%)**	**Average wind speed (m/s)**	**Average temperature (˚C)**	**Average mixing height (m)**
A	0%	2.9	25.0	1239.0
B	3%	3.2	22.7	1266.2
C	13%	4.0	20.6	1438.1
D	66%	5.3	17.4	1732.4
E	9%	1.9	12.5	494.1
F	9%	0.8	9.8	143.6

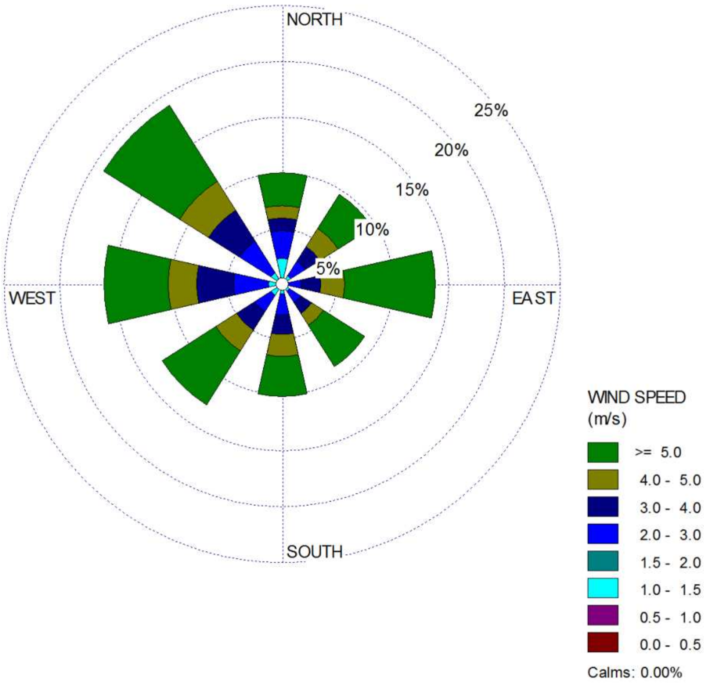


Figure 5 - Annual wind rose for Albany.

Table 9 - Frequency distribution of wind speeds by wind direction for Albany.

Wind Speed (m/s)	N	NE	E	SE	S	SW	W	NW
0-2	3%	1%	1%	1%	1%	1%	1%	1%
2-4	4%	4%	3%	3%	4%	4%	7%	8%
4-6	2%	4%	5%	3%	4%	5%	6%	6%
6-8	2%	2%	4%	2%	2%	3%	3%	4%
8-10	0%	0%	2%	1%	0%	1%	1%	2%
10-12	0%	0%	0%	0%	0%	0%	0%	0%
12-14	0%	0%	0%	0%	0%	0%	0%	0%

Table 10 - Stability class statistics for the Albany meteorological file.

Pasquil Gifford stability class	Frequency (%)	Average wind speed (m/s)	Average temperature (˚C)	Average mixing height (m)
A	0.3%	1.7	20.4	856.4
B	3.6%	3.2	18.9	1065.9
C	15.3%	4.2	16.6	1216.6
D	60.2%	5.5	15.2	1402.4
E	10.6%	3.6	12.9	925.0
F	10.0%	1.8	11.5	505.7

4 Modelling methodology

4.1 Meteorological data

Meteorological data was sourced from: Bunbury to represent the Kemerton site and Albury Airport for the Albany site as described in Section 3.3. Validated data was purchased in a format that was suitable for direct input into Ausplume dispersion model.

4.2 Modelling software

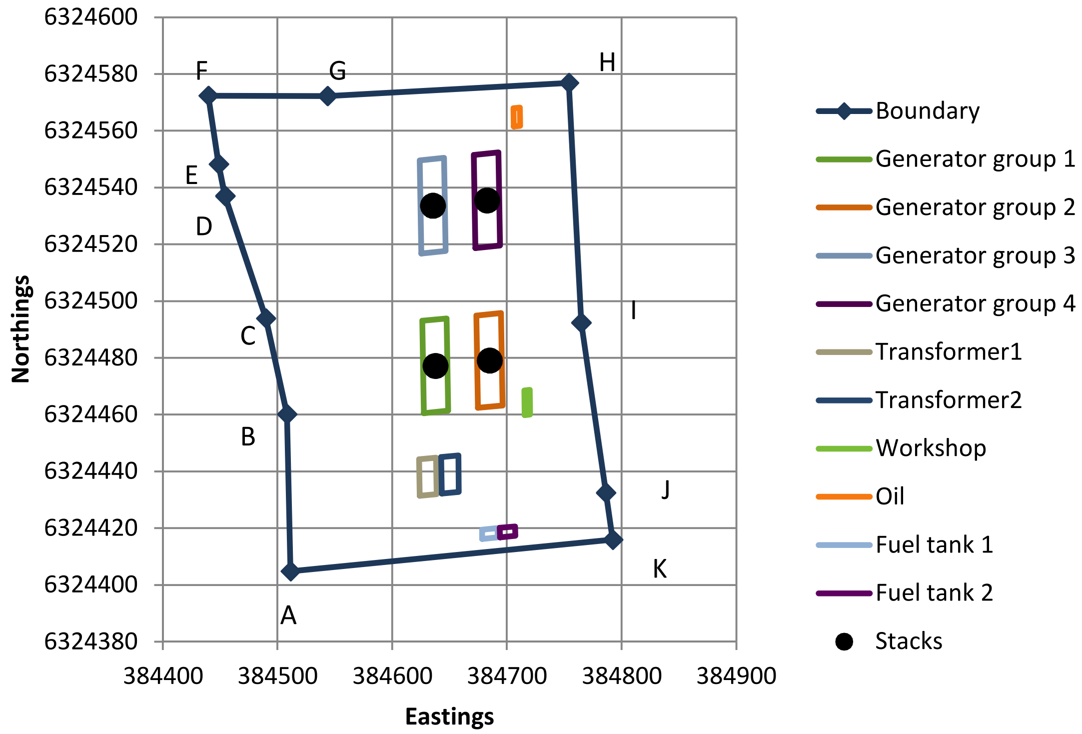
Ausplume v.6.0 was selected as a suitable model to assess the dispersion of pollutants arising from the power station at all sites. Ausplume is a Gaussian-plume dispersion model recommended by most regulatory agencies in Australia. Ausplume is best suited for modelling elevated point source plume dispersion over middle-range scales and in the absence of complex terrain or non-steady-state-type applications, and hence this model was well-suited for this assessment. An example of the Ausplume configuration file used for Albany is provided in Appendix A.

4.3 Modelling inputs and outputs

Given the flat topography of the surroundings at all sites, terrain effects and topographical data were accounted for by adjusting relevant modelling parameters. To help account for enhanced plume dispersion associated with a rolling rural land-use, a roughness factor of 0.4 m was chosen for both Kemerton and Albany (Table 11). The Irwin rural atmospheric stability dependent wind profile exponent was used to representatively characterise the boundary layer profile. Stack tip downwash and building downwash effects were included given the relatively low stack height. Building downwash was explicitly modelled for the generator groups, transformers, work shop, fuel tanks and oil store at each site (Figure 6).Averaging times varied for each pollutant according to the relevant regulation as listed in Table 3. The 100th percentile, i.e., the maximum value, was reported for each calculated ground-level-concentration (GLC). Calculated ground level concentrations (GLCs) were calculated for a number of discrete receptors sited at regular intervals along the boundary of each site in order to verify that regulatory assessment criteria were not exceeded. These discrete receptors are labelled receptors A to K in Figure 6. GLCs were also calculated at gridded receptors spaced evenly at 80 m throughout a 4,000 x 4,000 m modelling domain centred on the stack to verify that no exceedances would occur at any location outside the site boundaries.

Table 11 – Model input parameters.

Parameter	Value
Location classification	Rolling rural
Terrain topology	Flat
Surface roughness	0.4 m
Distance to nearest receptor	Site boundary (≈50 m)
Distance to nearest residential receptor (non-conforming residential dwelling)	1.8 km Kemerton (see Figure 2) and 1.1 km Albany (see Figure 3)



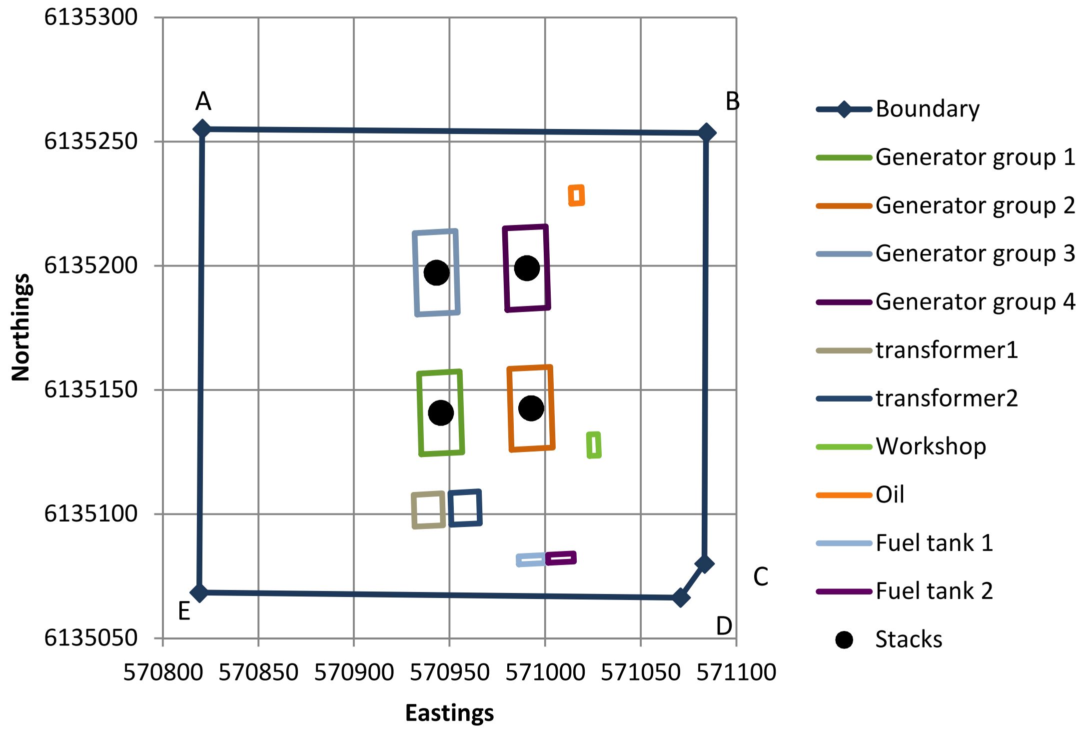


Figure 6 – Site plan for each of the Kemerton (top) and Albany (bottom) sites. The locations are shown for the various buildings as well as of the discrete receptors located along the boundary of the site (denoted by blue diamonds).

4.4 Emission source characteristics

The specifications for the peak load power stations are provided in Table 12 (as supplied by Tesla). The generators used are the same as those from a previous assessment for a smaller power station at Picton (Synergetics 2010). The layout of the proposed power stations is quite similar as indicated in Figure 6. Information regarding the building elevation profile for the power stations was not provided, to guide this air quality assessment the similar plans for a smaller power station at Geraldton (Synergetics 2011) will be used. In order to ensure satisfactory dispersion of pollutants, the forty generator exhausts were modelled as four clusters of ten adjoining stacks, forming what is referred to as a multi-flue stack.

For modeling purposes it was assumed that each multi-flue stack behaves as a single stack with the same discharge temperature and discharge velocity as each exhaust, but with the cross sectional area and pollutant emission rates equal to the combined area of ten exhausts. The resultant modeled stack characteristics are specified in Table 13. Emission rates for SO_2, Acetaldehyde, Benzene, Formaldehyde, Polycyclic Aromatic Hydrocarbons (PAH's), Toluene and Xylenes were obtained from NPI Australia emission estimation techniques (NPI combustion engines, 2008).

Table 12 - Peak load station specification summary.

Parameter	Value
Number of generators	40
Generator type	Caterpillar type 3516BDITA
Fuel	Diesel
Nominal station power output	60 MW (40 generators)
Number of operational hours	Up to 500 hours per year (for the purposes of modelling, assumed continuous emissions).

Table 13 - Stack characteristics and emission rates as used in the modelling.

Variable		Units	Value
Stack height		m	12.5
Stack diameter of individual stacks		m	0.406
Stack diameter used for each multi-flue		m	1.284
Emission temperature		˚C	509
Emission velocity		m/s	54.1
Emission rates (combined emissions from 10 generators, 4 multi-flue stacks of this type on each site)	CO	kg/h	21.01
	NO_x	kg/h	246.03
	PM_{10}	kg/h	1.38
	$PM_{2.5}$	kg/h	1.34
	SO_2	kg/h	0.089
	Acetaldehyde	kg/h	0.0016
	Benzene	kg/h	0.0525
	Formaldehyde	kg/h	0.0052
	PAHs	kg/h	0.0000008
	Toluene	kg/h	0.0185
	Xylenes	kg/h	0.0129

4.1 Derivation of NO_2 from calculated NO_x concentrations

NO_x is a group of oxides of nitrogen including NO and NO_2; however assessment criteria only exist for NO_2 due to its properties as an irritant to the respiratory system. For this reason, it is necessary to estimate NO_2 concentrations based on NO_x levels.

The emission rates presented in Table 13 show that oxides of nitrogen (NO_x) are emitted at high rates compared with other pollutants. This makes sense in light of the fact that the pollutants are sourced from combustion processes. NO_x are a group of pollutants comprising largely NO and NO_2, of which only the latter is directly hazardous to humans and thus is assigned an assessment criterion for comparison (refer to Table 3). Hence, the proportion of NO_X that is NO_2 must be calculated for the assessment.

Given that the present assessment involves NOx emissions in the atmosphere, it is appropriate that NO_2 concentrations are derived from NO_x values by means of the "ozone limiting method" specified by DEC NSW (2005). This methodology relies on the relationship shown below to conservatively predict the conversion of NO into NO_2 in the atmosphere.

$$[NO_2]_{total} = \{0.1 \times [NO_x]_{pred}\} + MIN\left\{0.9 \times [NO_x]_{pred} \; or \; \frac{46}{48} \times [O_3]_{bkgd}\right\}$$

Where:

- $[NO_2]_{total}$ = the calculated concentration of NO_2 in µg/m^3
- $[NO_x]_{pred}$ = the calculated concentration of NOx in µg/m^3
- MIN = the minimum of the two quantities within the braces
- $[O_3]_{bkgd}$ = the background ambient O_3 concentration µg/m^3
- (46/48) = ratio of the molecular weights of NO_2 and O_3

The first component of the sum represents the NO_2 that is expected to be directly emitted by the generators, estimated by the well-established 0.1 proportion (i.e., 10%) of NO_x. This component is added to the second component of the sum, which estimates the maximum possible concentration of NO_2 that could arise as a result of the oxidation of NO into NO_2 due to ozone. The relationship conservatively assumes that the atmospheric oxidation of NO into NO_2 by ozone is instantaneous, when in practice it takes place over a period of time in the order of minutes and hours. These assumptions combined provide evidence for the conservative nature of the calculated NO_2 concentrations using this methodology.

Background ambient ozone (O_3) concentrations for the sites as described previously in section 3.2 were examined. Ambient levels of O_3 are monitored at Caversham, Quinns Rock, Rockingham, Rolling Green, South Lake and Swanbourne WA (DEC 2010). Data from the most representative location was used.

The New Zealand Good Practice guide for assessing discharges to air from industry (MFE 2008) provide some justification for the use of the ozone-limiting method for estimating NO_2 concentrations. The results of a study comparing measured and estimated NO_2 concentrations showed a consistent and significant level of conservativeness in the estimated values, particularly when NO_x concentrations were high (Figure 7). Based on these results, the estimated NO_2 concentrations are likely to be conservative over-predictions of the likely NO_2 concentrations actually recorded at the receptors.

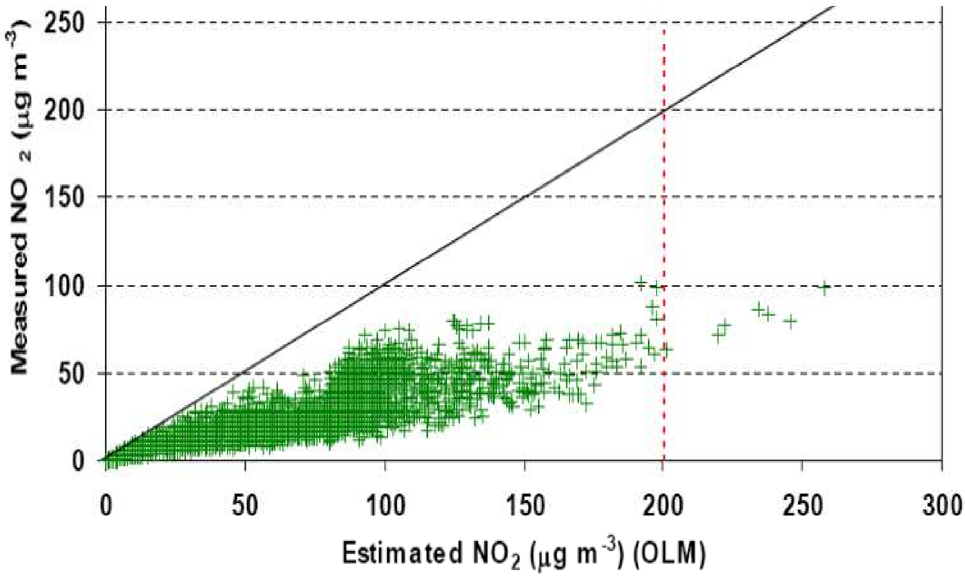


Figure 7 – Comparison between measured and modelled NO_2 1-hour average concentrations at Takapuna in 2001 using the ozone limiting method (MFE 2008).

5 Results

In the following sections of this report, the modelled ground level concentrations (GLCs) at the various receptors are presented and compared against the relevant assessment criteria. A "compliance factor" (CF) is also reported as the ratio of the guideline value and the calculated GLC. A value of CF < 1 indicates the calculated GLC is higher than the guideline value whereas a value ≥ 1 indicates the calculated GLC is equal to or below the guideline value. The CF allows an immediate assessment of the potential for the facility to exceed guideline GLC values.

All modelled GLCs at the discrete modelling receptors are presented in Table 14 and Table 15 for Kemerton and Albany respectively. Also included are the GLCs at the nearest residential receptor shown in Figure 2 and Figure 3. For the sake of clarity and due to the large amount of data presented, all cells with a CF smaller than 10 have been shaded in the tables to help locate all potentially significant GLCs. All GLCs for each of the proposed power stations were below relevant assessment criteria.

At each of the sites, calculated PM_{10} and $PM_{2.5}$ concentrations were quite close to the regulatory limit, with the CF in the range of 1.7 to 6.0. This is largely attributed to the high background particulate concentrations, as the power stations were found to contribute at most 8.3% of daily averaged PM_{10} (at Albany), with the remainder being background PM_{10} pollution.

The worst case GLCs caused by the power station emissions, i.e., background not included, was found to be NO_2, with the lowest compliance factor being 1.17 for hourly NO_2 at the Kemerton site. While the CF is quite small it is a very conservative modelling output. This air quality assessment was conducted under the assumption that the facility operated at full capacity all year round. Synergetics have been advised by Tesla that the actual operational hours of the facility will be less than 500 hours a year. Furthermore, even though there are no registered NO_x emitters with the NPI, Synergetics have taken a conservative approach in estimating the background concentrations. From the predicted GLCs, the background concentrations had represented 26% of the total NO_2 estimate. Contour plots of calculated hourly and annual NO_x concentrations (background not included) are provided in Figure 8 and Figure 9 for Kemerton and Albany respectively.

As described in section 4.1, the NSW DEC (2005) ozone oxidation method was used to estimate NO_2 from modelled NO_x concentrations. To test the validity of this method, the NO_2/NO_x ratios were calculated at the receptors at each site A study on the dispersion of a plume from a turbine driven compressor (Leahey et al. 1983) found that average NO_2/NO_x were not strongly affected by time following the first minute or so, and averaged around 0.37, 0.63 and 0.55 during sampling campaigns in summer, autumn and winter, respectively. These data provide some support to the likely conservativeness of the ozone oxidation method employed in the present assessment.

Table 14 - Direct and cumulative impacts of the ground level concentrations and compliance factors for Kemerton power station. All concentrations are expressed in mg/m³. Shaded cells denote GLCs that are less 10 times the regulatory limit, i.e. have a compliance factor < 10. The worst-case discrete (boundary) receptor is reported and identified by a label as per Figure 6. For the worst case gridded receptor, the coordinates (in m) relative to the stack location and time are provided.

Pollutant	Aver. time	Assess. criteria	b/g	Worst-case gridded receptor				Worst-case site boundary discrete receptor			
				GLC (-b/g)	GLC (+b/g)	CF	Receptor	GLC (-b/g)	GLC (+b/g)	CF	Receptor
CO	15-min	100	0.89	0.0761	0.9661	>100	(240,0)	0.0562	0.9462	>100	E
	1-hour	30	0.67	0.0602	0.7302	41.0	(240,0)	0.0436	0.7136	42.0	E
	8-hour	10	0.47	0.0421	0.5121	19.5	(320,-80)	0.0221	0.4921	20.3	K
NO_2	1-hour	0.246	0.055	0.1546	0.2096	1.17	(240,0)	0.1351	0.1901	1.29	E
	1-year	0.062	0.004	0.0094	0.0134	4.61	(400,80)	0.0077	0.0117	5.29	F
PM_{10}	24-hour	0.05	0.025	0.0018	0.0268	1.86	(320,00)	0.0009	0.0259	1.92	F
	1-year	0.03	0.005	0.0002	0.0052	5.82	(400,80)	0.0001	0.0051	5.93	F
$PM_{2.5}$	24-hour	0.025	0.013	0.0018	0.0148	1.69	(320,00)	0.0009	0.0139	1.79	F
	1-year	0.008	0.003	0.0001	0.0031	2.54	(400,80)	0.0001	0.0031	2.62	F
SO_2	10-min	0.713	0.084	0.0003	0.0843	8.45	(240,0)	0.0003	0.0843	8.46	E
	1-hour	0.52	0.059	0.0003	0.0593	8.77	(240,0)	0.0002	0.0592	8.78	E
	24-hour	0.21	0.013	0.0001	0.0131	16.0	(320,00)	0.0001	0.0131	16.0	F
	1-year	0.06	0.001	0.0000	1.010E-03	59.4	(400,80)	0.0000	0.0010	59.7	F
Acetaldehyde	1-hour	0.042	-	0.0000	4.585E-06	>100	(240,0)	0.0000	3.317E-06	>100	E
Benzene	1-hour	0.029	-	0.0002	1.504E-04	>100	(240,0)	0.0001	1.088E-04	>100	E
Formaldehyde	1-hour	0.02	-	0.0000	1.490E-05	>100	(240,0)	0.0000	1.078E-05	>100	E
PAHs	1-hour	0.0004	-	0.0000	2.292E-09	>100	(240,0)	0.0000	1.658E-09	>100	E
Toluene	1-hour	0.36	-	0.0001	5.301E-05	>100	(240,0)	0.0000	3.835E-05	>100	E
Xylenes	1-hour	0.19	-	0.0000	3.697E-05	>100	(240,0)	0.0000	2.674E-05	>100	E

Table 15 - Direct and cumulative impacts of ground level concentrations and compliance factors for Albany power station. All concentrations are expressed in mg/m^3. Shaded cells denote GLCs that are less 10 times the regulatory limit, i.e. have a compliance factor < 10. The worst-case discrete (boundary) receptor is reported and identified by a label as per Figure 6. For the worst case gridded receptor, the coordinates (in m) relative to the stack location and time are provided.

Pollutant	Aver. time	Assess. criteria	b/g	Worst-case gridded receptor				Worst-case site boundary discrete receptor			
				GLC (-b/g)	GLC (+b/g)	CF	Receptor	GLC (-b/g)	GLC (+b/g)	CF	Receptor
CO	15-min	100	0.43	0.0931	0.5231	>100	(160,-160)	0.0974	0.5274	>100	C
	1-hour	30	0.33	0.0724	0.4024	74.55	(-160,0)	0.0803	0.4103	73.12	C
	8-hour	10	0.23	0.0449	0.2749	36.37	(-240,0)	0.0305	0.2605	38.39	A
NO_2	1-hour	0.246	0.030	0.1689	0.1989	1.24	(-160,0)	0.1781	0.2081	1.18	C
	1-year	0.062	0.002	0.0088	0.0108	5.76	(320,-160)	0.0096	0.0116	5.36	B
PM_{10}	24-hour	0.05	0.022	0.0019	0.0239	2.09	(-320,0)	0.0008	0.0228	2.19	A
	1-year	0.03	0.004	0.0001	0.0045	6.65	(320,-160)	0.0000	0.0044	6.75	B
$PM_{2.5}$	24-hour	0.025	0.010	0.0018	0.0118	2.11	(-320,0)	0.0008	0.0108	2.32	A
	1-year	0.008	0.002	0.0001	0.0021	3.79	(320,-160)	0.0000	0.0020	3.91	B
SO_2	10-min	0.713	0.027	0.0004	0.0274	26.00	(160,-160)	0.0004	0.0274	25.9	C
	1-hour	0.52	0.019	0.0003	0.0193	26.9	(-160,0)	0.0003	0.0193	26.8	C
	24-hour	0.21	0.008	0.0001	0.0081	25.8	(-320,0)	0.0001	0.0081	26.0	A
	1-year	0.06	0.002	7.380E-06	2.007E-03	29.8	(320,-160)	0.0000	0.0020	29.9	B
Acetaldehyde	1-hour	0.042	-	5.515E-06	5.515E-06	>100	(-160,0)	6.113E-06	6.113E-06	>100	C
Benzene	1-hour	0.029	-	1.810E-04	1.810E-04	>100	(-160,0)	2.006E-04	2.006E-04	>100	C
Formaldehyde	1-hour	0.02	-	1.792E-05	1.792E-05	>100	(-160,0)	1.987E-05	1.987E-05	>100	C
PAHs	1-hour	0.0004	-	2.757E-09	2.757E-09	>100	(-160,0)	3.057E-09	3.057E-09	>100	C
Toluene	1-hour	0.36	-	6.376E-05	6.376E-05	>100	(-160,0)	7.068E-05	7.068E-05	>100	C
Xylenes	1-hour	0.19	-	4.446E-05	4.446E-05	>100	(-160,0)	4.929E-05	4.929E-05	>100	C

Table 16 - Direct and cumulative impacts of ground level concentrations and compliance factors for Albany and Kemerton power stations at the nearest residential receptor shown in Figure 2 and Figure 3. All concentrations are expressed in mg/m^3. Shaded cells denote GLCs that are less 10 times the regulatory limit, i.e. have a compliance factor < 10.

Pollutant	Aver. time	Assess. criteria	Kemerton worst case at residential receptor				Albany worst case at residential receptor			
			b/g	GLC (-b/g)	GLC (+b/g)	CF	b/g	GLC (-b/g)	GLC (+b/g)	CF
CO	15-min	100	0.89	0.0199	0.9099	>100	0.43	0.022	0.452	>100
	1-hour	30	0.67	0.0155	0.6855	43.7664	0.33	0.017	0.347	86.44
	8-hour	10	0.47	0.0094	0.4794	20.8597	0.23	0.013	0.243	41.10
NO_2	1-hour	0.246	0.055	0.1022	0.1572	1.5645	0.030	0.104	0.134	1.83
	1-year	0.062	0.004	0.0077	0.0117	5.3085	0.002	0.009	0.011	5.40
PM_{10}	24-hour	0.05	0.025	0.0004	0.0254	1.9671	0.022	0.001	0.023	2.20
	1-year	0.03	0.005	0.0001	0.0051	5.9369	0.004	0.000	0.004	6.75
$PM_{2.5}$	24-hour	0.025	0.013	0.0004	0.0134	1.8648	0.010	0.001	0.011	2.33
	1-year	0.008	0.003	0.0001	0.0031	2.6215	0.002	0.000	0.002	3.92
SO_2	10-min	0.713	0.084	0.0001	0.0841	8.4789	0.027	0.000	0.027	26.31
	1-hour	0.52	0.059	0.0001	0.0591	8.8038	0.019	0.000	0.019	27.26
	24-hour	0.21	0.013	0.0000	0.0130	16.1204	0.008	0.000	0.008	26.10
	1-year	0.06	0.001	0.0000	0.0010	59.7949	0.002	0.000	0.002	29.96
Acetaldehyde	1-hour	0.042	-	1.177E-06	1.177E-06	>100	-	1.301E-06	1.301E-06	>100
Benzene	1-hour	0.029	-	3.862E-05	3.862E-05	>100	-	4.268E-05	4.268E-05	>100
Formaldehyde	1-hour	0.02	-	3.826E-06	3.826E-06	>100	-	4.227E-06	4.227E-06	>100
PAHs	1-hour	0.0004	-	5.885E-10	5.885E-10	>100	-	6.503E-10	6.503E-10	>100
Toluene	1-hour	0.36	-	1.361E-05	1.361E-05	>100	-	1.504E-05	1.504E-05	>100
Xylenes	1-hour	0.19	-	9.490E-06	9.490E-06	>100	-	1.049E-05	1.049E-05	>100

Abbreviations used in Table 14 and Table 15 include:

- Aver. time = Averaging time (see section 2.3)
- Assess. criteria = Assessment criteria (see section 2.3)
- b/g = background pollutant concentrations (see section 3.2)
- GLC - b/g = calculated ground level concentration arising from the stack alone.
- GLC + b/g = total calculated ground level concentration including stack emissions and background pollutant concentrations.
- CF = Compliance factor.
- Receptor = For discrete receptors along the boundaries of the site, results are only provided for the worst-case receptors.
- Location = For gridded receptors located up to 4,000 m from the stack, results are only provided for the single worst-case receptor. This column provides information as to the location of this gridded receptor (as x,y coordinate relative to the centre of the emissions stacks and measured in metres) where these concentrations were calculated to occur.

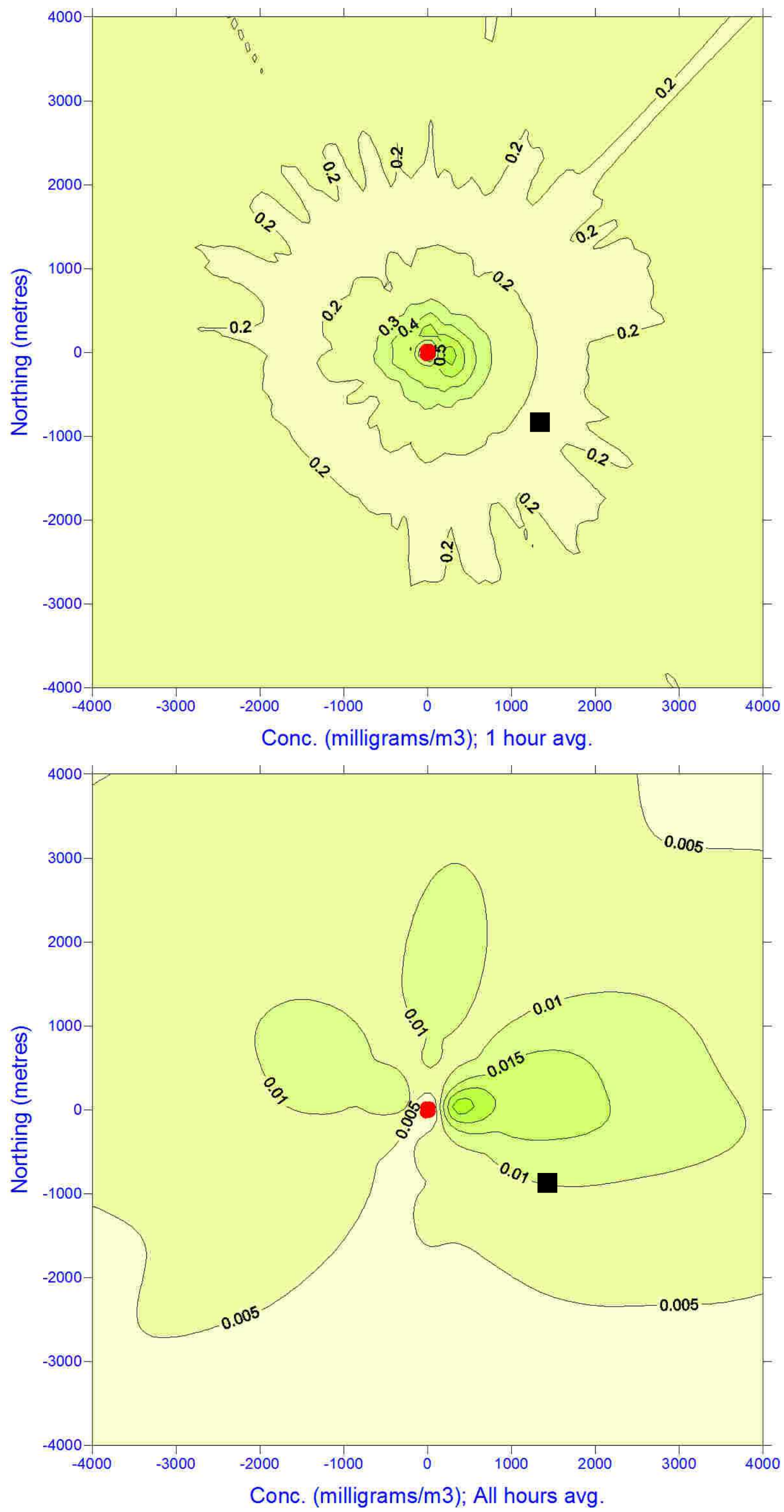
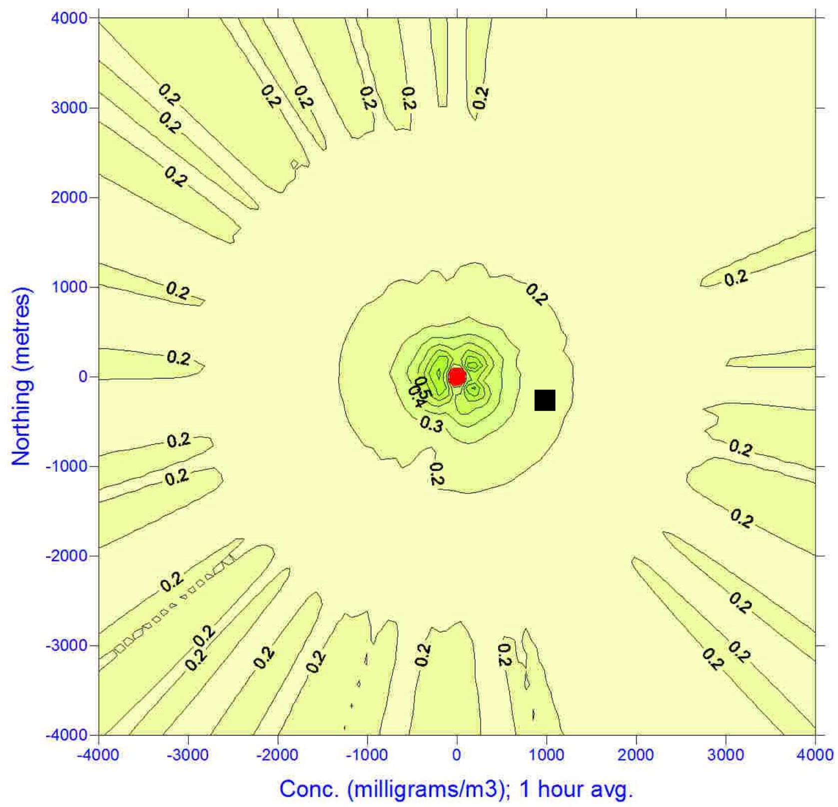


Figure 8 – Contour plots of hourly (above) and annual (below) calculated NOx concentrations in the area surrounding the Kemerton site. The stack is denoted as a red circle, the nearest receptor is located at the black square.



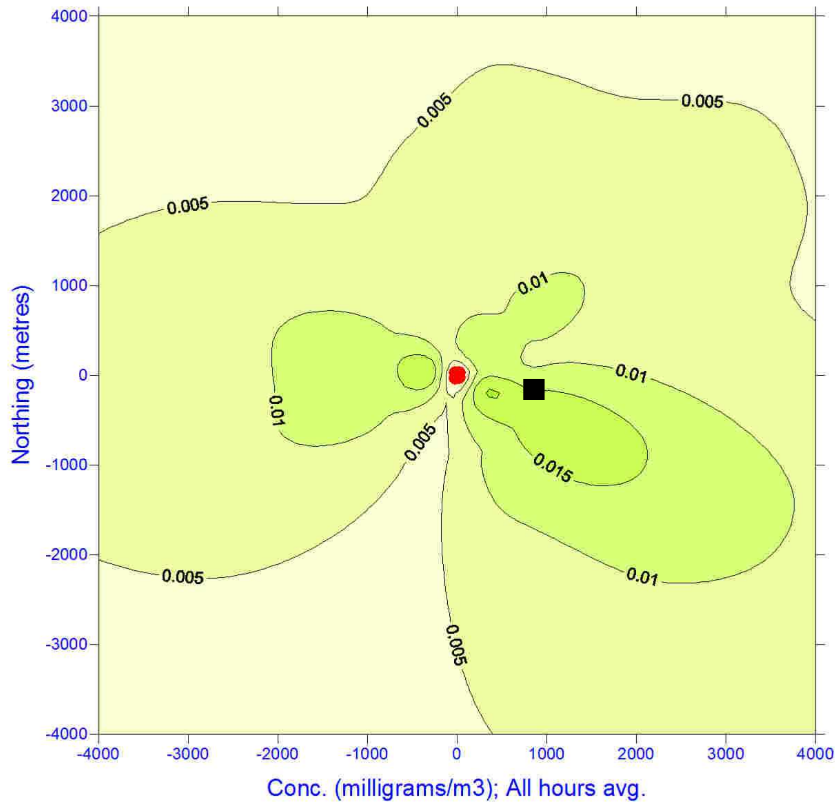


Figure 9 – Contour plots of hourly (above) and annual (below) calculated NOx concentrations in the area surrounding the Albany site. The stack is denoted as a red circle, the nearest receptor is located at the black square.

6 Conclusions

The present air quality impact assessment has investigated the potential direct and cumulative impacts associated with the proposed construction of a power station respectively at the Kemerton and Albany sites in WA. The assessment was carried out using the appropriate regulatory approved dispersion model with very conservative assumptions.

For both sites, the predicted air quality impacts were found to fall below relevant regulatory assessment criteria, indicating that the proposed development are not deemed to exert a negative impact on the surrounding air environment.

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Appendix A. Sample configuration file for the Albany site Ausplume run

```
  6.0 version
*************************************************************
* WARNING - WARNING - WARNING - WARNING - WARNING - WARNING *
*                                                           *
* This is a generated file. Please do not edit it manually. *
* If  editing  is  required, under any circumstances do not *
* edit information enclosed in curly braces.  Corruption of *
* this information or changed order of data blocks enclosed *
* in curly braces may render the file unusable.             *
*                                                           *
*************************************************************

Simulation Title
{Tesla_Albany_60MW}
Concentration(1)/Deposition(0),     Emission     rate     units,
Concentration/Deposition     units,Background     Concentration,
Variable Background flag,Variable Emission Flag
{True kg/hour milligrams/m3 0 False False }

Terrain influence tag, 0-ignore, 1 - include
{0}
Egan coefficients
{0.5 0.5 0.5 0.5 0.7 0.7 }
Number of source groups
{1}
Total number of sources (Stack + Area + Volume sources)
{4}

Source Group information
Total Number of Sources in Group 1
{4}
Sources in Source Group 1
{Stack1 Stack2 Stack3 Stack4 }
BPIP Run (1-True, 0-False)
{0 }
Total number of buildings
{10 }
Building name, Base elevation, Number of tiers
{Gen1   0 1 }
Height, Number of sides
{4.525 4 }
X coordinates
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Y coordinates
{-45.839 -44.993 -12.458 -13.3 }
Building name, Base elevation, Number of tiers
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Height, Number of sides
{4.525 4 }
X coordinates
{14.664 36.121 34.831 13.374 }
Y coordinates
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Building name, Base elevation, Number of tiers
{Gen3   0 1 }
Height, Number of sides
{4.525 4 }
```

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{-34.758 -13.436 -14.737 -36.059 }
Y coordinates
{10.452 11.298 44.096 43.2509 }
Building name, Base elevation, Number of tiers
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Height, Number of sides
{4.525 4 }
X coordinates
{12.432 33.889 32.588 11.131 }
Y coordinates
{12.323 13.174 45.973 45.122 }
Building name, Base elevation, Number of tiers
{Trans1 0 1 }
Height, Number of sides
{2.8 4 }
X coordinates
{-36.149 -21.199 -21.708 -36.658 }
Y coordinates
{-74.946 -74.353 -61.517 -62.109 }
Building name, Base elevation, Number of tiers
{Trans2 0 1 }
Height, Number of sides
{2.8 4 }
X coordinates
{-16.876 -1.926 -2.4351 -17.385 }
Y coordinates
{-74.181 -73.588 -60.752 -61.345 }
Building name, Base elevation, Number of tiers
{W/shop 0 1 }
Height, Number of sides
{3.75 4 }
X coordinates
{55.402 60.205 59.8624 55.059 }
Y coordinates
{-46.495 -46.304 -37.655 -37.845 }
Building name, Base elevation, Number of tiers
{Oil    0 1 }
Height, Number of sides
{3.75 4 }
X coordinates
{45.887 51.555 51.3 45.632 }
Y coordinates
{55.129 55.354 61.795 61.571 }
Building name, Base elevation, Number of tiers
{Fuel1  0 1 }
Height, Number of sides
{3.9 4 }
X coordinates
{18.455 31.904 31.773 18.324 }
Y coordinates
{-90.158 -89.624 -86.333 -86.866 }
Building name, Base elevation, Number of tiers
{Fuel2  0 1 }
Height, Number of sides
{3.9 4 }
X coordinates
{33.825 47.27 47.143 33.6948 }
Y coordinates
{-89.548 -89.015 -85.723 -86.257 }
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```
Source Information

Source ID, Source Type (1 - stack, 2 - area, 3- volume) and X,
Y, Z coordinates
{Stack1 1 -22.51 -29.15 0 }
Stack height and diameter
{12.5 1.284 }
Stack temperature, Velocity, Cross, Height
{782 54.1 -1 -1 }
Emission type (1-constant, 2-monthly, 3-hours of the day, 4-wind
and stability, 5-hour and season, 6-temperarture), Number of
particle fractions
{1 0 }
Constant emission rate
{246.03}
Building width
{10.13829 8.968538 7.526279 5.855337 4.006485 4.79423 6.405114
7.821382 9.000001 9.905159 10.50935 10.79423 17.02924 16.78273
16.85641 17.0872 16.79881 11 10.13829 8.968536 7.526276 5.855334
4.006479 4.794234 6.405118 7.821384 9.000003 9.905161 10.50936
10.79423 10.75113 10.75113 10.79423 10.50935 10.36902 11 }
Building height
{3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 4 4 4 4 4 3.2
3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2
3.2 3.2 }

Source ID, Source Type (1 - stack, 2 - area, 3- volume) and X,
Y, Z coordinates
{Stack2 1 24.74 -27.274 0 }
Stack height and diameter
{12.5 1.284 }
Stack temperature, Velocity, Cross, Height
{782 54.1 -1 -1 }
Emission type (1-constant, 2-monthly, 3-hours of the day, 4-wind
and stability, 5-hour and season, 6-temperarture), Number of
particle fractions
{1 0 }
Constant emission rate
{246.03}
Building width
{10.13829 8.968538 7.526279 5.855337 4.006485 4.79423 6.405114
7.821382 9.000001 9.905159 10.50935 10.79423 17.02924 16.78273
16.85641 17.0872 16.79881 11 10.13829 8.968536 7.526276 5.855334
4.006479 4.794234 6.405118 7.821384 9.000003 9.905161 10.50936
10.79423 10.75113 10.75113 10.79423 10.50935 10.36902 11 }
Building height
{3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 4 4 4 4 4 3.2
3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2
3.2 3.2 }

Source ID, Source Type (1 - stack, 2 - area, 3- volume) and X,
Y, Z coordinates
{Stack3 1 -24.747 27.274 0 }
Stack height and diameter
{12.5 1.284 }
Stack temperature, Velocity, Cross, Height
{782 54.1 -1 -1 }
Emission type (1-constant, 2-monthly, 3-hours of the day, 4-wind
and stability, 5-hour and season, 6-temperarture), Number of
particle fractions
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```

```
Constant emission rate
{246.03}
Building width
{10.13829 8.968538 7.526279 5.855337 4.006485 4.79423 6.405114
7.821382 9.000001 9.905159 10.50935 10.79423 17.02924 16.78273
16.85641 17.0872 16.79881 11 10.13829 8.968536 7.526276 5.855334
4.006479 4.794234 6.405118 7.821384 9.000003 9.905161 10.50936
10.79423 10.75113 10.75113 10.79423 10.50935 10.36902 11 }
Building height
{3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 4 4 4 4 4 3.2
3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2
3.2 3.2 }

Source ID, Source Type (1 - stack, 2 - area, 3- volume) and X,
Y, Z coordinates
{Stack4 1 22.51 29.148 0 }
Stack height and diameter
{12.5 1.284 }
Stack temperature, Velocity, Cross, Height
{782 54.1 -1 -1 }
Emission type (1-constant, 2-monthly, 3-hours of the day, 4-wind
and stability, 5-hour and season, 6-temperarture), Number of
particle fractions
{1 0 }
Constant emission rate
{246.03}
Building width
{10.13829 8.968538 7.526279 5.855337 4.006485 4.79423 6.405114
7.821382 9.000001 9.905159 10.50935 10.79423 17.02924 16.78273
16.85641 17.0872 16.79881 11 10.13829 8.968536 7.526276 5.855334
4.006479 4.794234 6.405118 7.821384 9.000003 9.905161 10.50936
10.79423 10.75113 10.75113 10.79423 10.50935 10.36902 11 }
Building height
{3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 4 4 4 4 4 3.2
3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2
3.2 3.2 }

Receptor information

Discrete receptors
Receptor coordinates type (1-Cartesian,0-Polar),Number of
Receptors
{1 5 }
X, Y coordinates and Elevation
{-148.75 -101.49 0 }
X, Y coordinates and Elevation
{-147.22 85.1416 0 }
X, Y coordinates and Elevation
{116.408 83.6216 0 }
X, Y coordinates and Elevation
{115.478 -89.878 0 }
X, Y coordinates and Elevation
{102.848 -103.53 0 }

Gridded receptors
Receptor coordinates type (1-Cartesian, 0-Polar), Number of X
and Y coordinates, Receptor height
{1 101 101 0 }

X grid coordinates
```

```
{-4000 -3920 -3840 -3760 -3680 -3600 -3520 -3440 -3360 -3280 -
3200 -3120 -3040 -2960 -2880 -2800 -2720 -2640 -2560 -2480 -2400
-2320 -2240 -2160 -2080 -2000 -1920 -1840 -1760 -1680 -1600 -
1520 -1440 -1360 -1280 -1200 -1120 -1040 -960 -880 -800 -720 -
640 -560 -480 -400 -320 -240 -160 -80 0 80 160 240 320 400 480
560 640 720 800 880 960 1040 1120 1200 1280 1360 1440 1520 1600
1680 1760 1840 1920 2000 2080 2160 2240 2320 2400 2480 2560 2640
2720 2800 2880 2960 3040 3120 3200 3280 3360 3440 3520 3600 3680
3760 3840 3920 4000 }

Y grid coordinates
{-4000 -3920 -3840 -3760 -3680 -3600 -3520 -3440 -3360 -3280 -
3200 -3120 -3040 -2960 -2880 -2800 -2720 -2640 -2560 -2480 -2400
-2320 -2240 -2160 -2080 -2000 -1920 -1840 -1760 -1680 -1600 -
1520 -1440 -1360 -1280 -1200 -1120 -1040 -960 -880 -800 -720 -
640 -560 -480 -400 -320 -240 -160 -80 0 80 160 240 320 400 480
560 640 720 800 880 960 1040 1120 1200 1280 1360 1440 1520 1600
1680 1760 1840 1920 2000 2080 2160 2240 2320 2400 2480 2560 2640
2720 2800 2880 2960 3040 3120 3200 3280 3360 3440 3520 3600 3680
3760 3840 3920 4000 }

Model settings and parameters
Emission conversion factor, Averaging Time
{277.8 0 }

Land use (surface roughness)
{0.4}

Averaging time flags (1,2,3,4,6,8,12,24 hrs, 7, 90 days, 3
month, All hrs
{1 0 0 0 0 0 0 0 0 0 0 0 }

Statistical output options
{0 0 }

Output options (All meteodata, Every concentration/deposition,
Highest/2nd highest, 100 worst case table, Save all calculations
{0 0 0 1 0 0 }
Write concentration (1-yes, 0-no), Concentration rank, Write
frequency, Frequency Level
{1 1 0 -1 }

Disregard exponents (1-yes, 0-no), Exponent Scheme (1-Irvin
urban, 2-Irvin rural, 3-ISCST, 4-User Defined
{0 2 }
Dispersion exponents
{0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.2
0.2 0.2 0.2 0.2 0.2 0.25 0.25 0.25 0.25 0.25 0.25 0.4 0.4 0.4
0.4 0.4 0.4 0.6 0.6 0.6 0.6 0.6 0.6 }

Building wake effects (1-include,0-not) , Default decay
coefficient, Anemometr height, Sigma-theta averaging period,
Roughness at vane site, Smooth stability changes, ConvectivePDF)
{1 0 1 60 0.4 0 0 }

Deposition options, Depletion options
{False False False False False False }

Stability class adjustments (0-None, 1-Urban1, 2-Urban2)
{0}
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```
Building wake algorithms (1-Huber-Sneider, 2-Hybrid, 3-Schulman-
Scire)
{4}

Gradual plume rise (1-yes,0-no), Stack tip downwash (1-yes,0-
no), Disregard Temperature Gradient (1-yes,0-no), Partial
Penetration, Temp Gradient,  Adiabatic Entrainment, Stable
Entrainment
{1 1 0 0 0.004 0.6 0.6 }
Temperature Gradients for Wind and Stability categories
{0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0.02 0.02 0.02
0.02 0.02 0.02 0.035 0.035 0.035 0.035 0.035 0.035 }

Dispersion curves (1-Pasquill Gifford, 2- Briggs rural,  3-Sigma
theta) horizontal < 100 m, ditto vertical < 100 m, ditto
horizontal > 100 m, ditto vertical > 100 m
{3 1 2 2 }
Adjust PG curves for roughness - Horizontal, Vertical (1-yes,0-
no)
{1 1 }
Enhance plume for buyoancy - Horizontal, Vertical (1-yes,0-no)
{1 1 }
Adjust for wind direction shear
{0}
Shear rates
{0.005 0.01 0.015 0.02 0.025 0.035 }

Wind Speed categories
{1.54 3.09 5.14 8.23 10.8 }

Output file
{'P:\MelbourneProjects\13006\AUSPLUME files\Albany_1hr.txt'}
Meteorological file
{'P:\MelbourneProjects\13006\AUSPLUME
files\metfiles\Albany.met'}
Concentration file
{'P:\MelbourneProjects\13006\AUSPLUME files\Albany_1hr.dat'}
```

APPENDIX H

Noise Modelling Report

Final report: Environmental noise assessment of proposed power stations in Kemerton and Albany, Western Australia

for

Tesla Holdings Pty Ltd

3 June 2013

Final report: Environmental noise assessment of proposed power stations in Kemerton and Albany, Western Australia

For

Tesla Holdings Pty Ltd

Report version	Date	Authored by	Checked by
Final v01	3/06/2013	CM, JM	DC

Prepared by

Callum Maltby
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Joseph McKee
Technical Support

Reviewed by

Dave Collins BE Hons, PhD, FIEAust, FAIE, COH, CIH
Principal Environmental Engineer

Contents

Nomenclature

- **Influencing factor**, (IF) in relation to noise received at noise sensitive premises, means the influencing factor determined under Schedule 3 under the regulation;
- $\mathbf{L_{A10}}$ is an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 10% of the time.
- $\mathbf{L_{A1}}$ is an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 1% of the time.
- $\mathbf{L_{Amax}}$ is an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time.
- **Noise sensitive premises** are:
    - Premises occupied solely or mainly for residential or accommodation purposes;
    - Rural premises; and
    - Any premises that is not an industrial and utility or commercial premises.

Executive summary

Tesla Holdings Pty Ltd (Tesla) has retained Synergetics to undertake an environmental noise assessment on the operation of two proposed peak load power stations which are to be constructed on sites in Kemerton and Albany, Western Australia.

The total capacity of each of the proposed power stations is 60 MW-e, consisting of forty 1.6 MW Caterpillar diesel engines housed in four engine houses each containing ten engines. Exhaust fumes of each of the engines are designed to be coupled into a single-flanged exhaust associated with each of the four engine houses. The engines are expected to run at no more than 500 hours per year (Synergetics 2013).

The Albany plant's nearest noise-sensitive premise is approximately 1.5 km from the facility's central point. The nearest noise-sensitive premise to the Kemerton plant is 1.8 km south-east from the centre point of the facility.

The purpose of this report is to determine the level of attenuation required to achieve an acceptable level of environmental noise compliant with Environmental Protection (Noise) Regulations (EPR) 1997 (WAEPA 1997a) at the plant boundary and at closest sensitive premises.

The power station noise was considered in two parts at each site:

- mechanical noise sourced from the surface of the engines and associated accessories; and
- exhaust noise.

It was determined that both the engine noise and the exhaust noise will both need to be attenuated at both sites to assure compliance with these regulations.

It was calculated that engine enclosures with a transmission loss of 26 dBA or more and exhaust silencers with an insertion loss of 41 dBA or more would provide sufficient attenuation to remain below the maximum acceptable SPL at Kemerton. The calculated attenuation required at Albany was 33 and 47 dBA for the enclosure and exhaust respectively. The SPL spectra of the unattenuated SPL at the limiting receptors are included in Table 4 and Table 6 to facilitate enclosure and silencer design. In addition the exhaust silencers and engine enclosure insertion loss and transmission loss properties will need to be designed to remove any tonality, modulation or impulsiveness from the engines and the exhausts.

Following implementation of these engine and exhaust noise controls, the design will comply with boundary noise requirements under the necessary conditions and the requirements of the Environmental Protection (Noise) Regulations (EPR) 1997 (WAEPA 1997a) will be satisfied.

1 Introduction

Tesla Holdings Pty Ltd (Tesla) has retained Synergetics to undertake an environmental noise assessment on the operation of two proposed power stations which are to be constructed on sites in Kemerton and Albany, Western Australia.

The purpose of this report is to determine the level of attenuation required to achieve an acceptable level of environmental noise compliant with Environmental Protection (Noise) Regulations (EPR) 1997 (WAEPA 1997) at the plant boundary and at sensitive premises.

The assessment is based on information supplied by the Tesla Holdings through email and personal communications (Tesla, 2010a). This environmental noise assessment complements an air quality assessment described in Synergetics (2013).

2 Site description

2.1 Site description

The Kemerton site lies along the flat coastal plain between the Indian Ocean and the Darling ranges. The Albany site is located on the rainbow coast of southern WA approximately 20 km inland of the City of Albany. The approximate locations of the two Tesla Holdings sites are shown in Figure 1.

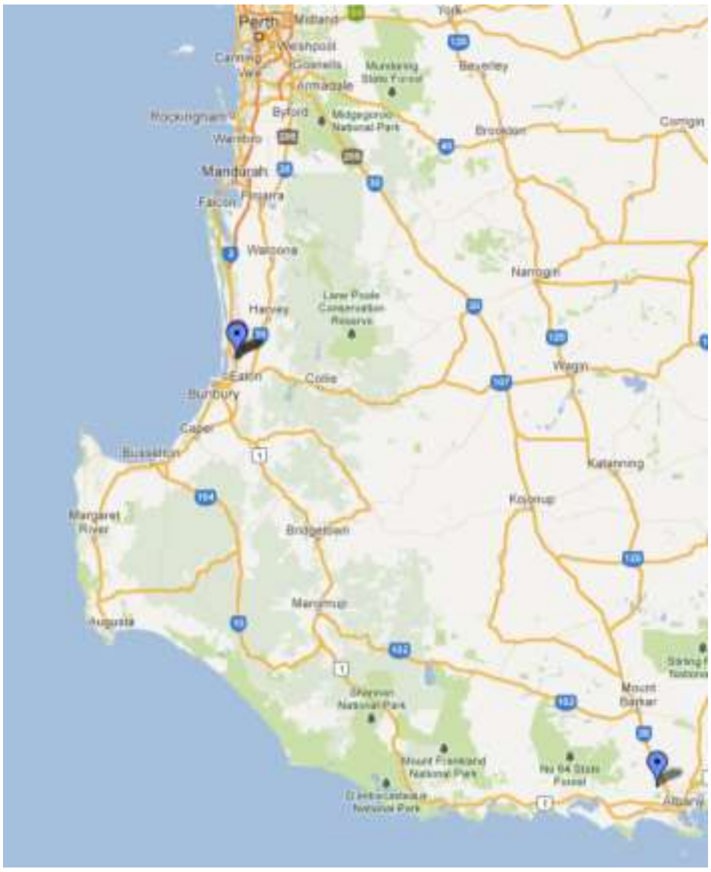

Figure 1 - Locations of the Kemerton and Albany sites with respect to Perth.

The Kemerton site is located in semi-rural industrial zone north of Bunbury, the Albany site is located inland and on a pocket of industrial land surrounded by a rural/agricultural setting. Neither of the sites is close to significant residential areas. The Albany site however, has its western and southern boundaries flush with a rural land use, as it is the south-westernmost lot in the designated industrial area. In contrast the Kemerton area contains a significant buffer area immediately at the perimeter of the industrial block which is not intended for residential purposes.

Aerial photographs showing the rural surrounding land use of the Kemerton and Albany sites are provided in Figure 2 and Figure 3 respectively.

Figure 2 – Aerial photograph of the Kemerton site boundary is denoted by the red lines. Note rural land-use character. Scale is approximately 1:20,000. Numbered Receptors 2, 3 and 6 are referenced in Table 5 of this report. Note rural land-use character.

Figure 3 – Aerial photograph of the Albany site boundary is denoted by the red lines. Scale is approximately 1:20,000. Numbered Receptors 1, 3, 4, and 5 are referenced in Table 5 of this report. Note rural land-use character.

2.2 Background sound pressure levels

The Environmental Protection (Noise) Regulations 1997 state that information should be provided on existing sound pressure levels (SPLs) in order to:

- Identify the impact of noise level increases over low ambient noise levels;
- Identify the likelihood of limit-exceeding noise resulting from the combination of the ambient noise with that of the proposal; and
- Enable the assessment of the likely audibility of any tonal, modulation or impulsive components in the noise from the proposal.

Background noise levels are not available for the site. However given the rural character of the surrounding land-use, it is reasonable to assume that the background noise levels are likely to be very quiet, and hence would not contribute to SPLs.

2.3 Site activity

Both the Kemerton and Albany sites' main sources of noise are forty 1.6MW diesel engines. The engines will emit noise characteristics as specified under the Gen Set Package Performance Data [516DE90] provided to Synergetics by Tesla referenced as Caterpillar (2010).

The diesel engines are expected to meet peak load requirements and hence are likely to operate only during the day period when peak power demand occurs for a maximum of 500 hours per year.

Noise from activities such as maintenance was assumed to be minimal in comparison to the operational noise of the engines and thus would not significantly contribute to the SPL at surrounding receptors. Construction was not addressed in this assessment on the assumption that it would be addressed as part of normal planning approvals processes.

2.4 Site meteorology

Kemerton

The south-western regions of Western Australia experience a Mediterranean climate, characterised by hot, dry summers and mild, wet winters. These seasons extend into the autumn and spring months, which are transitional periods between the main seasons. The climate of the region is strongly influenced by the position of the axis of the band of high pressure known as the sub-tropical ridge, and in the warmer months by the development in the easterlies to the north of the ridge of a trough of low pressure near the West Coast (the 'West Coast Trough'). For much of the year the ridge is located to the south allowing easterly and south-easterly winds to prevail. During the cooler months the ridge periodically moves to the north allowing cold fronts to pass over the west coast and deliver much of the annual rainfall. Sometimes these fronts interact with tropical cloud bands from the north-west and this can increase rainfall.

Kemerton is located less than 10 km from the coast and experiences mainly southerly to south-easterly winds as affected by the West Coast Trough, but also westerly afternoon sea breezes that are associated with the bulk of the rainfall (Figure 1, Table 1 and Table 2).

For the purpose of the present assessment, data from the Bunbury Bureau of Meteorological (BoM) station were considered to represent the Kemerton site which is approximately 15 km away and likely to experience very similar weather patterns.

Albany

Albany experiences a Mediterranean-type climate, experiencing mild summers and cool, wet winters. The city is situated on the southern coast of Western Australia and experiences seasonal extremes in weather, from hot summer days when north-easterly winds arrive from the interior of the State, to cold, wet, windy winter days as cold fronts from the Southern Ocean and move through the region (Figure 2, Table 3 and Table 4).

The wind climatology at Albany is strongly dominated by the effects of the land-sea interface where North-Westerly offshore land breezes are common in the morning, whilst afternoon South-Westerly sea breezes are common.

The present assessment considered meteorological data from the Albany Airport as representative of the study site, which was located approximately 4 km away.

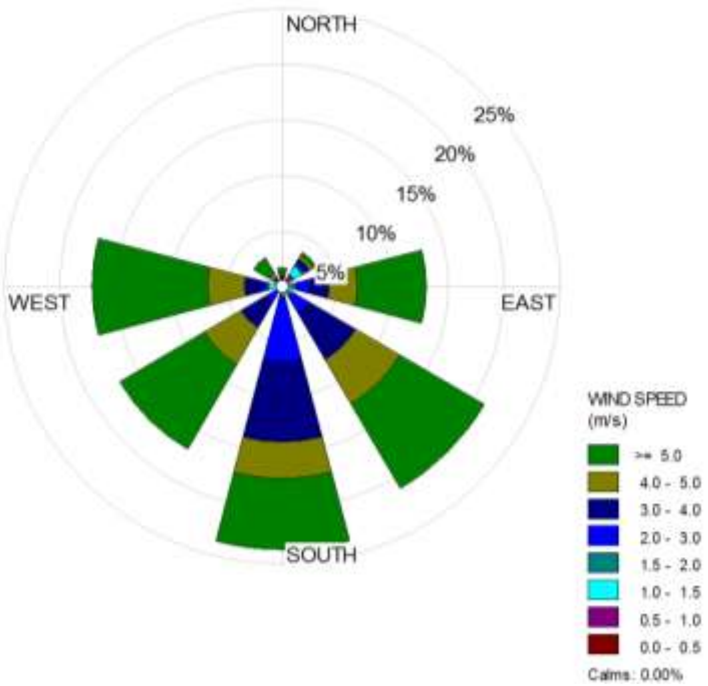

Figure 1 - Annual wind rose for Kemerton.

Table 1 - Frequency distribution of wind speeds by wind direction for Kemerton.

Wind speed (m/s)	N	NE	E	SE	S	SW	W	NW
0-2	1%	4%	3%	1%	2%	1%	2%	1%
2-4	2%	3%	4%	6%	9%	4%	2%	2%
4-6	2%	1%	4%	5%	3%	5%	6%	3%
6-8	1%	0%	2%	2%	2%	3%	6%	3%
8-10	0%	0%	0%	0%	0%	1%	2%	1%
10-12	0%	0%	0%	0%	0%	0%	1%	0%
12-14	0%	0%	0%	0%	0%	0%	0%	0%

Table 2 - Stability class statistics for the Kemerton meteorological file.

Pasquil Gifford stability class	Frequency (%)	Average wind speed (m/s)	Average temperature (˚C)	Average mixing height (m)
A	0%	2.9	25.0	1239.0
B	3%	3.2	22.7	1266.2
C	13%	4.0	20.6	1438.1
D	66%	5.3	17.4	1732.4
E	9%	1.9	12.5	494.1
F	9%	0.8	9.8	143.6

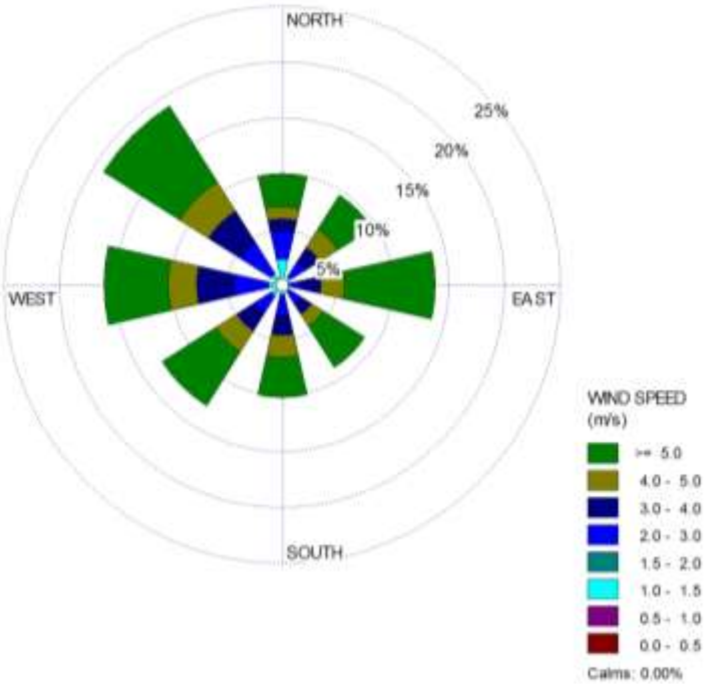

Figure 2 - Annual wind rose for Albany.

Table 3 - Frequency distribution of wind speeds by wind direction for Albany.

Wind Speed (m/s)	N	NE	E	SE	S	SW	W	NW
0-2	3%	1%	1%	1%	1%	1%	1%	1%
2-4	4%	4%	3%	3%	4%	4%	7%	8%
4-6	2%	4%	5%	3%	4%	5%	6%	6%
6-8	2%	2%	4%	2%	2%	3%	3%	4%
8-10	0%	0%	2%	1%	0%	1%	1%	2%
10-12	0%	0%	0%	0%	0%	0%	0%	0%
12-14	0%	0%	0%	0%	0%	0%	0%	0%

Table 4 - Stability class statistics for the Albany meteorological file.

Pasquil Gifford stability class	Frequency (%)	Average wind speed (m/s)	Average temperature (˚C)	Average mixing height (m)
A	0.3%	1.7	20.4	856.4
B	3.6%	3.2	18.9	1065.9
C	15.3%	4.2	16.6	1216.6
D	60.2%	5.5	15.2	1402.4
E	10.6%	3.6	12.9	925.0
F	10.0%	1.8	11.5	505.7

3 Assessment criteria

In Western Australia, the Environmental Protection (Noise) Regulations (EPR) 1997, described in WAEPA (1997a), is the legislation pertaining to the assessment of environmental noise. They are a subsidiary of the Environmental Protection Act 1986.

These Regulations contain “assigned noise levels” which are upper limits - not to be exceeded at any time - to the SPL at any noise sensitive premises. The assigned noise levels vary with the types of noise sensitive premises and time of day as summarised in Table 5.

Table 5 – Applicable[1] assigned noise levels as per the Environmental Protection (Noise) Regulations 1997

Type of premises receiving noise	Receptor/s numbers as shown in Figure 1 or Figure 2	Time of day	Assigned noise level (dBA)[2]		
			$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ max}$
Noise sensitive premises at locations within 15 metres of a building associated with a noise sensitive use	1. The closest residential premise 1.5km east of the Albany site inside a 15m radius from the house itself. 2. The closest residential premise 1.8km south-east for the Kemerton site inside a 15m radius from the house itself.	0700 to 1900 hours Monday to Saturday	45 + IF	55 + IF	65 + IF
		0900 to 1900 hours Sunday and public holidays	40 + IF	50 + IF	65 + IF
		1900 to 2200 hours all days	40 + IF	50 + IF	55 + IF
		2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + IF	45 + IF	55 + IF
Noise sensitive premises at locations further than 15 metres from a building associated with a noise sensitive use	3. The area of the residential premises outside a 15m radius from the house itself at both sites. 4. The S and W boundary of the Albany site which abut rural land uses.	All hours	60	75	80
Industrial and utility premises	5. The N and E boundary of the Albany site. 6. All site boundaries at Kemerton.	All hours	65	80	90

[1] Commercial premises were excluded as they are not relevant to this assessment.
[2] IF denotes a calculated influencing factor to adjust the assigned noise level for the types of land use surrounding the noise sensitive premise.

Under WAEPA (1997, Section 7.1a), a noise source should not exceed, or significantly contribute to, a level of noise which exceeds the assigned level. Further in WAEPA (1997, Section 7.2), "…a noise emission is taken to significantly contribute… if the noise emissions… exceeds… 5dB below the assigned level". Assuming that the existing background levels associated with rural activities are not a significant contributor, the "maximum acceptable SPL" (measured as L_{A10}) due to the power station activities is "60 – 5 = 55" dBA at Receptors 3 and 4, and "65 – 5 = 60" dBA at Receptors 5 and 6 respectively.

At Receptors 1 and 2, as the power station is expected to only operate during periods of maximum electricity demand, i.e., 0700 to 1900 hours period as shown in Table 1, the "maximum acceptable SPL" (measured as L_{A10}) due to the power station activities is "40 dBA + IF – 5 = 35 +IF" dBA.

4 Methodology

All SPL calculations are performed in accordance with ISO (2005) and Beranek (1998), the calculated noise levels have an uncertainty of ±3 dB. Calculated SPL at receptors in the near-field where hemispherical divergence cannot be relied on, may have a greater level of uncertainty but is likely to be no more than ±5 dB. Standard methods and techniques for manipulating sound data were sourced from Institute of Noise Control Engineering (Beranek 1988).

The data used to determine the sound power of the mechanical noise and the exhaust noise was provided by Caterpillar (2010), and is contained within the specifications for the engine model 3516BDITA. In order to calculate the sound power level from the supplied data, a hemispherical geometrical divergence, i.e., omni-directional behaviour was assumed.

Attenuation due to physical blocking such as foliage and undulating terrain was assumed to be negligible given the flat rural land use. This is a slightly conservative assumption as the calculated SPL is likely to be slightly greater than the observed value.

The following sources of attenuation were considered:

- Geometric divergence - As the sound wave expands, it forms a larger surface area. Therefore, the sound pressure at any point decreases as the radius of the sphere increases. This is formalised in the law $L_W = L_I + 10\log(S)$, where L_W is the SPL at 1m from the source, L_I is the SPL at a point at radius r from the source and S is the surface area at the radius r. This is the one instance where calculations have deviated from the ISO standards, because that provides a formula which models the area spread as a sphere. Unless the sound source is high above the ground, this is an invalid assumption. As such, a hybrid formula for the surface area has been used that takes into account the height of the source to determine if the area is a sphere or a spherical cap.
- Atmospheric absorption - The air absorbs some of the energy of the sound wave as a linear function of the distance of air travelled.
- Ground effect - The attenuation resulting from interference between the propagating wave and reflections from the earth's surface, and acoustically absorptive soil and ground cover.
- Wind speed – Wind can deflect the sound pressure waves in a downwind direction increasing SPLs at distant downwind receptors.
- Temperature profile – Strong inversion conditions can diffract the sound pressure waves towards the ground increasing SPLs at distant receptors.

A logarithmic transformation is applied to the sound pressure value which gives us the SPL, measured in dB. Sound pressure levels are then A-weighted in units of dBA to take into account that the human ear is more effective at hearing sounds across the frequency range of 500 to 5000 Hz.

Because the level of attenuation is dependent on the frequency the frequency spectra of sound pressure, power station noise emission data were obtained from the supplier which were supplied in octave band centre frequency (OBCF) as shown in Caterpillar (2010). The total A-weighted SPL in dBA was determined by summing logarithmically each octave band contribution. To maximise representativeness and accuracy of the calculated resultant noise level at the noise sensitive receptors, the SPL at the site boundary has been modelled by treating each of the forty-four sound sources (forty engines and four exhaust stacks) as individual sources, each with unique 3D Cartesian coordinates, i.e., x, y and z.

The WAEPA (1997a) requires that the presence of tonality, modularity and impulsiveness is adjusted in the calculated or measured data according to Table 6.

Table 6 - Adjustments to measured value based on the characteristics of the sound as per the WAEPA (1997)

Adjustment[3] (dBA)		
Where tonality is present	Where modulation is present	Where impulsiveness is present
+5	+5	+10

It was assumed that the exhaust silencers and engine enclosures have insertion loss and transmission loss properties respectively such that they remove any tonality, modulation or impulsiveness and that no adjustment was required in this assessment.

Given the short propagation distances to the limiting Receptors 4, 5 and 6, typically less than 150 m from the nearest generator, the effects of wind and atmospheric stability are negligible, and for the purposes of this assessment, were not considered. The distances from the sites to the nearest residential Receptors 1, 2 and 3 of approximately 1.5 km are more significant, however meteorological effects can also be neglected at these receptors if the compliance margin relative to the limiting receptors is greater than 5 dBA which is the maximum likely wind or inversion influence at these distances.

[3] Where noise emission is not music. These adjustments are cumulative to a maximum of 15 dBA.

5 Noise modelling and analysis

The modelled sound data - with no attenuation - at the closest residence (Receptor 2) and the closest boundary (Receptor 6) for the Kemerton site are summarised in Table 7.

Table 7 - Unattenuated data for the Kemerton site

Parameter		Units	Residence (Receptor 2)	Site boundary (Receptor 6)
Sound Pressure Level		dBA	60.93	94.24
Maximum acceptable SPL[4]		dBA	35	60
Control required		dBA	25.93	34.24
Exhaust Sound Intensity		W/m^2	1.17E-06	2.54E-03
Exhaust Sound Pressure Level		dBA	60.69	94.05
Engines Sound Intensity		W/m^2	6.61E-08	1.15E-04
Engines Sound Pressure Level		dBA	48.20	80.62
Exhaust Intensity Fraction		-	0.95	0.96
Average Distance		m	1824.18	101.10
Octave Band Centre Frequency (Hz)	63	dB	40.99	65.86
	125	dB	55.66	85.69
	250	dB	55.18	82.77
	500	dB	52.14	82.33
	1000	dB	54.28	87.46
	2000	dB	49.99	90.01
	4000	dB	30.09	85.67

Exhaust noise dominates the SPL at these receptors. The site boundary (Receptor 6) requires the greatest level of control, with an overall attenuation of approximately 34 dBA (calculated as 34.24 dBA), and is the limiting receptor for Kemerton, i.e., if Receptor 6 is acceptable, then all other receptors will be acceptable. A breakdown of the SPL for exhaust and mechanical noise at Receptor 6 is provided in Table 8 to assist with design of noise controls.

Table 8 - Breakdown of the SPL for exhaust and mechanical noise for Receptor 6 at the Kemerton site

OBCF[5] (Hz)	Exhaust contribution (dB)	Mechanical contribution (dB)	Combined contribution (dB)
63	64.85	59.03	65.86
125	84.79	78.4	85.69
250	82.52	70.37	82.77
500	82.09	69.71	82.33
1000	87.35	71.33	87.46
2000	89.96	71.02	90.01
4000	85.58	68.63	85.67

[4] Neglecting the benefits of the influencing factor.
[5] OBCF is an acronym for "Octave band centre frequency".

In Table 9 are the modelled sound data for the Albany site with no exhaust silencers or sound barriers applied.

Table 9 - Unattenuated noise data for the Albany site

Parameter		Units	Residence (Receptor 3)	Rural site boundary (Receptor 4)	Industrial site boundary (Receptor 5)
Sound Pressure Level		dBA	64.8	90.9	100.1
Maximum acceptable SPL[6]		dBA	35	55	60
Control required		dBA	29.8	35.9	40.1
Exhaust Sound Intensity		W/m^2	2.82E-06	1.94E-03	9.87E-03
Exhaust Sound Pressure Level		dBA	64.57	90.77	99.90
Engines Sound Intensity		W/m^2	1.25E-07	5.071E-05	5.557E-04
Engines Sound Pressure Level		dBA	51.29	77.05	87.45
Exhaust Intensity Fraction		-	0.955	0.959	0.946
Average Distance		m	1367.23	147.44	68.11
Octave Band Centre Frequency (Hz)	63	dB	45.17	62.94	71.26
	125	dB	60.11	82.63	91.22
	250	dB	60.04	79.20	89.88
	500	dB	58.17	78.88	88.94
	1000	dB	61.82	84.38	92.93
	2000	dB	60.25	86.77	95.68
	4000	dB	42.36	81.81	92.01

As before, exhaust noise dominates the SPL at the receptors. The site boundary (Receptor 5) requires the greatest level of control, with an overall attenuation of approximately 40 dBA (calculated as 40.1 dBA), and is the limiting receptor for Albany. A breakdown of the SPL for exhaust and mechanical noise is provided in Table 10 to assist with design of noise controls.

Table 10 - Breakdown of the SPL for exhaust and mechanical noise for Receptor 5 at the Albany site

OBCF[7] (Hz)	Exhaust contribution (dB)	Mechanical contribution (dB)	Combined contribution (dB)
63	70.07	65.07	71.26
125	90.06	84.94	91.22
250	89.54	78.68	89.88
500	88.68	76.67	88.94
1000	92.82	77.02	92.93
2000	95.62	76.86	95.68
4000	91.93	74.43	92.01

[6] Neglecting the benefits of the influencing factor.
[7] OBCF is an acronym for "Octave band centre frequency".

6 Noise controls

This section documents the engine and exhaust noise attenuation required to bring the SPL at Receptor 6 at Kemerton and Receptor 5 at Albany below maximum acceptable levels.

At the Kemerton site, the following attenuations must be applied to satisfy maximum acceptable SPLs at Receptor 6.

Table 11 – Attenuation Requirements for the Kemerton site

Type	Mechanical	Exhaust
Required attenuation (dBA)	26	41

Once these treatments have been applied, SPLs similar to those below will be experienced at the Kemerton receptors.

Table 12 – Attenuated Sound data for the Kemerton site

Receptor	Residence (Receptor 2)	Industrial site boundary (Receptor 6)
Calculated SPL after installation of controls (dBA)	24	57
Maximum acceptable SPL (dBA)	35 + IF	60

At the Albany site, the following attenuations must be applied to satisfy maximum acceptable SPLs at Receptor 5.

Table 13 – Attenuation Requirements for the Albany site

Type	Mechanical	Exhaust
Required attenuation (dBA)	33	47

Once these treatments have been applied, SPLs similar to those below will be experienced at the Albany receptors.

Table 14 – Attenuated Sound data for the Albany site

Receptor	Residence (Receptor 3)	Rural site boundary (Receptor 4)	Industrial site boundary (Receptor 5)
Calculated SPL after installation of controls (dBA)	21	47	57
Maximum acceptable SPL (dBA)	35 + IF	55	60

7 Discussion

The background sound levels in the rural surrounding area were assumed to be low relative to the maximum acceptable levels. To assure a conservative safety margin, the recommended silencer insertion loss and engine enclosure transmission loss implicitly incorporate up to 5 dBA safety margin as required under WAEPA (1997a Section 7.2).

The silencer insertion losses and engine mechanical attenuations calculated based on these assumptions are technically feasible. Sound enclosures with an attenuation of 60 dBA are available. In-line silencers sized for grouped exhaust are also commercially available with the required insertion-loss at a cost of approximately $20k each (supply only).

The engine exhausts for engine house are flanged together into a single outlet stack. It was assumed that the sound is transmitted perfectly though the exhaust ducts to the silencer, with no losses from the ducting or interference. Additionally, it was assumed that the ducts are sufficiently thick to prevent noise breakout before the exhaust gas passes through the silencers.

8 Conclusions

Synergetics Pty Ltd undertook an assessment of the noise impact from Tesla Holdings Pty Ltd on the subject sites in Albany and Kemerton. The assessment consisted of:

- the determination of assessment criteria;
- the calculation of noise levels while the engines are running;
- the assessment of the calculated noise levels against the assessment criteria; and
- the evaluation of potential noise control options.

Calculations on the noise resulting from the proposed operations at the Tesla plants quantified the level of silencer insertion loss and engine enclosure transmission loss required to meet the assessment criteria.

It was calculated that at Albany, an engine house enclosure with a transmission loss of 33 dBA or more will provide sufficient attenuation for the mechanical noise, and a grouped exhaust silencer with an insertion loss of 47 dBA or more will provide sufficient attenuation for the exhaust noise. Similarly at Kemerton, an engine house enclosure with a transmission loss of 26 dBA or more will provide sufficient attenuation for the mechanical noise, and a grouped exhaust silencer with an insertion loss of 41 dBA or more will provide sufficient attenuation for the exhaust noise. The exhaust silencers and engine enclosures insertion loss and transmission loss properties respectively will need to be selected to remove any tonality, modulation or impulsiveness from the engines and the exhausts.

Following implementation of the engine and exhaust noise controls, it was calculated that the power stations will comply with boundary noise requirements with a minimum of a 3dBA margin [8], as summarised in Table 15 below, and hence the requirements of the Environmental Protection (Noise) Regulations (EPR) 1997 (WAEPA 1997a) will be satisfied.

Table 15 – Summary of calculated receptor SPLs following controls

Receptor		Calculated SPL after installation of controls (dBA)	Maximum acceptable SPL (dBA)
No.	**Description**		
1	The closest residential premise 1.5km east of the Albany site inside a 15m radius from the house itself.	21	35 + IF
2	The closest residential premise 1.8km south-east for the Kemerton site inside a 15m radius from the house itself.	24	35 + IF
3	The area of the residential premises outside a 15m radius from the house itself at both sites.	21	35 + IF
4	The S and W boundary of the Albany site which abut rural land uses.	47	55
5	The N and E boundary of the Albany site.	57	60
6	All site boundaries at Kemerton.	57	60

[8] 3dBA is the level of uncertainty associated with the calculation methodology.

9 References

Beranek L 1988. Noise and Vibration Control, Institute of Noise Control Engineering, Washington DC, USA

Caterpillar 2010. Gen Set Package Performance Data [516DE90], Shane Gilles, PSG Web Based Systems Support, Caterpillar Inc, 2010.

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WAEPA 1997a. Environmental Protection (Noise) Regulations. Environmental Protection Authority of Western Australia, Perth.

WAEPA 1997b. Environmental Protection (Noise) Regulations – Summary of the Regulations. Environmental Protection Authority of Western Australia, Perth.

WAEPA 2007c. Guidance for the Assessment of Environmental Factors – Environmental Noise. Environmental Protection Authority of Western Australia, Perth.

APPENDIX I

Stakeholder Consultation Letters

Our Ref: INF061AD

24 August 2011

Mr Ainsley Jonathon Kemp
316 Hazzard Road,
Willyung WA 6330

To Mr Kemp

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

Following construction and commissioning it is envisaged that the operation will generally be confined to business days in summer when power usage is at maximum load. It is expected that the facility will be used for less than 200 hours per year and will be generally operated within standard business hours.

We invite you to comment on the proposed project. Comments may be submitted in writing to 360 Environmental by post to PO BOX 14, West Perth 6872 or by email to admin@360environmental.com.au, by 6 September 2011. Should you have any queries or require further information please do not hesitate to contact Gemma Whitfield or the undersigned on (08) 9388 8360. We look forward to hearing from you.

For and on behalf of

360 Environmental Pty Ltd

Joseph Toon

Joseph Toon

Team Leader – Infrastructure

Enc *Site Location*
Table 1 Key Characteristics Table

Table 1. Key Characteristics Table

Element	Description
Project Location	Lot 5 Down Road, Albany.
Life of Project	30 years.
Power Station Footprint	Approximately 7,000 m^2.
Nominal Configuration	30 x self bunded diesel fuelled Caterpillar type 3516B-HD generator sets.
Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
Inputs	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

Balgrove Pty Ltd
PO Box 22
Cuballing WA 6311

To whom it may concern

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

Following construction and commissioning it is envisaged that the operation will generally be confined to business days in summer when power usage is at maximum load. It is expected that the facility will be used for less than 200 hours per year and will be generally operated within standard business hours.

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For and on behalf of

360 Environmental Pty Ltd

Joseph Toon

Joseph Toon

Team Leader – Infrastructure

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Site Location

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Project Location	Lot 5 Down Road, Albany.
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Nominal Configuration	30 x self bunded diesel fuelled Caterpillar type 3516B-HD generator sets.
Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
INPUTS	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

Mr Derek Charles Bunn
394 Redmond-Hay River Road
Drome WA 6327

To Mr Bunn

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

Following construction and commissioning it is envisaged that the operation will generally be confined to business days in summer when power usage is at maximum load. It is expected that the facility will be used for less than 200 hours per year and will be generally operated within standard business hours.

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For and on behalf of

360 Environmental Pty Ltd

Joseph Toon

Joseph Toon

Team Leader – Infrastructure

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ELEMENT	DESCRIPTION
Project Location	Lot 5 Down Road, Albany.
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Power Station Footprint	Approximately 7,000 m^2.
Nominal Configuration	30 x self bunded diesel fuelled Caterpillar type 3516B-HD generator sets.
Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
INPUTS	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

Elizabeth Margaret Hollingworth
PO Box 240
Mt Barker WA 6324

Dear Elizabeth

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

Following construction and commissioning it is envisaged that the operation will generally be confined to business days in summer when power usage is at maximum load. It is expected that the facility will be used for less than 200 hours per year and will be generally operated within standard business hours.

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For and on behalf of

360 Environmental Pty Ltd

Joseph Toon

Joseph Toon

Team Leader – Infrastructure

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Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
INPUTS	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

Mr Gregory Eric Brook
PO Box 465
Mt Barker 6324

To Mr Brook

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

Following construction and commissioning it is envisaged that the operation will generally be confined to business days in summer when power usage is at maximum load. It is expected that the facility will be used for less than 200 hours per year and will be generally operated within standard business hours.

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360 Environmental Pty Ltd

Joseph Toon

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Team Leader – Infrastructure

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Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
INPUTS	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

Mr Huburt Joseph Kohlen
35521 Albany Highway
Drome WA 6330

To Mr Kohlen

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

Following construction and commissioning it is envisaged that the operation will generally be confined to business days in summer when power usage is at maximum load. It is expected that the facility will be used for less than 200 hours per year and will be generally operated within standard business hours.

We invite you to comment on the proposed project. Comments may be submitted in writing to 360 Environmental by post to PO BOX 14, West Perth 6872 or by email to admin@360environmental.com.au, by 6 September 2011. Should you have any queries or require further information please do not hesitate to contact Gemma Whitfield or the undersigned on (08) 9388 8360. We look forward to hearing from you.

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360 Environmental Pty Ltd

Joseph Toon

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Team Leader – Infrastructure

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Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
Inputs	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

JL and GJ Steel
PO Box 465
Mt Barker 6324

To whom it may concern

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

Following construction and commissioning it is envisaged that the operation will generally be confined to business days in summer when power usage is at maximum load. It is expected that the facility will be used for less than 200 hours per year and will be generally operated within standard business hours.

We invite you to comment on the proposed project. Comments may be submitted in writing to 360 Environmental by post to PO BOX 14, West Perth 6872 or by email to admin@360environmental.com.au, by 6 September 2011. Should you have any queries or require further information please do not hesitate to contact Gemma Whitfield or the undersigned on (08) 9388 8360. We look forward to hearing from you.

For and on behalf of

360 Environmental Pty Ltd

Joseph Toon

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Team Leader – Infrastructure

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Element	Description
Project Location	Lot 5 Down Road, Albany.
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Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
Inputs	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

Mr Lindsay Norman Black
35552 Albany Highway
Drome WA 6330

To Mr Black

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

Following construction and commissioning it is envisaged that the operation will generally be confined to business days in summer when power usage is at maximum load. It is expected that the facility will be used for less than 200 hours per year and will be generally operated within standard business hours.

We invite you to comment on the proposed project. Comments may be submitted in writing to 360 Environmental by post to PO BOX 14, West Perth 6872 or by email to admin@360environmental.com.au, by 6 September 2011. Should you have any queries or require further information please do not hesitate to contact Gemma Whitfield or the undersigned on (08) 9388 8360. We look forward to hearing from you.

For and on behalf of

360 Environmental Pty Ltd

Joseph Toon

Joseph Toon

Team Leader – Infrastructure

Enc *Table 1 Key Characteristics Table*
Site Location

Table 1. Key Characteristics Table

ELEMENT	DESCRIPTION
Project Location	Lot 5 Down Road, Albany.
Life of Project	30 years.
Power Station Footprint	Approximately 7,000 m^2.
Nominal Configuration	30 x self bunded diesel fuelled Caterpillar type 3516B-HD generator sets.
Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
INPUTS	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

Mt Romance Australia Pty Ltd
2 Down Road
Drome WA 6330

To whom it may concern

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

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360 Environmental Pty Ltd

Joseph Toon

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Nominal Configuration	30 x self bunded diesel fuelled Caterpillar type 3516B-HD generator sets.
Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
INPUTS	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

Mr Neil George Johnson
35133 Albany Highway
Green Valley 6330

To Mr Johnson

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

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Joseph Toon

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ELEMENT	DESCRIPTION
Project Location	Lot 5 Down Road, Albany.
Life of Project	30 years.
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Nominal Configuration	30 x self bunded diesel fuelled Caterpillar type 3516B-HD generator sets.
Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
INPUTS	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

North Stirling Downs Pty Ltd
PO Box 169
Gnowangerup WA 6335

To whom it may concern

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

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Joseph Toon

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Team Leader – Infrastructure

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ELEMENT	DESCRIPTION
Project Location	Lot 5 Down Road, Albany.
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Nominal Configuration	30 x self bunded diesel fuelled Caterpillar type 3516B-HD generator sets.
Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
INPUTS	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

Mr Peter Roger Eades
121 Redmond-Hay River Road
Redmond WA 6327

To Mr Eades

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

Following construction and commissioning it is envisaged that the operation will generally be confined to business days in summer when power usage is at maximum load. It is expected that the facility will be used for less than 200 hours per year and will be generally operated within standard business hours.

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Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
Inputs	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

Ravensdown Fertiliser Co-operative Ltd
66 Down Road
Drome WA 6330

To whom it may concern

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

The proposed facility will consist of approximately 30 diesel generator units, two transformers, two safe fill self-bunded diesel fuel tanks and a control hut. An Environmental Noise Assessment Report and Environmental Air Quality Report are currently being undertaken by suitably qualified professionals and results will be available upon request. The facility will meet (or exceed) requirements of all relevant emission regulations and should have minimal impact on the surrounding land users. The key characteristics of the proposed facility are outlined in Table 1.

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360 Environmental Pty Ltd

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Hydrocarbon storage	300,000 L in safe fill, self bunded diesel fuel tank(s).
Operating Hours	Maximum 200 hours per year.
Vegetation Disturbance	No native vegetation disturbance required.
INPUTS	
Nominal fuel (diesel) consumption	15,750 litres per hour.
Approximate peak water demand	None during operation. Small volumes may be required for equipment wash-down and in the event of an emergency.

Our Ref: INF061AD

24 August 2011

Tanya Cecila Sandilands
35256 Albany Highway
Drome WA 6330

Dear Tanya

Proposed Power Station at Lot 5 Down Road, Albany

360 Environmental Pty Ltd, on behalf of Tesla Corporation, will be seeking approval from the Department of Environment and Conservation (DEC) to construct a 60 megawatt diesel-fired, peak load Power Station (the proposed facility) on Lot 5 Down Road, Albany. A site location figure is enclosed.

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