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abn: 51 088 857 470

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**Report No. ENE50-25**

**Shute Harbour Marina  
EIS  
Electricity & Telecommunications  
Report**

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**Developer: Shute Harbour Marina Development Pty Ltd**

Report Approval:  
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Managing Director  
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Report Manager:  
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Approved for issue: P. Perkins

Revision 3

Date 29/07/2008

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## 1. INTRODUCTION

This report has been prepared in response to Shute Harbour Marina Development Pty Ltd's request, that we provide responses, regarding electricity supply and communications for the project, to sections '3.5.3 Energy' and '3.5.6 Telecommunications' of the "Shute Harbour Marina Project, Terms of Reference for an Environmental Impact Statement under Part (4) of the Queensland State Development and Public Works Organisation Act 1971 by the Coordinator-General, May 2007".

These sections are:

### **"3.5.3 Energy**

"The EIS should describe all energy requirements, including electricity, natural gas, and/or solid and liquid fuel requirements for the construction and operation of the Proposal including the incorporation of energy efficient design principles. The locations of any easements should be shown on the infrastructure plan. Energy conservation should be briefly described in the context of any Commonwealth, State and local government policies. If upgrading of electricity supply infrastructure is required, provide details of the intended route with respect to existing property boundaries."

and:

### **"3.5.6 Telecommunications**

"The EIS should describe any impacts on existing telecommunications infrastructure (such as optical cables, microwave towers, etc.) and identify the owners of that infrastructure. If upgrading is required provide details of the intended route with respect to existing property boundaries."

## 2. SCOPE OF WORKS

### 2.1 REPORT

This report and appendices outline the results to date of liaison with Ergon and Telstra and investigation of capacities of other communications carriers and includes the following key issues:

- ❖ Development electrical layout, including possible locations of PMT's, & cable routes
- ❖ 66kV external works required to supply the development
- ❖ Impact on existing 11kV Electricity Network
- ❖ Zone substation status and requirements
- ❖ Cable and mobile telecommunications
- ❖ Existing and proposed easements
- ❖ Possible disturbances to vegetation, watercourses and the natural environment in general
- ❖ Conflicts with existing infrastructure, including main roads, power and telco networks and wireless services
- ❖ Visual impacts
- ❖ Noise from installed equipment
- ❖ Electromagnetic radiation (EMR)

### 2.2 CONCEPTUAL DESIGN

An AutoCAD electrical conceptual design plan for the development (Appendix 1) has been prepared to indicate preferred PMT locations and high voltage underground network (internal and external to the development) and infrastructure and environmental conflict points. To support this Lectel performed the following tasks:

- ❖ Obtained current records of existing services from all relevant authorities
- ❖ Obtained electronic base plans & supporting information from the client (incl lot layout)
- ❖ Undertook site visits to verify existing conditions and likely conflict points (with existing infrastructure)
- ❖ Further liaised with Ergon for design parameters & supply issues
- ❖ Liaised with Telstra for design parameters and planning
- ❖ Performed voltage drop calculations to roughly plan numbers and locations of PMT's
- ❖ Drafted refinements to the AutoCAD concept electrical design showing preferred PMT locations and HV backbone network routes for the entire development.

### 3. ENVIRONMENTAL IMPACTS

#### 3.1 ELECTRICAL

From the present layout, we have calculated the estimated total electrical demand of the development based on 669 marina berths, 117 accommodation lots, 109 suite hotel and commercial facilities as 1.9MVA. We have sought Ergon's advice regarding supply to the development and awaiting responses thereto. We have been unable to obtain advice on when detailed information will be available.

Our present understanding of likely effects of the development is described below.

As the development is to be under a community title, Ergon will only provide underground high voltage reticulation and ground mounted substations. Low voltage reticulation to individual residential lots and to the hotel and commercial developments will be private reticulation to AS/NZS 3000.

##### 3.1.1 HV Transmission

###### a) 11kV Network

Depending on the development timetable, the electricity supply requirements for early stages of the development may be able to be provided from the existing overhead 11kV network adjacent to and north of Proserpine Shute Harbour Rd.

Electrical reticulation in the development will be run underground. Upgrade of Ergon's existing 11kV network may be required. This may require heavier grade poles and/or overhead conductors.

The extent and layout of the proposed marina will require 11kV/240V padmount transformer substations (PMTs) to be located within the marina. It is expected these PMTs will be mounted on a platform on piles. Ergon's present advice is that Ergon will not provide a PMT for installation other than on land. Accordingly these PMTs will be privately owned and provided by the developer. Earthing of these marina PMTs will require specific consideration during design to minimise effects on the PMTs, on the marina components and on marine craft. Air cooled rather than an oil cooled transformers in the PMTs will avoid potential oil spill concern. Oil cooled transformers, similar to those used by Ergon, would require the provision of secure bunding as part of the pontoon support system for potential oil spills. Private PMTs will require a suitably qualified electrical contractor to be appointed to undertake operation and maintenance of the PMTs. While failure of PMTs is not regular, as PMTs are manufactured to order, to ensure continuity of supply for the marina, a spare PMT should be held available to minimise any interruption to supply due to failure of a privately owned PMT.

###### b) 66kV Network

Ergon's existing 66kV network is remote from the site. Appendix 2 shows a plan of the existing Ergon 66kV near the site.

Ergon has indicated the existing Mount Rooper zone substation is near capacity and that to provide adequate capacity for the development the project will likely require either major upgrading thereof or construction of a new zone substation (66/11kV). Ergon will have to review options to be able to advise the effects of the development. The timing of constructions of the development will effect the timing of any works required by Ergon. The location of a possible new zone substation would be subject to future consideration. Should a zone substation be required, Ergon would most likely require a financial contribution by the developer toward its cost. Upgrading of an existing zone substation or construction of a new zone substation would take approximately 2 years from agreement of a site and for it to proceed to energisation.

Depending on the necessity and location of a new zone substation, the 66kV reticulation may not be required to be extended toward the site. Upgrading of the existing 66kV network may be necessary and could require heavier grade poles and/or overhead conductors.

At this time there is no indication Ergon will require any new feeder to the development site but it is noted the existing 11kV overhead route is not on an electricity alignment along a gazetted road. Connection of the development to the existing 11kV route will most likely require an easement between Proserpine Shute Harbour Road and the existing Ergon 11kV route along the north side of Proserpine Shute Harbour Road.

We have undertaken a site visit and confirmed also from Ergon maps that no empty conduits exist across Proserpine Shute Harbour Road. Connection of underground electricity supply across Proserpine Shute Harbour Road will be included as part of the major upgrading of Proserpine Shute Harbour Road which will be part of the development works.

*c) Site HV Network*

Ergon will require dedicated easements for Ergon assets on the development. Cable routes will be covered by a 3 metre wide easement and padmount sites may require an easement of up to 12m by 7.2m. Ergon requires padmount easements to be exclusive and that cable easements have no other services within them without prior written approval.

No other conflicts have been identified with other infrastructure or natural features.

### **3.1.2 Zone Substation**

If Ergon requires a new zone substation, it may be either an outdoor or indoor type. An outdoor substation will require a site not less than 78m by 66m. While an indoor substation requires a smaller area it is also more expensive than an outdoor type. We are awaiting further response by Ergon regarding the development.

*a) Visual Impact*

Minimal visual impact is anticipated for installation of an indoor zone substation and minimal cost would be required to reduce that impact, if required, through the provision of additional screening/fences and or additional landscaping.

*b) Noise Impact*

Minimal noise impact is anticipated. Equipment does emit a low audible hum, but sited next to a commercial development would not cause any disturbance. Noise control could be facilitated with minimal cost by use of with noise enclosures/landscaping, provision of low noise transformers or consideration of a slightly bigger site to gain additional distance.

*c) EMF*

As any zone substation would be an Ergon asset, we have sought Ergon's advice regarding EMF from any proposed zone substation and are awaiting their advice. We understand that the fields surrounding the substation and powerlines are only a small fraction of National Health and Medical Research Council (NHMRC) limits of exposure and are not considered a risk to the public or the environment.

*d) Conflicts with other assets*

The proposed substation site contains no easements over it (excluding electrical). Other infrastructure services (e.g. rising mains, etc) are required not to run along the substation front property boundary, although if not feasible, extra depth may be required to allow for cable ingress and egress.

*e) Other Environmental Studies*

Ergon are required to complete their own environmental studies as part of the planning of new substations.

### 3.1.3 Internal Reticulation

Whether the internal electricity reticulation and street-lighting be privately owned or an Ergon network, HV and LV underground cables will be required to be installed throughout the development. A number of 125mm conduits and PMTs will be required at intervals throughout the development. If the development is community titled, minimum 3 metre wide easements are required for Ergon electrical network assets within the community title area. Indicative numbers and locations of PMT's have been shown on Appendix 1.



*Photo 7: Example of a Padmount Transformer (PMT).*

Depending on customer loads a single PMT can supply up to 90 residential customers and is located on an easement of 3m by 2.8m. On sloping ground a slightly larger area would be required to accommodate retaining walls outside the easement.

Each PMT may require an earth grid. Should an earth grid be required for an Ergon PMT, the padmount easement would be 12m by 7.2m.

The HV reticulation to pontoon mounted PMTs would be privately owned and would be connected to an HV metering point on land. It is considered that HV reticulation cabling within the marina should be run underground to below each PMT and should rise to accommodate tidal variation and pontoon motion. An LV switchboard to control circuits to power outlets on bollards would be installed adjacent to each PMT. LV circuits could be installed below pontoon decking.

### 3.3 Telecommunications

Telstra are currently mandated to provide a copper cable telephone network, or PSTN, in all new freehold developments free of charge to the developer except for the cost of trenching and any possible civil headworks. Although the PSTN will be fully owned by Telstra, other service providers would be able to resell their services across it.

Telstra plans show adequate existing conduits and optic fibre cable available in the vicinity of the development. Telstra's adjacent existing assets include a fibre optic cable in conduit along the north side of and a copper cable in conduit along the south side of Proserpine Shute Harbour Rd connecting to a pillar at the boundary with the property east of the development site. The existing network is broadband data transmission enabled via ADSL technology. No additional conduits should be required but Telstra may need to upgrade mains cabling.

No environmental impacts are identified by providing telecommunications services to and reticulating through the Shute Harbour Marina Development.

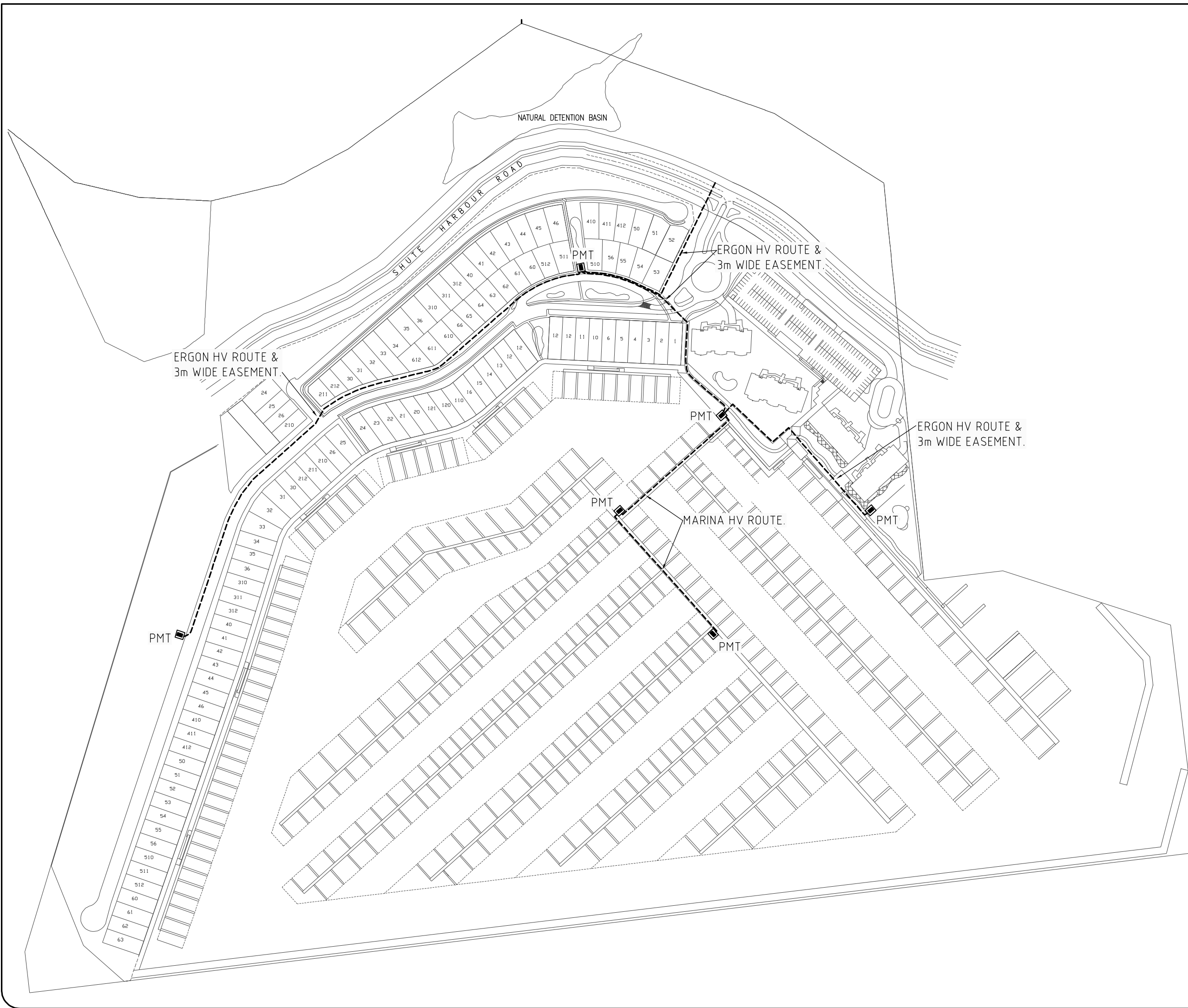


*Example of Telstra Pillar.*

The area should receive adequate mobile phone coverage from Telstra and Optus repeater stations as well as wireless data coverage from existing base stations. The area is also located within the Austar satellite digital pay TV footprint for pay TV services.

#### **4. ABBREVIATIONS**

A	Ampere (Unit of electric current)
ADMD	After Diversity Maximum Demand
CMEN	Common Multiple Earth Neutral
CoC	Certificate of Completion
CoS	Certificate of Supply
EMF	Electric and Magnetic Fields
HV	High Voltage – 11,000V + supply
kV	Kilovolt (1000 V)
kVA	Kilovolt-Amp (1000 VA – similar to kW 'Kilowatt' for power)
LV	Low Voltage – 415/240V supply
OH	Overhead
PMT	Padmount Transformer
RPEQ	Registered Professional Engineer Queensland
SL	Street-Light
UDC	Underground Distribution Construction
UG	Underground
URD	Urban Reticulation Development (incl UG, OH and SL)
V	Volt (Unit of electric potential)




**RETICULATION LEGEND**

EXISTING	PROPOSED	DESCRIPTION
< (   )	< (   )	STATION NUMBER
⏏	⏏	AIR BREAK SWITCH
⏏	⏏	DROPOUT FUSE / DISCONNECT LINKS
⏏	⏏	GROUND TRANSFORMER
⏏	⏏	POLE TRANSFORMER
⏏	⏏	URD PADMOUNT TRANSFORMER
⏏	⏏	SERVICE PILLAR
⏏	⏏	LINK PILLAR
⏏	⏏	EARTH
⏏	⏏	U/G JOINT
⏏	⏏	HV U/G POLE TERMINATION
⏏	⏏	LV U/G POLE TERMINATION
⏏	⏏	LV POLE / STREET LIGHT COLUMN
⏏	⏏	HV POLE
⏏	⏏	HV & LV POLE
⏏	⏏	POLE STAY
⏏	⏏	SERVICE LEAD-INS AND PHASE
⏏	⏏	ELECTRICAL CABLE IN CONDUIT
⏏	⏏	STREET LIGHT GENERAL SYMBOL
⏏	⏏	U/G MAINS / ELECTRICAL CONDUIT
⏏	⏏	O/H MAINS
⏏	⏏	U/G S/L MAINS / S/L CONDUIT
⏏	⏏	CAPPED CONDUIT/S
⏏	⏏	EXISTING U/G TELSTRA
⏏	⏏	EXISTING U/G GAS
⏏	⏏	EXISTING U/G STORMWATER
⏏	⏏	EXISTING U/G SEWERAGE
⏏	⏏	EXISTING U/G WATER
⏏	⏏	EXISTING KERB LINE

**DANGER**  
 BEFORE EXCAVATING CHECK FOR POWER CABLES AND GAS PIPES. ENSURE THAT YOU HAVE CALLED "1100 DIAL BEFORE YOU DIG" FOR ALL SERVICES LOCATIONS

DATE PLOTTED: 28 September, 2007 - 4:35pm



**lectel**  
 technology engineering solutions  
*switched on performance*

**CABOOLTURE**  
 11, 75 King St Q 4510  
 (PO Box 1658)  
 p 07 5431 6900  
 f 07 5431 6999

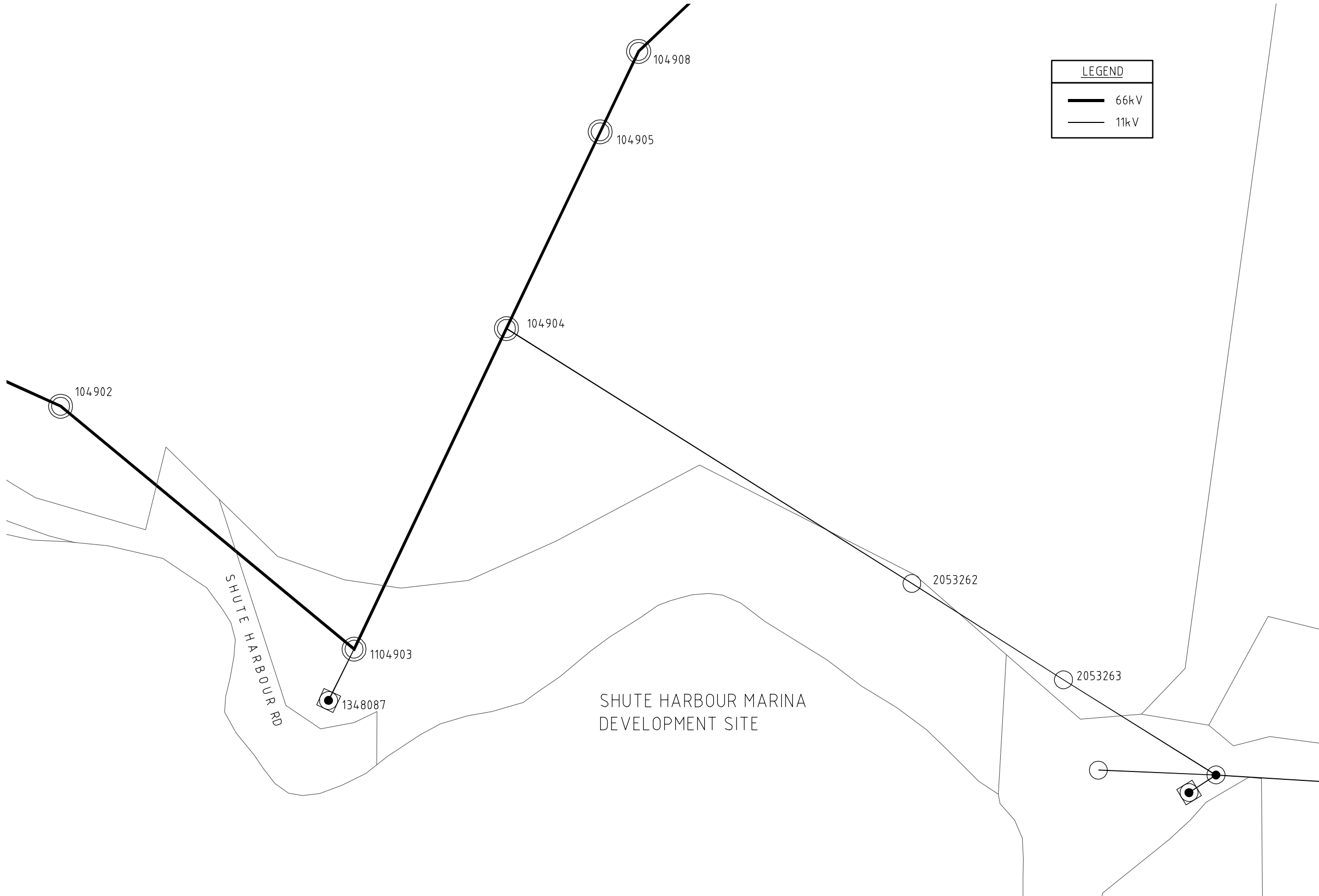
**UNDERWOOD**  
 TA, 130 Kingstons Rd Q 4119  
 p 07 3489 6900  
 f 07 3489 6999

abn 51 088 857 470

REV	DATE	REMARKS	SIGNED
A	28-09-07	HV CONCEPT ONLY	
DESIGNED		J. LUCHT	28-09-07
DRAFTED		D. CLARK	28-09-07
DRAFTING CHECK			
DESIGN REVIEW			

**HV CONCEPT PLAN**  
**SITE LAYOUT**  
**SHUTE HARBOUR MARINA**  
**SHUTE HARBOUR ROAD**

CLIENT	PORT BINNLI PTY LTD
CAD FILE	ENE50-25_CP1_RevA.DWG
ITEM	APPENDIX 1
DRAWING No.	ENE50-25_CP1
SHEET 1 OF 1	SCALE: 1:1000
REV A	A1



LEGEND	
	66kV
	11kV

RETICULATION LEGEND		
EXISTING	PROPOSED	DESCRIPTION
		STATION NUMBER
		AIR BREAK SWITCH
		DROPOUT FUSE / DISCONNECT LINKS
		GROUND TRANSFORMER
		POLE TRANSFORMER
		URD PADMOUNT TRANSFORMER
		SERVICE PILLAR
		LINK PILLAR
		EARTH
		U/G JOINT
		HV U/G POLE TERMINATION
		LV U/G POLE TERMINATION
		LV POLE / STREET LIGHT COLUMN
		HV POLE
		HV & LV POLE
		POLE STAY
		SERVICE LEAD-INS AND PHASE
		ELECTRICAL CABLE IN CONDUIT
		STREET LIGHT GENERAL SYMBOL
		U/G MAINS / ELECTRICAL CONDUIT
		O/H MAINS
		U/G S/L MAINS / S/L CONDUIT
		CAPPED CONDUIT/S
		EXISTING U/G TELSTRA
		EXISTING U/G GAS
		EXISTING U/G STORMWATER
		EXISTING U/G SEWERAGE
		EXISTING U/G WATER
		EXISTING KERB LINE

**DANGER**  
 BEFORE EXCAVATING CHECK FOR POWER CABLES AND GAS PIPES ENSURE THAT YOU HAVE CALLED "1100 DIAL BEFORE YOU DIG" FOR ALL SERVICES LOCATIONS

DATE PLOTTED: 28 September, 2007 - 5:12pm

**CARBOULTURE**  
 11, 75 King St Q 4510  
 (PO Box 1658)  
 p 07 5431 6900  
 f 07 5431 6999

**UNDERWOOD**  
 technology engineering solutions  
 TA, 130 Kingston Rd Q 4119  
 p 07 3489 6900  
 f 07 3489 6999

abn 51 088 857 470

REV	DATE	REMARKS	SIGNED
A	28-09-07	ERGON HV RETICULATION	
DESIGNED		J. LUCHT	28-09-07
DRAFTED		D. CLARK	28-09-07
DRAFTING CHECK			
DESIGN REVIEW			
APPROVED			

**EXISTING ERGON 66 & 11kV RETICULATION LAYOUT AJACENT TO SHUTE HARBOUR MARINA SHUTE HARBOUR**

CLIENT	PORT BINNLI PTY LTD		
CAD FILE	ENE50-25_ER1_RevA.DWG		
ITEM	APPENDIX 2		
DRAWING No.	ENE50-25_ER1	SHEET 1 OF 1	REV A
		SCALE: 1:1000	A1

BASED ON SMALLWORLD CAPTURE AT 28-09-2007



## Appendix 3

### Contact Details

Service Provider	Phone	Web
Dept of Communications, Information Technology & the Arts	02 6271 1000	<a href="http://www.dcita.gov.au/tel">www.dcita.gov.au/tel</a>
Ergon	131 046	<a href="http://www.energex.com.au">www.energex.com.au</a>
Lectel	07 5431 6900	<a href="http://www.lectel.com.au">www.lectel.com.au</a>
Telecommunications Industry Ombudsman	1800 062 058	<a href="http://www.tio.com.au">www.tio.com.au</a>
Telstra – Smart Community	07 3221 1296	<a href="http://www.telstrasmartcommunity.com">www.telstrasmartcommunity.com</a>

## Appendix 4

### EMF (Electric & Magnetic Fields) Information

Electric and magnetic fields (EMF) are produced wherever electricity or electrical equipment is in use, including overhead and underground cables.

Anything with electric current flowing through produces EMF, such as powerlines running from the street to your home, the home wiring system, electrical appliances and especially high voltage distribution lines. Magnetic fields associated with powerlines depend on the amount of current flowing along the line and the distance from the line. Fields rapidly decrease in strength with distance, therefore inside a house, magnetic fields from nearby powerlines is usually similar to that from wiring and appliances.

The following table shows typical magnetic field strengths from a number of common sources, including powerlines. Fields are measured in a unit 'milligauss'. To give you an idea of the relative strengths of EMF, the following guide shows the typical magnetic fields from appliances and under powerlines.

Common sources of EMF	Typical measurement (in Milligauss)	Range of measurements (in Milligauss)
Personal Computer *	5	2-20
Television *	1	0.2-2
Electric Blanket *	20	5-30
Hair Dryer *	25	10-70
Distribution Power Lines (under line)	10	2-20
Distribution Power Lines (8m away)	2	0.4-4
33 kV UG cables (directly above buried cable)	12 (1m above ground)	3 (4m away)
Pad mounted distribution transformer	2 (at 5m)	1-20 (10m to close up)
Major zone substation	2 (at fence)	1-6 (at fence)
"Modular" substation	1.5 (at fence)	0.5-3 (at fence)
Transmission Power Lines (under line)	20	10-200
Transmission Power Lines (at edge of easement)	10	2-50

(\* Note: Appliance measurements taken at normal user distance)

The table above is based on a consistent set of measurements undertaken by power authorities in Australia, using similar techniques and protocols to overseas measurements.

The National Health and Medical Research Council (NHMRC) guidelines recommend the following limits of exposure:

- Public exposure to magnetic fields of 1000 milligauss continuous or 10000 milligauss for up to 2 hours/day
- Occupational exposure to magnetic fields of 5000 milligauss (for a working day) or 50000 milligauss for up to 2 hours/day
- Public exposure to electric fields 5 kV/m continuous or 10 kV/m for up to 2 hours/day
- Occupational exposure to electric fields 10 kV/m for a working day or 30 kV/m for 2 hours/day

Further information is available from the websites:

Electricity Networks Associations <http://www.ena.asn.au/>