Zone Substation – Royal North Shore Hospital

Prepared for NSW Health

NSW HEALTH

in conjunction with Energy Australia

EnergyAustralia® We're on it

By Urban Planning Outcomes Pty Ltd
PO Box 787
Matraville NSW 2036

Zone Substation at Royal North Shore Hospital Environmental Assessment Report

Contents

Appendices

Executive Summary

On 30th January 2008, the Director General of the Department of Planning, as the Minister's delegate, formed the opinion that the Royal North Shore Hospital Zone Substation proposal is a major project under the terms of the State Environmental Planning Policy - Major Projects (Major Projects SEPP) and Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Director General's Environmental Assessment Requirements (DGEARs) were issued on the same date. This Environmental Assessment Report details the proposed Zone Substation to be located within the grounds of the Royal North Shore Hospital at St Leonards and assesses its environmental impacts in terms of the DGEARs attached in Appendix A.

In April 2007, the Minister for Planning approved a Concept Plan for the redevelopment of the Royal North Shore Hospital site to allow for the construction of a new acute hospital, community health services, commercial, retail and residential development. The approval also allowed for the demolition and preparatory work to ground level on the site, without further approval.

The Concept Plan showed the indicative location of a new Zone Substation to supply the necessary energy requirements for the new hospital and future development. This application is for the construction and operation of that substation. It aims to:

- Provide the RNSH site with a reliable power supply that is sufficient for the efficient functioning of the new acute hospital and the surrounding development proposed by the approved Concept Plan for the site;
- Adequately accommodate and protect the associated electrical equipment;
- Provide a safe and comfortable working environment for all users;
- Operate effectively for a 50 year life cycle;
- Require minimal maintenance;
- Have an appropriate level of security to protect infrastructure, staff and members of the public;
- Have appropriate access for equipment installation, maintenance and replacement particularly with regard to Live Substations;
- Comply with all relevant EnergyAustralia Network Standards;
- Comply with the requirements of the Building Code of Australia (BCA) where appropriate and relevant Australian Standards;
- Minimise impact on the environment; and
- Be acceptable to the local community and approval authorities.

The proposed building will house the indoor 11kV switchgear, control room, battery rooms, cable basement, communication room, stairs and staff amenities. The substation is designed to have underground 132kV cables enter the site, and then connect to two (2) separate transformers which convert the 132kV voltage to 11kV. The transformers are connected to indoor switchgear that is located in the Switch Room via underground cables. The indoor switchgear allows the 11kV voltage to be safely isolated and also provides reticulation of the electricity to multiple underground cables which finally exit the substation site. These 11kV underground cables will supply power to the hospital site with some level of interconnection to the existing EnergyAustralia network in the area. The use of underground cables, wherever possible, also minimises the visual impact on the surrounding area.

The proposal also involves the construction and use of new access off Westbourne Street and parking for construction and maintenance and new landscaping for visual amenity.

EnergyAustralia has concerns for environmental sustainability, including reduced energy and natural resource consumption over the life time of the building, and this has been addressed through incorporation of natural ventilation systems, improved thermal mass and roof insulation and selection of high quality durable low maintenance and long life construction materials.

NSW Health is working with EnergyAustralia to achieve a project outcome, in harmony with the existing and proposed environment. This will take into consideration the access needs of all parties, and to this end have initiated special measures within the design as can be seen in the architectural drawings.

The proposal for the Zone Substation has a Capital Investment Value of approximately $17.6 million. The new substation is required to ensure that the new acute hospital and surrounding development have sufficient uninterrupted supply of power for the functioning of the hospital. Construction works are proposed to commence mid 2009. The project completion date is anticipated to be early 2011.

The Royal North Shore Hospital Zone Substation has been designed to be sympathetic to the amenity of the locality. Specifically, the built form responds to the nature of the surrounding buildings and specific design features put in place to limit EMF levels and operational noise. The proposal is consistent with existing approvals for the site and addresses the principles of ecologically sustainable development. Parking and access to the site and the proposals impact on the surrounding area have been investigated with measures adopted to minimise these impacts. While these mitigation measures increased the project costs, the result is a better environmental and social outcome.

It is considered the potential environmental impacts can be adequately mitigated by implementation of the measures outlined in the report and the Statements of Commitment. On that basis the proposal is unlikely to have a significant affect on the environment and we look forward to the Minister's favourable consideration.

1. Introduction

The following Environmental Assessment report is structured as follows:

1. Introduction	This section provides an overview of the project and relevant background.
2. Site Analysis	This section provides details of the existing site.
3. The Project	This section provides an overview of the proposal.
4. Heads of Consideration	This section responds to the Director General's Requirements in terms of the Key Issues raised.
5. Environmental Assessment	This section provides an assessment of the Environmental Impacts of the proposal and mitigation measures adopted.
6. Draft Statement of Commitments	This section contains a Draft Statement of Commitments.
7. Conclusion	This summarises the key issues and provides a recommendation to approve the Project as outlined within the report.

1.1 Background

In April 2007, the Minister for Planning approved a Concept Plan for the redevelopment of the Royal North Shore Hospital site to allow for the construction of a new acute hospital, community health services, commercial, retail and residential development. The approval also allowed for the demolition and preparatory work to ground level on the site, without further approval.

The Concept Plan showed the indicative location of a new Zone Substation to supply the necessary energy requirements for the new hospital and future development.

In late 2006 the Minister for Planning declared development undertaken on the Royal North Shore Hospital site as being Critical Infrastructure as defined under Part 3A of the *Environmental Planning and Assessment Act 1979* (as amended). As a result the development of the Zone Substation on the site is deemed to be Critical Infrastructure and requires the Minister for Planning's approval.

Director-Generals Environmental Assessment Requirements for this project were issued on 30th January 2008. This report addresses those requirements and seeks a Project Approval for the following:

- Construction of a Zone Substation at Royal North Shore Hospital;
- Excavation and tree removal to facilitate the Zone Substation; and
- Subdivision following the construction of the Zone Substation.

1.2 Aims and Objectives

The aims and objectives of the development are to:

- Provide the RNSH site with a reliable power supply that is sufficient for the efficient functioning of the new acute hospital and the surrounding development proposed by the approved Concept Plan for the site;
- Adequately accommodate and protect the associated electrical equipment;
- Provide a safe and comfortable working environment for all users;
- Operate effectively for a 50 year life cycle;
- Require minimal maintenance;
- Have an appropriate level of security to protect infrastructure, staff and members of the public;
- Have appropriate access for equipment installation, maintenance and replacement particularly with regard to Live Substations;
- Comply with all relevant EnergyAustralia Network Standards;
- Comply with the requirements of the Building Code of Australia (BCA) where appropriate and relevant Australian Standards;
- Minimise impact on the environment; and
- Be acceptable to the local community and approval authorities.

1.3 The Project Team

The team for this redevelopment project is:

Company	**Name**	**Role**
Energy Australia	Phil Gates	Manager - Major Projects Development North
Energy Australia	Steve Nash	Project Manager
Acor Consultants	Greg Haggett	Hydraulic
Acor Consultants	Chris Rowse	Structural/Civil
Brewster Murray	Tim McNamara	Architect
Currie Brown	Dan Brown	Quantity Survey
Tramonte Jenson	Joseph Tramonte	Landscape
TTW	Stephen Brain	Traffic and Access
Urban Planning Outcomes	Leoné McEntee	Planner

1.4 Compliance with Director Generals Requirements

Table 1 following outlines how the Project Application addresses the Director General's Environmental Assessment Requirements which are appended at Appendix A.

Table 1

Issue	Location
An Executive Summary.	Page 1
A description of the proposal and description of adjoining sites;	Section 3
Consideration of any relevant statutory provisions; a) overview of other environmental issues and any relevant provisions arising from environmental planning instruments; b) a detailed assessment of the key issues specified below, which includes: ▪ an assessment of the potential impacts of the project; ▪ a description of the measures that would be implemented to avoid, minimise, mitigate, offset, manage, and/or monitor the impacts of the project; c) a draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures d) a conclusion justifying the project, taking into consideration the environmental impacts of the proposal, the suitability of the site, and whether or not the project is in the public interest e) a signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false nor misleading	Section 5 Section 5 Section 6 Section 7 Page 7
Part A – Heads of Consideration - Suitability of the site; - Likely environmental, social and economic impacts; - The public interest	Sections 4.1; 4.2 and 4.3
Part B – Relevant EPIs and approved Concept Plan Planning provisions applying to the site	Section 5
Part C – Environmental Assessment	
Built form: - Provide details of the height, bulk and scale of the proposed works, and the visual impact of the proposed works on the RNSH site and adjoining properties. - Materials and finishes, and roof treatments to be detailed	Section 3.2; Section 5.1; Appendix D and Appendix H
Access and Parking: - Provide an assessment of the vehicular and pedestrian access to the site and any parking arrangements. - Detail traffic management during construction. As the proposed substation is on an existing parking area, address the reduction in on-site parking on the RNSH site.	Section 3.3; Section 5.2 and Appendix E

Landscaping: - Detail proposed landscaping works; Address impacts of construction work on any existing vegetation	Section 3.4; Section 5.3; Appendix F and Appendix G
Stormwater: Detail stormwater management	Section 5.4 and Appendix J
Electro-magnetic radiation: Address potential electro-magnetic radiation impacts.	Section 5.5 and Appendix L
Noise and Odour: Address noise and odour emissions that may be generated from the operation of the substation	Section 5.6 and Appendix M
Ecologically Sustainable Development: Detail any proposed measures for reduction of water and energy usage, usage of raw materials and waste production	Section 5.7
Other approvals: - Consistency with the Concept Plan for RNSH (MP 06_0051) approved on 13 April 2007, including landscaping and parking. - Address how the proposed works relate to other approvals issued or under consideration by Willoughby City Council including: - DA 2006/165 for stage 3 of the Royal North Shore Private Hospital; - DA 2007/142 for alterations to 'The Cottage' breast screen facility	Section 4.5 and Section 5.9
Part D - Statement of Commitments The Environmental Assessment for the project application must include the following: - Proposed mitigation and management of residual impacts; and - A draft Statement of Commitments detailing measures for environmental management and mitigation measures and monitoring for the project. Issues are to include stormwater management, construction impacts (including traffic and landscape management), waste generation and collection and mitigation of amenity impacts from construction activities etc.	Section 6
Architectural drawings and diagrams of your proposal:	
Existing site survey plan (in the vicinity of the substation) showing the location of all existing structures on site, existing rights of way and significant vegetation	Appendix B
Proposed site plan	Appendix D
Architectural drawings to be drawn to scale and include elevations and proposed materials and finishes	Appendix D and Appendix H
Landscaping plan	Appendix G

1.5 Statement of Validity

Submission of Environmental Assessment	
Prepared under Part 3A of the *Environmental Planning and Assessment Act 1979*	
Environmental Assessment prepared by	
Name:	Leoné McEntee
Qualifications:	BA (Geog), Grad Diploma Urban and Regional Planning, Grad Diploma Natural Resources Law
Address:	UPO Pty Ltd PO Box 787 Matraville NSW 2036
In respect of:	Zone Substation Royal North Shore Hospital
Applicant & Land Details	
Applicant name	Health Administration Corporation on behalf of Health Infrastructure
Applicant Address	PO Box1770 Chatswood NSW 2057
Land to be developed	Royal North Shore Hospital site
Lot & DP	Lots 21 and 22 DP 863329 and Lot 102 DP 1075748
Environmental Assessment	An environmental assessment is attached
Statement of Validity	I certify that I have prepared the contents of the environmental assessment in accordance with the Director Generals Environmental Assessment Requirements dated 30th January 2008, and that to the best of my knowledge, the information contained in the environmental assessment is neither false nor misleading.
Signature	
Date	4 December 2008

2. Site Analysis

2.1 The Site

The Royal North Shore Hospital site is legally known as Lot 21 and Lot 22 DP 863329 and Lot 102 DP 1075748 (see Figure 1 below). The approximately **3088** sqm site proposed for the Zone Substation is located within the Hospital site and is currently occupied by "The Cottage" Breast screen facility and the Animal House in Building 44. The land is within Willoughby Local Government Area.

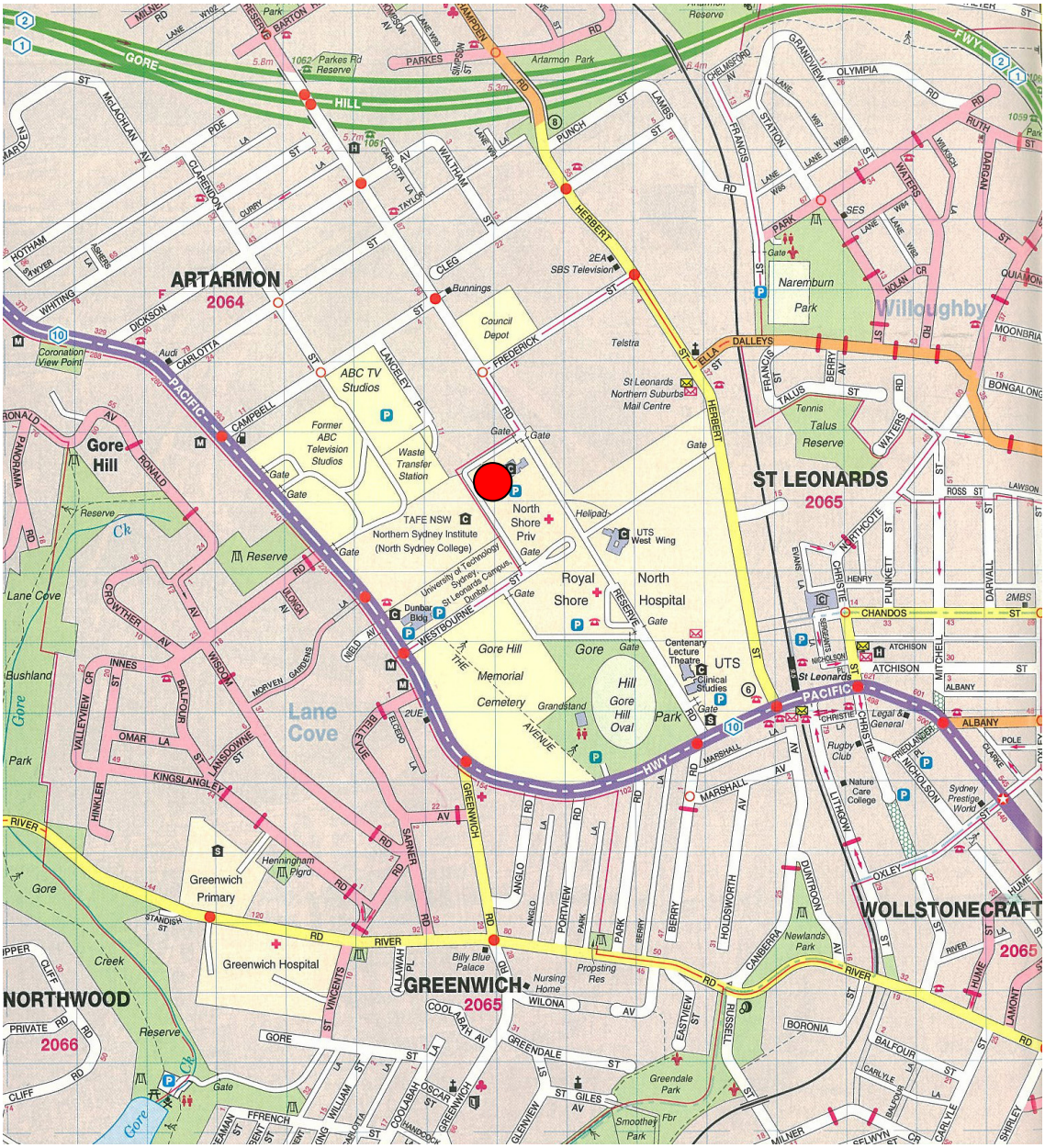

Figure 1 Site Location

2.2 Zoning and Ownership

The site is zoned 5(a) Special Uses "A" under Willoughby Local Environmental Plan 1995 and "utility installations" are permissible with consent. The Health Administration Corporation (HAC) is the owner of the land and following construction the land will be subdivided and the substation site transferred to Energy Australia. An indicative subdivision plan is attached at Appendix N.

2.3 Easements and Restrictions

The site contains the following easements and restrictions as shown on the existing site survey at Appendix B:

1. An easement for gas pipeline, which will be relocated off the site as part of the subdivision.
2. A Right of Way for pedestrian access by the Private Hospital over the Royal North Shore Hospital land.

Neither of these easements will impact on the proposed development. Easements required for the proposal are shown indicatively at Appendix N.

2.4 Urban Character

The site is situated at the rear of the North Shore Private Hospital and adjacent to the TAFE car park. Specifically the adjoining development consists of:

- To South, RNS Private Hospital, with Stage 3 plans to expand toward the Substation site.
- To the West, Gore Hill TAFE Campus building complex.
- To the East, RNS Multi-storey Parking Station which has an additional storey approved.
- To the North, a parking area with the St. Leonards industrial area beyond.

The character of the area is highly built up and in many respects industrial in nature. There is no "streetscape" as such as the following photos indicate.

Figure 2 Buildings surrounding the site

2.5 Access

Access to the site currently is via the hospital grounds. Road access to car parking is via Westbourne Street and Reserve Road.

2.6 Geology and Landform

2.6.1 Geology

Douglas Partners were engaged by EnergyAustralia to conduct some preliminary testing on site and a copy of their report it attached at Appendix C. The field work for the investigation comprised the drilling of five boreholes, in-situ testing, sampling of the soils and coring of the underlying bedrock. Laboratory testing of selected soil and rock core samples was undertaken, followed by engineering analysis and reporting. This investigation also included a review of previous geotechnical investigations and assessments carried out by Douglas Partners Pty Ltd (DP) in close proximity to the site. The previous work includes a geotechnical investigation for proposed extensions to the North Shore Private Hospital (to the south of the site) and geotechnical assessments of the excavation faces around the former quarry to the north of the site.

Reference to the Sydney 1:100 000 Series Geological Sheet indicates the site is underlain by Ashfield Shale which typically comprises black to dark grey shale and laminite (interbedded shale, siltstone and fine grained sandstone). Near the ground surface these rocks often weather to form moderate to highly reactive clays. The geological mapping was confirmed by the field work which identified residual soils and underlying shale and laminite.

Further information in respect to the results of the investigations is provided in Section 5.8 and Appendix C.

2.6.2 Landform

The site is located on a gentle north-facing slope near the top of a local topographic high. Within the site, the surface generally falls to the north from approximately RL 98.0 to RL 93.0, relative to Australian Height Datum (AHD), at an average slope of approximately 5 degrees. Significant excavation has previously been carried out on the former quarry to the north of the site with near-vertical excavations to depths of approximately 15 m to 25 m (to about RL 72).

2.7 Existing Development

The site proposed for the EnergyAustralia Zone Substation is currently occupied by “The Cottage” Breast Screen facility and the Animal House (Building 44). Both these buildings are proposed for demolition in accordance with the existing Concept Plan for the Royal North Shore Hospital site. Occupants of these buildings will be decanted into alternative accommodation pending the delivery of the acute hospital and the completion of the Research and Education Building which will house the new animal facilities. This is likely to occur by the end of 2008.

Figure 3 Existing Development - Aerial View

Figure 4 "The Cottage"

Major Project Approval 06_0051 for the Royal North Shore Hospital Concept Plan also gave authority for the demolition and preparatory works to ground level on the entire Royal North Shore Hospital site, subject to conditions, pursuant to 75P(1)(c) of the *Environmental Planning and Assessment Act 1979*. This work does not require further environmental assessment.

However Part C of the above application requires that separate approval be sought for tree removal and for excavation to allow further development. ***Approval for both tree removal and excavation is sought as part of this application***.

2.8 Site Contamination

A Preliminary Contamination Report was prepared by Coffey Geosciences for submission with the Concept Plan for Royal North Shore however the area to the west of Reserve Road was not specifically studied as part of that work.

3. The Project

3.1 Introduction

The proposal involves the construction and operation of a new electrical zone substation at Royal North Shore Hospital to provide the appropriate upgrade of power for the new hospital and surrounding precincts. The works include the construction of a new building (switch and control rooms etc), installation of transformers and associated civil and electrical infrastructure.

The proposal also involves the construction and use of new access off Westbourne Street and parking for construction and maintenance and new landscaping for visual amenity.

The proposal for the Zone Substation has a Capital Investment Value of approximately $17.6 million, with a further investment in the vicinity of $5.1 million for new underground cables to supply the surrounding electricity network[1]. The works are expected to be complete by early 2011. Photo montages of the proposal are shown in Figures 5 and 6 below. The new substation is required to ensure that the new acute hospital and surrounding development have sufficient uninterrupted supply of power for the functioning of the hospital.

Figure 5 View from South

[1] Underground cable works are not part of this project application

Figure 6 View from West

The associated 132kV and 11kV cables will be laid by EnergyAustralia in surrounding streets and eventually connected to the Willoughby Sub Transmission Substation. As these are not within the site, they are subject to a separate environmental assessment and approval under Part 5 of the *Environmental Planning and Assessment Act 1979.*

3.2 Building Design

3.2.1 Operational Design

The proposed building will house the indoor 11kV switchgear, control room, battery rooms, cable basement, communication room, stairs and staff amenities.

The Royal North Shore Hospital Zone Substation is designed to have underground 132kV cables enter the site, and then connect to two (2) separate transformers which convert the 132kV voltage to 11kV. The transformers are connected to indoor switchgear that is located in the Switch Room via underground cables. The indoor switchgear allows the 11kV voltage to be safely isolated and also provides reticulation of the electricity to multiple underground cables which finally exit the substation site. These 11kV underground cables will supply power to the hospital site with some level of interconnection to the existing EnergyAustralia network in the area. The use of underground cables, wherever possible, also minimises the visual impact on the surrounding area.

The positioning of equipment aims to

- Allow connection of the necessary components;
- Avoid shadowing on nearby buildings;
- Minimise any Electric and Magnetic Fields (EMF) of impact to the hospital building (even though the substation will readily meet current Australian and International Health Guidelines and standards for public exposure);

- Provide EnergyAustralia's substation operators with a safe and reliable means of controlling and checking the operation of substation; and
- Prevent access to members of the public to the substation site through the use of security fences and walls.

The design is in accordance with EnergyAustralia's Network Standards and was developed in response to the site constraints. The layout has been designed to minimise both urban and environmental impacts to the surrounding properties, particularly the Royal North Shore Private Hospital, whilst meeting operational needs.

3.2.2 Architectural Design

The vision for the Royal North Shore Hospital substation development is to create a high quality architectural and urban design response utilising contemporary architectural forms, high quality materials and best practice environmentally sensitive design solutions.

Responding to the unique local circumstances including the surrounding, health and educational built environment, the development integrates materials and colours that respect those of the existing surrounding buildings.

EnergyAustralia has concerns for environmental sustainability, including reduced energy and natural resource consumption over the life time of the building, and this has been addressed through incorporation of natural ventilation systems, improved thermal mass and roof insulation and selection of high quality durable low maintenance and long life construction materials.

NSW Health is working with EnergyAustralia to achieve a project outcome, in harmony with the existing and proposed environment. This will take into consideration the access needs of all parties, and to this end have initiated special measures within the design as can be seen in the architectural drawings in Appendix D.

3.2.3 Proposed Building Footprint and Associated Areas to be developed

The proposed building areas are approximately as follows:

- Cable Marshalling Area (basement) = 167 sqm
- Ground Level Area (excluding external landings) = 411 sqm
- Dock area = 90 sqm
- Transformer Roadway =335 sqm
- Transformer Bays = 292 sqm
- Landscaped area = 1105 sqm

3.2.4 Transformers and Transformer Bays

The proposal will include two (2) transformer bays on the north western boundary and a switchroom and control room building located on the north eastern side of the site, closest to the existing single level car park. The transformer roadway will be on the southern side of the transformer bays and switchroom building. A service access driveway (shared Right of Way) will be located off Westbourne Street with provision for two car parking spaces at the front of the substation site.

Each bay will house one 132kV/11kV, 37.5 MVA oil filled transformer. The transformers installed will be a low noise type (manufacturers guaranteed sound power level 68dB(A)). The transformer bays will have walls extending around the rear and sides to a maximum height of 8.5 metres. These walls provide protection of people and assets in the event of a fault and acoustic damping.

An oil containment system will be integrated into the transformer bays to capture oil from the transformer bunded areas in the event of a leak or spill of transformer oil. The transformer bunds will be constructed to comply with AS 1940 - The Storage and Handling of Flammable and Combustible Liquids, AS 3600 - Concrete Structures and AS 3735 - Liquid Retaining Structures. The construction and operation of the oil containment system will be in accordance with EnergyAustralia's Network Standards.

Parallel Plate Separators (PPS) shall be used with closed drainage oil containment systems that rely on bund storage. The PPS shall be correctly installed and fully commissioned on site followed by ongoing maintenance to ensure effective long term operation of the system.

3.2.5 Fencing and security

The substation will be secured in accordance with EnergyAustralia's Protective Security Manual which is based on relevant Australian and Industry Standards.

In order to establish effective physical security, a "defence in depth" concept has been applied, establishing an equally weighted and layered protective security system which offers reliable protection against the assessed threats and risks.

The security system on site includes physical barriers such as fences and locks, and also psychological barriers such as warning signs and electronic security measures.

The proposal includes two types of fence to minimise the risk of unauthorised access to the site. A palisade style fence (2.1 metres high) will be installed on the substation boundary to restrict access to the site, whilst maintaining the appearance of the site. A standard EnergyAustralia intruder-resistant security fence, three (3) metres high of weldmesh construction and topped with barbed wire stranding, will be installed within the substation site to mitigate the risk of unauthorised access to live substation equipment, and forming the main security barrier in combination with the substation buildings.

A number of gates are also proposed for vehicle and pedestrian access. These include one double leaf vehicle access gate, and one pedestrian access gate located on the substation boundary to the Westbourne Street right of way. Fencing has been designed to be compatible with the surrounding development and to avoid interference with existing escape routes from the adjoining car park site. Fencing has been located to minimise the security risks which are inherent to the site due to the proximity to adjoining structures. The proposed layout of fencing for the site is shown in drawings located in Appendix D.

Figure 7 Typical Security Fencing

An electronic security system shall be installed for the substation in accordance with EnergyAustralia's Protective Security Standard – Electronic Security Systems. The system will consist of a Security Alarm System (SAS) and an Electronic Access Control System (EACS).

The Rights of Way from Westbourne Street and Reserve Road are currently secured by boom gates. Following construction of the substation, the boom gate in Westbourne Street will be relocated to allow access for large vehicles. The existing security card access on the boom gate will be modified to operate in parallel with EnergyAustralia's EACS to allow access by staff for operations.

Closed Circuit Television (CCTV) cameras may be installed within the fenced area of the property. The requirement for the cameras will be determined by EnergyAustralia's internal security guidelines (Refer Statement of Commitments in Section 6).

3.2.6 Lighting

Lighting will be provided on the external walls of the substation building and within the transformer enclosures. These lights will be used during maintenance of equipment, or for other essential operational reasons. Lighting will generally be directed away from surrounding buildings.

No external building lighting will be on at night unless a security issue arises sometime after commissioning of the substation and the need is instigated by EnergyAustralia security group. However, external lights may need to be utilised during infrequent night visits by an operator or emergency staff for repair of equipment.

Internal lighting illumination levels may also be higher than BCA requirements due to operational needs as specified in EnergyAustralia guidelines.

3.2.7 Signage

During construction, signage will be displayed in accordance with Occupational, Health and Safety Regulations for construction sites. This will include Danger signs and Protective Equipment signs. The installation of safety signage will be outlined in the Project Safety Management Plan.

Contact information for the project will be displayed on the site fencing for the duration of the construction period to facilitate feedback to EnergyAustralia, and resolution of stakeholder issues. A sample of this signage is shown in Figure 8.

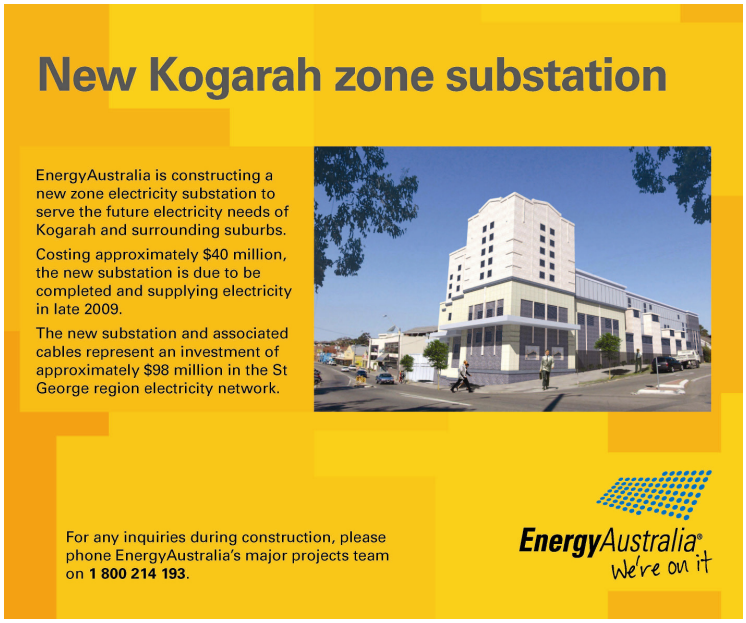

Figure 8 Sample Construction Contact Signage

For operation, signage will be installed in accordance with EnergyAustralia's Network Standard. Statutory building signage shall be provided to ensure compliance with the relevant legislation, Australian Standards, ENA Standards and Guidelines, the BCA or other statutory authority requirements.

Signage will be placed on the switchyard fence and includes standard signs such as "High Voltage – Keep Out", "Authorised Personnel Only", "Trespassers will be Prosecuted". Figure 9 shows this type of signage.

Figure 9 Sample Operational Signage

3.3 Access

3.3.1 Traffic Access

During construction, access to the site will be via both a Right of Way (ROW) to Westbourne Street over TAFE land and via a ROW off Reserve Road under the existing multistorey car park. EnergyAustralia will be granted an exclusive licence for this right of way during the construction period.

Delivery and removal of transformers to and from the site will be via the negotiated ROW referred to above to Westbourne St connecting to the substation transformer driveway. Transformers are large units in excess of 30 tonnes and are required to be delivered by large specially configured vehicles. A traffic management plan for the delivery of transformers and other major pieces of equipment will be established with the delivery contractor.

Delivery of a transformer would only occur during the construction of the substation, at the end of the equipment life span (approximately 50years) or as a result of equipment failure. These events would be undertaken in accordance with RTA controls.

The substation is unmanned and therefore creates no traffic impacts during operation. Access to the site for maintenance and in the case of an emergency will be via Reserve Road. An Access and Traffic Report prepared by Taylor Thomson Whitting (NSW) Pty is at Appendix E.

3.3.2 Parking

The substation will have provision for two (2) car parking spaces. These will be located adjacent to the substation with access via Westbourne Street. Drawings showing parking arrangements are part of the set at Appendix D.

During construction vehicles will park either within an area provided by NSW Health on the hospital site or within the substation staging area to the south of the substation site.

During operation, small vehicles such as technician and operator's vans will park within the allocated parking spaces at the front of the site. Larger vehicles such as trucks will park within the substation transformer roadway so as to not cause obstruction to the Westbourne Street ROW or parking for TAFE.

3.3.3 Access for the disabled

The inherent design of a substation restricts disabled access due to the nature of the substation function. Access is limited due to fixed obstructions and design features that are necessary within the substation.

3.4 Landscaping

3.4.1 Tree Removal

An Aborist's report was commissioned to determine the impact of the proposed development on the existing trees. The full report is attached at Appendix F. The intention of this assessment was to determine the incursions to the root zone and canopies created by the proposed development and evaluate the likely impact of the proposed works on the trees.

The proposed development will necessitate the removal of nine (9) trees of low and very low retention value. An additional five (5) trees of moderate retention value are also being removed.

Four (4) trees of high retention value are also proposed to be removed. These include Tree 24 (River Oak), Trees 25 & 31 (both Eucalypts) and Tree 30 (Forest Red Gum). Given the nature of the proposed development, there are no feasible alternatives that can be implemented that would permit the retention of these trees.

3.4.2 New Landscaping

The site is surrounded by walls of the operational hospital and TAFE buildings, the North Shore Private Hospital, the multi-story and ground level car parking, and is not visually prominent within its environs. Scattered trees adjacent to these areas soften the interface between this site and the adjacent activities, and as such mass screen planting is not assessed as essential to this site.

A detailed Landscape Plan is attached at Appendix G. Species selected are:
Leptopsermum polygalifolium 'pacific beauty' (Dwarf Tea Tree)
Dianella 'Little Jess' (Dwarf Dianella)
Lomandra 'tanika' (Dwarf Lomandra).

These species have been selected to minimise maintenance and water use and to provide appropriate screening to the infrastructure.

3.5 Resource Management

3.5.1 During Construction

The waste generated from the proposed development, as a result of the demolition, excavation and construction phase, will be consistent with developments of a similar size and nature and consist predominately of demolition and excavation waste spoil. Any excavated material from the site that can not be used for backfilling will be disposed of at an appropriate landfill. Soil which is required to be disposed of will we be assessed and classified against the guideline values presented in the EPA NSW (1999) *Environmental Guidelines, Assessment, Classification and Management of Liquid and Non-Liquid Wastes* before being transported and disposed of to a suitably licensed waste treatment facility.

A Waste Management Plan for the construction phase will be prepared prior to works commencing. Applications for disposal of demolition and construction waste materials will be made separately by the appointed contractor.

The construction contractor will be required to comply with EnergyAustralia's Waste Reduction and Purchasing Plan (WRAPP) which requires that where practicable, all attempts must be made to minimise, reuse and recycle building waste. In particular, each of the following issues must be addressed, and the methods for complying with these requirements described:

- Avoiding the generation of waste;
- Separation of generated wastes for re-use or recycling;
- Purchase of low-waste products and products with recycled content, wherever these are technically suitable and cost- and performance-competitive;
- Selling and reusing excess construction material, where practicable and cost-effective;

- Keeping excavation activities and disturbance of the existing environment to a minimum to avoid the generation of waste; and

In addressing these issues, the Contractor shall ensure compliance with best practice measures described in the Environment Protection Authority's Construction & Demolition Waste Action Plan (Nov. 1998), and any relevant local government codes.

All non-recyclable or reusable waste will be disposed of off-site at the appropriate waste disposal facility. The location for recycled and disposable waste facilities will be determined by the appointed Building Contractor.

3.5.2 During Operation

Once constructed, the substation will be a low maintenance facility. There will be no staff working permanently from the substation; however, staff will be required to attend the site to perform routine maintenance on a regular basis.

Maintenance of the substation will cause the production of wastes such as oils, cable off cuts, scrap metal etc. These wastes will be dealt with in accordance with EnergyAustralia's WRAPP.

3.5.3 Waste Reduction and Purchasing Policy

The Waste Reduction and Purchasing Policy is a NSW government initiative to which EnergyAustralia and its contractors have to adhere. The aim of the policy is to encourage waste reduction, reuse and recycling and the purchase of products with recycled content.

As part of the Waste Reduction and Purchasing Policy EnergyAustralia has prepared a WRAPP, which was endorsed by the Managing Director and submitted to the EPA in July 2001.

3.6 Timing/ scheduling

Construction works are proposed to commence mid 2009. The project completion date is anticipated to be early 2011.
The project will be scheduled with the following works phases:

- Excavation and Civil Construction commencing July 2009.
- Electrical Equipping by May 2010.
- Practical completion by March 2011.

3.7 Operational and Maintenance Activities

Once constructed, the substation will be a low maintenance facility. There will be no staff working permanently from the substation; however, staff will be required to attend the site to perform maintenance and repair activities as required. Ongoing property maintenance will include activities such as periodic cleaning of the substation to remove dust build up from equipment, landscape maintenance and stormwater system maintenance.

It would be expected that, on average, a crew of two (2) to three (3) people would be in attendance at the substation approximately one day in every four weeks during normal working hours for routine maintenance. In the event of equipment failure and loss of electricity supply, an operator may be required to attend the substation outside normal working hours to investigate and initiate repair as required.

3.8 Ecologically Sustainable Development

The Project has been assessed against the following four principles of Ecologically Sustainable Development (ESD) listed in the *Protection of the Environment Administration Act 1991*:

- the precautionary principle;
- the principle of social inter-generation equity;
- the principle of biological diversity and maintained ecological integrity; and
- the principle of improved valuation and pricing of environmental resources.

The principles of ESD have been taken into account in the design and operational criteria of the zone substation. A detailed assessment of ESD is in Section 5.7

3.9 Engineering and Services

3.9.1 Stormwater

Stormwater from the site, permeable areas and subsurface drainage will be designed to run off into either dedicated downpipes (roof water) or pits (surface and sub surface water).

The downpipes and pits will then be connected by dedicated stormwater pipes, gravity draining, to Reserve Road. The pipes will be located in the dedicated easement through the TAFE car park. There is no requirement to provide an on site detention facility for storm water.

3.9.2 Sewer

The development will have a single WC (unisex) toilet and a single hand basin. Sewage waste from these facilities will run via dedicated sewerage drainage pipes via gravity to Reserve Road.

The single 150mm diameter pipe will be located within the dedicated easement through the TAFE car park.

3.9.3 Water supply

The existing Breast screening unit and the Animal House Building is fed from the water main in Reserve Road. There will be adequate flow from the main in Reserve Road to service both the new fire hydrant and the WC and hand basin within the sub station building.

A new 150 diameter PVC and 25mm copper pipe will be laid in the easement through the TAFE car park from Reserve Road to service the fire hydrant and WC and hand basin respectively.

3.10 Contamination

The Coffey Geosciences report referred to in Section 2.8 did not deal with the land that is the subject of this application. For that reason NSW Health has commissioned a Preliminary Contamination Report to be prepared dealing with the proposed Substation site. This is currently underway and the results will inform the excavation process and the removal of piers and footings of the existing buildings on site. This will be undertaken prior to work commencing on any excavation work and submitted to the Department of Planning for information.

Depending on the outcome of this Report, a site auditor will be engaged and a Remedial Action Plan prepared if required as per conditions C3, C4 and C5 of the Concept Plan approval.

The substation site will be remediated (as required) to be suitable for use as a substation prior to construction of the proposal.

4. Heads of Consideration

4.1 Suitability of the site

The Zone Substation site is located within the Royal North Shore Hospital site and to the rear of the North Shore Private Hospital. The site is identified in the Concept Plan for the purposes of a Zone Substation and is considered suitable for this purpose for the reasons outlined below:

- The site currently supports a major hospital facility part of which is to be redeveloped for a state of the art acute hospital as well as ancillary and supporting health and medical research facilities
- The Royal North Shore Hospital Concept Plan identifies a significant growth in population for the site and its surrounds into the future which requires augmentation of the existing power supply to serve the hospitals and identified future development on site.
- The site chosen for the zone substation is at the rear of the site to minimise any visual and operational impacts on the majority of users of the site and allow it to "blend in" with the large infrastructure already in place in this location – eg the private hospital, multi-deck car park etc.
- The location is appropriate given the access requirements for construction and operation of the facility, allowing for independent access for service and maintenance.
- The need for a reliable power supply is essential to the functioning of the hospitals on the Campus and therefore it is appropriate that the infrastructure be located on site.

The location of the site presents a number of engineering challenges in relation to its proximity to the Royal North Shore Private Hospital and also by virtue of lack of frontage to a public road. EnergyAustralia has designed the substation within the constraints of the proposed site and proposed engineering solutions in consultation with NSW Health.

4.2 Likely environmental social and economic impacts

4.2.1 Environmental Impacts

The likely environmental impacts of the proposed zone substation are outlined fully in Chapter 5 along with measures to mitigate any of these.

4.2.2 Social Impacts

The likely social impacts of the proposal are as follows:

- The certainty that the acute hospital, the private hospital and other development proposed for the Royal North Shore precinct can have a reliable power supply.

- The provision of power supply will ensure the feasibility of the realisation of the Concept Plan from the perspective of energy supply, thereby allowing for the creation of hospital and medical related jobs, an increase in housing supply and a variety of other workplaces.

4.2.3 Economic Impacts

The economic impacts are likely to be:

- The availability of a reliable power supply to provide the proposed employment growth to the area and the ongoing economic benefits for the surrounding catchment.
- The provision of increased capacity to supply the energy required for continued economic growth on the Royal North Shore hospital site.

4.3 The public interest

The proposed Zone Substation is in the public interest as it enables the efficient development of the Royal North Shore Hospital precinct according to the approved Concept Plan and ensures the safe and timely delivery of reliable power for the hospitals and medical facilities on site.

4.4 Relevant Environmental Planning Instruments and Approved Concept Plan

4.4.1 Environmental Planning and Assessment Act 1979.

Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes an approval regime for Major Projects in conjunction with the State Environmental Planning Policy (Major Projects). In accordance with Part 3A of the EP&A Act and the Major Projects SEPP, the Minister for Planning declared the Royal North Shore Hospital Redevelopment a Major Project on 8th March 2006 and on that basis, the Minister is the consent authority.

In addition, on 29th September 2006 the Minister for Planning declared development within the Royal North Shore Redevelopment site to be Critical Infrastructure in accordance with Clause 75C of the EP&A Act and listed the project it under Schedule 4 of the Major Projects SEPP. In accordance with the declaration of Critical Infrastructure, the following are not required or do not apply to this application:

- Concurrence under Part 3 of the *Coastal Protection Act 1979* of the Minister administering that Part of the Act,
- A permit under section 201, 205 or 219 of the *Fisheries Management Act 1994*,
- An approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977,*
- A permit under section 87 or a consent under section 90 of the *National Parks and Wildlife Act 1974,*
- An authorisation referred to in section 12 of the *Native Vegetation Act 2003* (or under any Act to be repealed by that Act) to clear native vegetation or State protected land,
- A permit under Part 3A of the *Rivers and Foreshores Improvement Act 1948*,
- A bush fire safety authority under section 100B of the *Rural Fires Act 1997*,

- A water use approval under section 89, a water management work approval under section 90 or an activity approval under section 91 of the *Water Management Act 2000*.

- Division 8 of Part 6 of the *Heritage Act 1977*

In addition, the following orders or notices cannot be made or given so as to prevent or interfere with the carrying out of an approved critical infrastructure project:

- An interim protection order (within the meaning of the *National Parks and Wildlife Act 1974* or the *Threatened Species Conservation Act 1995*),

- An order under Division 1 (Stop work orders) of Part 6A of the *National Parks and Wildlife Act 1974*, Division 1 (Stop work orders) of Part 7 of the *Threatened Species Conservation Act 1995* or Division 7 (Stop work orders) of Part 7A of the *Fisheries Management Act 1994*,

- An environment protection notice under Chapter 4 of the *Protection of the Environment Operations Act 1997*,

- An order under section 124 of *the Local Government Act 1993*.

4.4.2 State Environmental Planning Policy (Major Projects) 2005

Schedule 5 of the Major Projects SEPP lists the "RNSH redevelopment site" as land comprising Lots 21 and 22, DP 863329, and Lot 102, DP 1075748 and declares development for the purposes of redeveloping the Royal North Shore Hospital site Critical Infrastructure. This schedule includes development for any of the following purposes:

(a) refurbishing or replacing the main hospital buildings and emergency service facilities,
(b) commercial premises along Herbert Street providing community health and primary care services and research and education facilities,
(c) other commercial uses (including for research and technology purposes),
(d) vehicular and pedestrian access to and from, and within, the site (including direct pedestrian access to St Leonards Station),
(e) accommodation for people receiving acute medical or other health-related services,
(f) retail and residential uses.

As the proposed zone substation is located within the RNSH redevelopment site, it is covered by the provisions for Critical Infrastructure in the EP&A Act.

4.4.3 State Environmental Planning Policy (Infrastructure) 2007

This Policy commenced on 1st January 2008 and repealed SEPP 8 and others relating to significant infrastructure provision. Under the Infrastructure SEPP, Electricity Transmission Works are addressed in Part 3 Division 5 and include infrastructure including substations. Clause 41 of the SEPP permits substations to be undertaken without development consent. Clause 42 requires notification of the development.

However as the proposed development in this case is declared to be a development to which Part 3A applies, Clause 8 of the Infrastructure SEPP places it in a subordinate position to the Major Projects SEPP and therefore the provisions of the Infrastructure SEPP do not apply to this proposal.

4.4.4 State Environmental Planning Policy No 55 – Remediation of Land

SEPP 55 aims to provide a Statewide planning approach to the remediation of contaminated land to reduce the risk of harm to human health or any other aspect of the environment. The SEPP achieves this by:

- specifying when consent is required, and when it is not required, for a remediation work,
- specifying certain considerations that are relevant in rezoning land and in determining development applications in general and development applications for consent to carry out a remediation work in particular,
- requiring that a remediation work meet certain standards and notification requirements.

When a development application is lodged with a consent authority the consent authority is not able to grant consent unless it has considered:

(a) whether the land is contaminated, and

(b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and

(c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

The Coffey Geosciences report referred to earlier did not deal with the land that is the subject of this application. For that reason NSW Health has commissioned a Preliminary Contamination Report to be prepared dealing with the proposed Substation site. This is currently underway and the results will inform the excavation proposal that will be submitted for the removal of piers and footings of the existing buildings on site, as this requires separate approval.

A site auditor sill be engaged and a Remedial Action Plan prepared if required as per conditions C3, C4 and C5 of the Concept Plan approval.

4.4.5 Approved Concept Plan

On 13th April 2007, the Minister for Planning approved a Concept Plan for the Royal North Shore site which included:

- Development parameters.
- Demolition, excavation and preparatory site works.
- Conceptual road design.
- Subdivision of the site into two hospital allotments and 5 separate development allotments.
- Maximum gross floor areas for each allotment.
- Broad land use distribution across the development allotments.
- Landscape, open space and heritage design concepts.
- Community facilities to be provided.
- Building heights planes, build to lines and setbacks.

At the time of the Concept Plan Application, EnergyAustralia had advised that there was insufficient capacity in the local system for additional major development, including the new hospital building. In conjunction with EnergyAustralia, the proponent has identified potential sites that could accommodate a new zone substation. This application progresses the site selection process with the site that achieves the outcomes acceptable to all parties.

The Proposed Zone Substation is consistent will all requirements and objectives of the Approved Concept Plan and is essential to bringing to fruition the vision of the Concept Plan for the RNSH site.

5. Environmental Assessment

5.1 Built Form

5.1.1 Context

NSW Health and Energy Australia are aware of the sensitivity of the site, and the effects of the placement of a Substation within it. The component parts have consequently been carefully examined, and treated so as to have minimal impact, on the amenity of neighbouring properties.

Land adjoining the substation property includes: -

- North Shore Private Hospital with approved plans for a Stage 3 expansion toward the Substation site.
- Gore Hill TAFE Campus with a building complex in close proximity.
- The Royal North Shore multi-storey parking station.
- A parking area with the St. Leonard's industrial area beyond.

5.1.2 Building Form and Character

The proposal building is to be a long life, low maintenance weather proof structure. It is to be appropriate to house a commercial building character compatible with surrounding streetscape.

In response to the vision for and context of the substation, the following design character has been applied to the design of Royal North Shore Hospital Zone Substation development:

- This substation, whilst catering for current and future needs, contains only essential components of power supply. The main switching functions are located on existing sites, such as Willoughby.
- Appropriate setbacks will be provided to adjoining properties to ameliorate any inherent impacts. A 15 metre EMF buffer zone within the EnergyAustralia property is proposed, along the southern boundary with the RNS Private Hospital.
- The Control Building and Transformer enclosures will be sited along the northern side of the site, away from the RNS Private Hospital.
- Use of landscaping to soften the "bulk" of the development.
- The two (2) transformer units will be partially enclosed within aesthetically selected masonry walls reducing their visual and acoustic impact.
- High quality, low maintenance, durable external materials and colours reflecting those found in the local environment will be used.

5.1.3 Aesthetics

The proposed building is designed to be compatible with the height, bulk, scale and character of existing development in the local area, and forms a loose connection with the RNS Private Hospital by the use of off-white masonry walling.

The proposed development generally complies with the objectives of façade materials including a dark neutral grey split face block work base, banded masonry walls and metal louvres. These are combined with clearly defined vertical and horizontal design elements, using alternating light and

dark coloured materials, which create an a firm visual rhythm, in balance with the character of adjoining development.

Selection of high quality, modern, durable and environmental sustainable external finishes, will ensure that the proposed development will enhance the amenity of the local area. The following table refers to the drawings of indicative finishes shown in Appendix D. A photographic representation of the finishes is provided at Appendix H.

Table 2 Indicative Materials and Finishes

Code	Material
B1	'Alabaster' Split Face, Designer Block.
B2	'Alabaster' Smooth Face, Designer Block
B3	'Pearl Grey' Smooth Face, Designer Blockwork.
B4	'Charcoal' Smooth Face, Designer Blockwork
B5	'Charcoal' Split Face, Designer Blockwork.
LVR	'Arrowhead' Dulux Powder Coat
MR	'Windspray' Colorbond Steel Roofing.
CFC	'Arrowhead' Fibre Cement Fascia.

5.1.4 Bulk and Scale

Overshadowing diagrams have been prepared for 9.00am, 12.00 noon and 3.00pm on 21st June showing existing shows and those which would be cast by the proposed substation. The diagrams were prepared to assess the appropriateness of the bulk and scale of the building, specifically to indicate any additional overshadowing from the proposal on adjacent properties. These overshadowing diagrams can be seen in Appendix I. The diagrams indicate that generally the proposal has a decreased impact on the existing structures. Additional overshadowing is evident at 9.00am across the closed Saville Road to the west of the substation.

On the basis that Saville Road is a closed road used primarily for parking, this is not seen to have a significant impact.

5.2 Access and Parking

5.2.1 During Construction

During the construction phases there will be an increase in traffic with the movement of heavy vehicles transporting equipment and materials to and from the site. It is expected that the capacity of the local and arterial road network will not be significantly impacted upon as a result of traffic generation associated with the proposal.

Obstruction of pedestrian and vehicle access is likely to result during the construction phase, particularly during the construction within easements and delivery of large equipment. These deliveries may require the implementation of a separate Traffic Management Plan which would be negotiated with the affected stakeholders as required. It is anticipated that the TAFE roadway off Westbourne Street will be the principal point of access for heavy vehicles to/from the site during construction.

During construction vehicles will park within the area provided by NSW Health or the substation staging area to the south of the substation site.

Issues in respect to mitigation of construction impacts have been addressed in Section 6 as a Statement of Commitment.

5.2.2 During Operation

During operation, access to the site will be largely via a shared driveway via the Rights of Way off Westbourne Street and Reserve Road. This is required for servicing and maintenance of the substation.

Parking for two cars will be provided on site to accommodate service and maintenance crews. During operation, small vehicles will park within the allocated parking spaces at the front of the site. Large vehicles for equipment delivery and major maintenance tasks, will park within the substation transformer driveway so as to not cause obstruction to the Westbourne Street right of way.

The zone substation is an unmanned site. Accordingly the traffic generated during the operation will be limited to servicing and maintenance and as such is not anticipated to have major impacts on the amenity of area.

5.2.3 Impacts on Existing Car Parking

The location of the zone substation will not remove any car parking spaces on the southern side of the site. The loss of car spaces in this location at the rear of the existing private hospital will result as implementation of the expansion of the private hospital occurs. It is understood these are being replaced as part of that development consent through a combination of below hospital car parking and the additional deck on the adjacent multi deck car park.

Parking along the western boundary of the site that is currently adjacent to Breastscreen will be lost as a result of this proposal. This amounts to approximately 15 car spaces.

Figure 10 Alteration to Existing Car Parking

The loss of these car parks is considered to be adequately dealt with in the redevelopment proposal for the RNSH site overall which will provide parking well in excess of that already located on site.

5.3 Landscaping

5.3.1 Tree Removal

A total of 18 trees are proposed to be removed by this development. Of these four (4) are of high retention value and include Tree 24 (River Oak), Trees 25 & 31 (both Eucalypts) and Tree 30 (Forest Red Gum). These trees are in good health and condition and make a positive contribution to the amenity of the site and surrounding properties. Given the nature of the proposed development, there are no feasible alternatives that can be implemented that would permit the retention of these trees. In order to compensate for loss of amenity, consideration will be given to replacement planting elsewhere within the property (hospital grounds).

Trenching for any proposed utilities within the easement may be located within the Tree Protection Zones of Trees 11, 11a, 17, 19, 20, 21 & 22. All of these trees are considered worthy of preservation. To minimise any adverse impact, all trenching for proposed utilities will be located outside the specified Minimum Setback Distance for each tree and all excavations will be undertaken in accordance with the recommendations contained within the Aborists Report.

Where trenching within the minimum setback distance is unavoidable, and large woody roots are encountered during excavations, consideration will be given to the removal of these trees.

The crowns of Trees 11, 11a, 10 & 10a currently project within the area of the easement and therefore pruning may be required to provide adequate clearance for high vehicles and movement of plant and equipment. Where pruning is required, all such work will be undertaken in accordance with the recommendations of the Aborist. Where significant pruning is required that is likely to cause disfigurement or loss of structural integrity, removal of the entire tree should be considered.

The existing site landscaping consists of tall scattered trees within a context that is predominately of built form. These trees are required to be removed for either building works, site works or for safe clearance zones. The site soil topsoil is derived from shale and sandstone base material, and is suitable to support replacement landscaping.

5.3.2 New Landscaping

New landscaping works are proposed to provide visual and physical amenity in the arrangement of planting layout and by the large extent of landscape planting. The landscape theme is based on providing a long-term low maintenance solution utilising indigenous plants with low-water requirements found in the Willoughby locality.

Surrounding the substation building and utility areas, gravel surfacing is proposed.

No trees are proposed due to operational safety and clearance requirements. The proposal uses indigenous native grasses and low indigenous shrub planting, providing mass planting to a landscaped area of approximately 1150m^2.

These plants are arranged to provide visual and physical amenity as seen from surrounding ground and above ground areas. The selected native grasses are self regenerating and will provide for a long term cover to the landscaped area.

Following initial site establishment in the first 12 months, the selected plants will not require maintenance. The following species will be used:

- *Leptopsermum polygalifolium 'pacific beauty'* (Dwarf Tea Tree)
- *Dianella 'Little Jess'* (Dwarf Dianella)
- *Lomandra 'tanika'* (Dwarf Lomandra)

5.4 Storm Water Management

5.4.1 Design

Storm water management will be designed using relevant Australian Standards, Local Government design guides and good engineering design using accepted practices and principles.

Permeable surfaces will be drained using dedicated stormwater pits and pipes as described in section 3.9.

During a 1:100 storm event should the proposed stormwater pits surcharge, the overland flow path will be designed and directed south west to the existing disused street (Saville Street). This overland flow path will match the existing overland flow for the site.

Indicative design is shown in Appendix J. Final design plans of the stormwater drainage systems shall be prepared in accordance with Council's and Sydney Water's requirements prior to the commencement of construction works. The hydrology and hydraulic calculations shall be based on models described in the current edition of Australian Rainfall and Runoff.

5.4.2 Mitigation Measures

During construction, surface water will be managed in accordance with the Sediment and Erosion Control Plan attached to Appendix K. Surface water will be managed in accordance with "Landcom Managing Urban Storm Water: Soils and Construction" Guideline (Landcom 2004). In addition, discharge from the oil containment system will be monitored for compliance with EnergyAustralia's Network Standard which has been reviewed by the EPA.

5.5 Electric and Magnetic Fields

Electric and magnetic fields (EMF) are part of the natural environment and are present in the Earth's core and the atmosphere. EMF is also produced wherever electricity or electrical equipment is in use. Power lines, electrical wiring, household appliances and electrical equipment all produce EMF. EMF is sometimes incorrectly referred to as electromagnetic radiation.

Energy Australia is aware of concerns in the community and some scientists regarding the possibility of adverse health effects from exposure to EMF.

All of the research has been extensively reviewed over the last 30 years by Australian and international inquiries and expert panels established for the purpose of trying to determine whether or not human exposure to EMF is related to adverse health effects.

There is scientific consensus that health effects have not been established, but that the possibility cannot be ruled out. Some scientists argue that there is a need for ongoing high quality scientific research in order to give better answers to the questions which have been raised. Others hold the view that no further research is required and that EMF should not be regarded as a risk to health.

It is well accepted by scientists that no study considered in isolation will provide a meaningful answer to the question of whether or not EMF can contribute to adverse health effects. In order to make an informed conclusion from all of the research, it is necessary to consider the science in its totality. Over many years, governments and regulatory agencies around the world have commissioned independent scientific review panels to provide such an overall assessment.

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), as part of the Health and Ageing Portfolio, is a Federal Government agency charged with responsibility for protecting the health and safety of people, and the environment, from EMF.
ARPANSA advises that:
"On balance, the scientific evidence does not indicate that exposure to 50 Hz EMFs found around the home, the office or near power lines is a hazard to human health."

"… the majority of scientists and Australian radiation health authorities in particular, do not regard chronic exposure to 50 Hz electric and magnetic fields at the levels commonly found in the environment as a proven health risk. Moreover, the evidence we have is inconclusive and does not allow health authorities to decide whether there is a specific magnetic field level above which chronic exposure is dangerous or compromises human health."
"At the present time there is no evidence that exposure to electric fields is a health hazard (excluding of course electric shock)."

Energy Australia's position on EMF has been adopted in the light of authoritative reviews having concluded that no adverse health effects from exposure to low level EMF have been established, but recognising that there is, within the community, some genuine public concern about the issue which must be addressed.

The following is Energy Australia's position on EMF, which largely reflects the policy of the energy industry representative body, the Energy Networks Association:

- to provide balanced, accurate information to our employees and customers, including electric and magnetic field measurements and advice
- take reasonable steps to limit field exposures from new facilities by locating and operating our electrical installations prudently within the latest Australian health guidelines
- closely monitor engineering and scientific research, overseas policy development and major reviews of scientific, medical and engineering research regarding electric and magnetic fields and health
- cooperate fully with any bodies established by governments in Australia to investigate and report about power frequency electric and magnetic fields.

Since 1989 Energy Australia and the Australian electricity industry have followed interim guidelines for exposure to EMF as developed by the National Health and Medical Research Council (NHMRC).

Energy Australia has operated its electricity network, including powerlines and substations, to comply with these exposure limits. These guidelines have now been officially rescinded ahead of the release of an Australian standard. A draft standard was released in December 2006 by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), which includes similar public exposure limits to the NHMRC guidelines. Under this standard the recommended magnetic field public exposure limit is 1,000milliGauss (mG) and up to 3,000mG under some circumstances.

A more detailed assessment of EMF has been prepared by EnergyAustralia. A copy of this assessment is included in Appendix L. This report concludes that

- EMFs are created whenever electricity flows, they are not something unique to power lines or substations.
- The body of scientific literature on the issue is both complex and voluminous, and public policy initiatives should be based on independent and authoritative reviews and reports.
- Adverse health effects from human exposure to EMF have not been established, but the possibility cannot be ruled out.
- Conventional science cannot guarantee absolute safety for exposure to environmental factors such as EMF.

- There is no basis to establish human exposure limits for EMF other than those which presently exist, and, in particular there is no scientific basis to support arbitrary exposure limits below the guidelines as a prudent avoidance measure.
- EnergyAustralia should continue to act prudently in relation to the issue of EMF. This includes implementing prudent avoidance measures in accordance with the principles established by the Gibbs Report.

The proposed Royal North Shore Zone Substation will comply with relevant local (rescinded and draft) and international health guidelines or standards for public exposure:

- International Commission on Non-Ionizing Radiation Protection (ICNIRP) (1998)
- Institute of Electrical and Electronics Engineers (IEEE) C95.6 (2002).
- The NHMRC (National health and Medical research Council) interim guidelines (1989). (Rescinded) *NOTE: The standard upon which the NHMRC limits are based has been subsequently reviewed and the relevant public exposure limit remains unchanged*.
- The Draft ARPANSA (Australian Radiation Protection and Nuclear Safety Agency) EMF standard (2006)

EnergyAustralia has advised NSW Health that EMF produced by the substation can interfere with the operation of devices and equipment, including devices and equipment used in health facilities. However, the impact of EMF on the operation or functionality of any device or equipment or any procedure or treatment is outside EnergyAustralia's area of expertise. NSW Health are undertaking separate EMF investigations based on a concept design provided by EnergyAustralia. The concept design included a 15 metre landscaped "buffer zone" between the substation and the North Shore Private Hospital which will both address visual impacts and assist in mitigating any potential EMF impacts. Depending on the results of the additional investigations, NSW Health may request EnergyAustralia to adopt certain recommendations.

The results of the additional investigations will be submitted to the Department of Planning prior to construction in accordance with Draft Statements of Commitment.

5.6 Noise and Odour

5.6.1 Operational Noise

Parsons Brinckerhoff, Australia Pty Ltd were engaged by EnergyAustralia to undertake an Environmental Noise Assessment of the proposed substation in accordance with the DECC's Industrial Noise Policy (INP) (2000). In order to quantify the existing noise environment unattended noise loggers where placed in locations close to the noise sources which monitored noise statistics every 15 minutes for a 10 day period between 29th May 2008 and 11th June 2008. The location of the noise loggers is shown in Figure 11 below. The results of this assessment were indicate the following:

Construction noise and vibration management and mitigation

Construction noise levels are predicted to exceed the adopted ECNM criteria by up to 12 dB(A) during the demolition phase of works [for which approval has already been granted]. The noise impact potential reported for the proposed construction works is consistent with short-term construction activities undertaken in the vicinity of existing TAFE receptors. This is a worst case prediction for the most intensive periods of activity, assuming required plant operating simultaneously and would be expected to occur for short term durations only.

Figure 11 Location of Noise Loggers

It is expected that a range of economically reasonable and technically feasible noise mitigation measures would be considered by the construction contractor to manage the noise impact of the construction works. A series of pre-construction and construction phase measures and management practices designed to mitigate and reduce noise impacts are detailed [in the report].

Compliance with the adopted noise design goals is the desired outcome. Where it is identified that the required noise criteria would not be met, all reasonable and feasible measures would be undertaken to reduce the noise emissions.

The assessment of potential vibration impacts has determined construction vibration to be unlikely to exceed the 0.2 – 0.4 m/s-1.75 residential VDV acceptable perceptible vibration criteria at receptors within 20 metres of construction activity. Accordingly, compliance for nearest commercial receptors would be expected to be achieved.

Pre-construction noise and vibration impact management

During the planning and scheduling of construction works the predicted noise impacts should be considered in establishing work site locations, construction techniques and on site practises. The following principles and proactive noise management measures should be implemented prior to the commencement of construction works:

- *A Construction Noise and Vibration Management Plan should be formulated to provide a framework for addressing potential noise and vibration impacts associated with construction works. Noise control options considerate of anticipated level of impact, including site mitigation and the investigation of low noise plant, should be detailed and direction provided for the delivery of best practice noise management on site.*

- *Works should adopt Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA) practices as encouraged by the DECC and as addressed in current acoustic guidelines. BMP includes some of the factors discussed within this report, but also includes the encouragement of a general staff attitude to reducing noise emissions. Contractors would be made aware of the problems associated with noise. BATEA practices involve incorporating the most advanced and affordable technology to minimise noise emissions. All plant should be selected after considering noise emissions.*

Construction noise and vibration impact management

The measures detailed below incorporate the principles of BMP and BATEA, and are designed to be implemented to manage and mitigate construction noise and vibration impacts. The application of construction noise mitigation techniques would be required, as a minimum, to include the following measures:

- *Residential class mufflers and, where applicable, engine shrouds (acoustic lining) would be used. All equipment would be maintained in good order, including mufflers, enclosures and bearings to ensure unnecessary noise emissions are eliminated.*
- *Construction works including warming up, deliveries and staff entry should be restricted to between 7 am and 6 pm (Monday to Friday), and between 8 am and 1 pm Saturdays, with no works on Sundays or public holidays.*
- *Construction activities should be undertaken in accordance with Australian Standard AS 2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites. All equipment used on site would be required to demonstrate compliance with the noise levels recommended within AS 2436-1981.*
- *Appropriate use of all plant and equipment, with reasonable work practices applied, including no extended periods of 'revving', idling or 'warming up' in proximity to existing residential receivers. Any excessively loud activities should be scheduled during periods of the day when general ambient noise levels are greatest. This would reduce the potential for cumulative noise impacts (relating to worst-case elevated operations) and extended periods of off-site annoyance.*
- *Minimising reversing alarm noise emissions from mobile plant and transport truck operations should be considered, provided occupational health and safety requirements are satisfied. Where practicable, site entry and exit points should be managed to limit the need for reversing.*

Operational noise management and mitigation

Assessment of noise impacts for the proposal have been predicted to be compliant with the adopted noise design goals of 42 dB(A) LAeq, 15min.hospital external, 35 dB(A) LAeq, 15min.hospital internal, 35 dB(A) LAeq, 15min.TAFE internal and 65 dB(A) LAeq, 15min commercial receptors.

Noise impacts at the proposed site boundary are expected to be compliant with respective noise design goals.

The following recommended source SWL measures are recommended considerate of the preservation of acoustic amenity and feasible substation source noise levels.

- *Transformer (including cooling) units to emit a total SWL of 68 dB(A) LAeq*
- *kiosk facades to emit a SWL of 61 dB(A) LAeq.*

Although it is expected that standard construction materials and typical construction methods for the proposed hospital extension will provide adequate attention to achieve the adopted internal noise deign goal of 35 dB(A) LAeq, it is recommended that where the sub station noise characteristics vary significantly to those assumed in this report, verification of internal noise levels may prove worthwhile.

It is recommended post commissioning source validation be undertaken to confirm recommended substation plant SWL's and adopted noise attenuation performance of transformer enclosure and substation structures.

These recommendations have been adopted through Statements of Commitment in Section 7. The final report is attached at Appendix M.

5.6.2 Odour

There is no odour resulting from this proposal.

5.7 Ecologically sustainable development

The Project has been assessed against the following four principles of ecologically sustainable development listed in the *Protection of the Environment Administration Act 1991:*

- the precautionary principle
- the principle of social inter-generational equity
- the principle of biological diversity and maintained ecological integrity
- the principle of improved valuation and pricing of environmental resources.

5.7.1 Precautionary principle

The precautionary principle states that:

…if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

(ii) an assessment of the risk-weighted consequences of various options.

A range of environmental investigations, including, EMF and noise assessments, have been undertaken during the preparation of this Project Application to manage the potential environmental impacts. The substation design has evolved to avoid environmental impacts where possible and mitigation measures have been recommended to minimise adverse impacts. No mitigation measures have been deferred due to a lack of scientific certainty. The proposal is therefore considered to be consistent with the precautionary principle.

5.7.2 Principle of inter-generational equity

The principle of inter-generational equity states that:

> *…the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations….*

The site is within a highly urbanised environment. The operation of the proposal would not result in any impacts that are likely to impact on the health, diversity or productivity of the environment for future generations.

A number of features have been included in the design to reduce the environmental footprint of the proposal to maintain the environment for future generations. The building will be designed and constructed to reduce the embodied energy on a whole of building approach and will incorporate opportunities for improved energy and water use efficiency, less waste and environmental footprint. This includes the following:

- The use of low embodied energy materials which provide good thermal insulation against exterior environment;
- Hot water will not be stored on site (to save on energy consumption);
- All toilets installed will be water efficient dual flush capacity with a minimum "AAA" rating;
- The building will not be fitted with any mechanical ventilation or air conditioning plant and equipment accordingly will effectively reduce the buildings on-going energy consumption. The building will take on a passive design and utilise natural ventilation with optimal positioning to ensure good natural air circulation and will include louvres to external walls.
- Light fittings will be energy efficient fittings designed to comply with energy efficiency requirements of the Building Code of Australia.

The greatest life-time energy impact of a building is its operational energy consumption. Hence the operational environmental management plan will include requirements for periodic auditing and improvement to optimise ESD performance.

The proposal is therefore considered to be consistent with the principle of inter-generational equity.

5.7.3 Principle of biological diversity and ecological integrity

The principle of biological diversity and ecological integrity states that:

> '*Conservation of biological diversity and ecological integrity should be a fundamental consideration.*'

A desktop flora and fauna assessment was undertaken for the proposed development to determine the extent of impact that the proposal may pose on biodiversity. The assessment concluded that impacts upon the ecological integrity will be negligible.

5.7.4 Improved valuation of environmental resources

The principle of improved valuation of environmental resources states that:

> *environmental factors should be included in the valuation of assets and services, such as:*
> *(i) polluter pays—that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*
> *(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
> *(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

The proposal has been designed to minimise adverse impacts on the environment by:

- siting infrastructure at locations that have been disturbed by previous land uses, and
- putting in place specific design measures to lesson the environmental impact on the area.

Although these measures did increase the costs associated with construction and operation of the proposal, it has resulted in minimising impacts on groundwater, material going to landfill and increasing the vegetation cover on the site. This indicates that environmental resources have been assigned a significant value and this has been taken into consideration during the concept design stage.

5.8 Geotechnical Impacts

Details of the conditions encountered are given in the borehole logs in Douglas Partners Report at Appendix C, together with colour photographs of the rock core samples and notes defining classification methods and descriptive terms.

The boreholes penetrated a subsurface profile typically comprising pavements and/or filling to depths of 0.15m to 0.8m, then residual clay and shaly clay to depths of 2.0m to 3.5m overlying bedrock comprising interbedded shale and laminite to the maximum investigation depth of 11.2m. The various strata are summarised below and interpreted geotechnical sections are provided in the full report.

PAVEMENTS: comprised asphaltic concrete (AC) 0.03m thick over sandy gravel filling (roadbase) 0.12m thick.

FILLING: encountered in BH 104 and BH 105 to depths of 0.5 and 0.8m, respectively. The filling generally comprised sandy clay with some gravel, glass and building rubble in BH 105.

RESIDUAL CLAY: generally comprised stiff to very stiff sandy clay and clay to depths of 1.0m to 2.0 m then hard shaly clay to depths of 2.0m to 3.5m.

SHALE/LAMINITE: generally comprised highly weathered, very low to low strength rock to depths of 7.5m to 9.0m (RL 85.5 to RL 86.5) over slightly weathered to fresh, medium strength rock.

Extremely low to very low strength and medium to high strength bands were encountered within the rock profile.

No free groundwater was observed during augering of the boreholes.

5.8.1 Specific site issues

Former Quarry

The northern site boundary is set back approximately 30m from the former quarry excavation face which is approximately 20m high. The section of the quarry face to the north of the site has soil nails installed within the upper clay soils and an unreinforced shotcrete covering over the rest of the face. The section of the quarry face to the west of the site (previous slip zone) has been extensively stabilised.

For the site of the proposed substation the worst case would be failure into the former quarry of a wedge extending up from the toe of the face at about 45 degrees above horizontal. The northern site boundary is set back approximately 10m behind this potential failure line, and therefore it is considered that there would be a low risk of instability and no special precautions need to be taken for the foundations.

If access roads are located to the north of the site then it is possible that some of the access roads may run parallel to the top of the quarry excavation faces and that very heavy transformers may be transported occasionally along these roads. For these temporary load conditions it is assessed that the installed stabilisation in the south-western corner of the quarry will provide adequate support. However, for the south-eastern corner of the quarry (directly to the north of the site) it is assessed that the factor of safety would not be sufficient for these heavy loads. In these areas it is recommended that the access roads be located at least 3m back from the top of the quarry face to minimise the risk of failure of the upper clay soils.

Proposed Extension to North Shore Private

At the time of the previous investigation, the proposed extension to the North Shore Private Hospital included a six-storey building with three levels of basement carparking. It is understood the lowest basement floor level (RL 90) will require excavation to depths of approximately 8 m below existing surface levels. The basement is set back approximately 9m from the southern boundary of the substation site.

It is anticipated that the basement excavation will be supported by a shoring system comprising soldier piles with temporary rock anchors installed to provide lateral restraint during excavation. The basement walls would presumably be supported by the building structure in the long term. In relation to the substation site, the worst case would be failure into the hospital excavation of a wedge extending up from the toe of the excavation face at about 45 degrees above horizontal. The southern site boundary is set back approximately 1 m behind this potential failure line, and therefore it is considered that there would be a low risk of instability and no special precautions need to be taken for the foundations.

Soil/Rock Anchors from Adjacent Excavations

There are existing permanent rock anchors and soil nails within the southern quarry face. The rock anchors comprise tensioned steel strands within grouted drill holes and the soil nails comprise passive (untensioned) steel bars within grouted drill holes.

On the eastern side of the southern quarry face (to the north of the site) there are soil nails within the clay profile. These soil nails are unlikely to extend much further than about 5m from the quarry face and should be set back at least 25m from the site. The longest rock anchors for stabilisation of the previous slip area (on the western part of the southern quarry face) were proposed to be 24m long. The slip area is located to the west of the site and the site is set back approximately 30m from the quarry face.

Specific details of the as-constructed anchors are not available, however, based on available information it is considered unlikely that these anchors extend below the site. It is anticipated that temporary rock anchors will be used to support the excavation for the proposed extension to the North Shore Private Hospital.

5.8.2 Site Preparation and Earthworks

Excavations will be mostly through filling, clay and extremely to very low strength shale/laminite which should be achievable using conventional earthmoving equipment. Low to medium strength shale/laminite may be encountered within the deeper parts of the excavation below about 3 m depth and may require some light to moderate ripping with an excavator.

Groundwater was not observed during auger drilling of the boreholes to maximum depths of 3.0m to 4.0 m, however groundwater seepage may occur along the top of the rock or through fractures and defects in the rock mass, particularly following periods of extended wet weather. During construction, groundwater seepage will be controlled by perimeter drains connected to a "sump-and-pump" dewatering system.

The requirement for dilapidation surveys will depend on the actual depth of excavation and proximity to site boundaries. If excavations are limited to depths of 3 m to 4 m and set back 5 m or more from site boundaries then dilapidation surveys may not be necessary.

The proposed excavation through the soils and underlying weathered rock will generally result in relatively minor vibrations however as the site is located within the hospital grounds additional measures will be taken to ensure minimum impacts on adjacent structures. There are no current Australian Standards for vibrations generated by construction plant. There are recommended maximum Peak Particle Velocities (PPV) in AS2187 (Explosives Code) for various structures subject to vibration. However the explosive code notes that these values are not applicable to specialist structures such as dams, reservoirs, hospitals or buildings housing scientific equipment which is sensitive to vibrations.

Guidelines for vibration during excavation will be developed in consultation with the hospital, and documented in the Construction Management Plan.

5.9 Other approvals

5.9.1 Concept Plan for RNSH

Concept Plan approval was given for the Royal North Shore Hospital site on 13th April 2007. That approval allowed the following development to occur on site, subject to modifications and conditions and subject to subsequent Project Applications as required. The development approved by the Concept Plan was:

- General development parameters.
- Demolition, excavation and preparatory site works.
- Conceptual road design.
- Subdivision of the site into two hospital allotments and 5 separate development allotments.
- Maximum gross floor areas for each allotment.
- Broad land use distribution across the development allotments.
- Landscape, open space and heritage design concepts.
- Community facilities to be provided.
- Building heights planes, build to lines and setbacks.

This application is consistent with the Concept Plan Approval in that it seeks Project Approval for the construction of the zone substation that was identified in the Concept Plan, in the location suggested by the Concept Approval. In addition, **this application seeks subdivision approval to allow the area that will occupied by the zone substation to be subdivided as per the attached Plan of Subdivision shown on Easement Plan at Appendix N**. This will allow the subject site to be transferred from Health Administration Corporation to Energy Australia.

The proposal for the zone substation is within the development parameters posed in the Concept Plan and consistent with the objectives and controls applying to the site.

5.9.2 DA 2006/163 – Stage 3 of the RNS Private Hospital

An application for an extension to the North Shore Private Hospital was lodged with Willoughby Council in September 2006 and approved by Council in November 2006. The consent permitted the extension of the Hospital into Stage 3 to the north and the addition on an additional deck to the existing multi deck car park adjacent.

The plans and documents related to the hospital expansion have been reviewed in detail and the design and operation of the proposed substation has taken into consideration the expansion proposed and the implications for access, parking, separation and amenity of the users of the hospital. The relationship between the proposed Private Hospital extension and the proposed substation is shown on Drawing DA10A in Appendix D. The design, construction and ongoing operation of the substations have taken into consideration the impacts on the hospital expansion. It is concluded that the design, construction and operation of the substation incorporates mitigative measures (such as the EMF buffer zone) to reduce and/or remove any impact on the operation and users of the Private Hospital.

5.9.3 DA 2007/142 Alterations to "The Cottage" Breastscreen facility

The development application for the alterations for the Breastscreen facility was withdrawn from Willoughby City Council on 19th March 2008 by the Northern Sydney Central Coast Area Health Service.

6 Draft Statement of Commitments

6.1 Prior to Construction

P1. A Traffic Management Plan will be prepared to minimise construction traffic impacts on the surrounding road network and disruptions from works within road reserves, as far as practicable, and ensure road safety is not compromised, including:

- Maintaining access along Westbourne Street and liaising with emergency services to ensure emergency response plans are not compromised;
- Provision of adequate spoil stockpiling capacity for spoil reuse where practicable to limit truck impacts;
- Informing the local community and road users on changed conditions prior to work commencing and spoil transportation;
- Arrangements for parking (onsite where practicable) and safe access to work areas from the adjacent road network;
- Traffic control in accordance with RTA Traffic Control at Work Sites and AS 1742.3 1996, Traffic Control Devices for Works on Roads;
- Backfill trenches with cold-mix bitumen and provide funding for Council to complete the remediation of roads and footpaths after backfilling is completed.

P3. The Construction Environmental Management Plan will be prepared to beneficially reuse all suitable spoil, effectively reducing the volumes of spoil disposed to landfill and traffic associated with construction works. The Plan will consider the following:

- Maximising the reuse of suitable material generated from construction, particularly waste classified as Virgin Excavated Natural Material (VENM), in preference to importing fill;
- Where required, spoil would be loaded directly into trucks for disposal at licensed landfill sites. The spoil would firstly be classified;
- Identifying possible sites for beneficial spoil reuse, recycling or storage (particularly VENM) or disposal and securing arrangements;
- Field investigations to confirm the presence of soil contamination and to classify spoil for disposal in accordance with the Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Waste (EPA, 1995).
- Contaminated soils if encountered managed in accordance with Department of Environment and Climate Change (DECC) guidelines;
- Minimisation, management and disposal of waste;
- Measures to avoid disturbing any known contaminated soils from construction work sites; and
- Auditing to ensure spoil reuse locations has required environmental and planning approvals.

P4. Design measures and management procedures will be developed for implementation during construction to prevent or suitably mitigate, damage to properties, structures and infrastructure (such as from vibration). This will include a process for conducting property inspections, and dilapidation surveys, if required, on all structures (including public infrastructure) at risk of impact during construction and formulation of measures to rectify property damage caused by construction at no cost to the owner.

P5. Prior to the commencement of work NSW Health will negotiate and attain approval (if required) with the utility authorities in relation to the location and/or adjustment of the services affected by the construction works.

P6. A survey is to be carried out of all utility services within and adjacent to the site including relevant information from utility authorities and excavation if necessary, to determine the position and level of services.

P7. The building must comply with the deemed to satisfy provisions of the Building Code of Australia (BCA). If compliance with the deemed-to-satisfy provisions of the BCA cannot be achieved an alternate solution in accordance with Part A0 of the BCA must be prepared by a suitably qualified person illustrating how the relevant performance requirements of the BCA are to satisfied during design.

P8. A Preliminary Contamination Report in accordance with SEPP55 will be prepared identifying any likely sources of contamination and recommending further actions required to be undertaken prior to construction. This will be submitted for approval to the Director General of Planning.

P9. A dilapidation report will be prepared and submitted to the Director-General for information, prior to commencement of excavation of footings, if required.

P10. A detailed subdivision plan indicating easements will be submitted to the Director-General for approval.

6.2 During Construction

C1. Construction will be restricted to between 7am to 6pm seven days per week, except:

- For delivery of materials outside these hours as required by authorities or for safety reasons; or
- Where it is required in an emergency to avoid the loss of lives, property and/or prevent environmental harm; or
- Where agreement has been reached with surrounding land owners in order to reduce the duration of construction activities and/or manage other traffic, amenity or disturbance issues.

C2. The Construction Environmental Management Plan will incorporate mitigation measures to address the impacts associated with noise and vibration from construction activities in accordance with the Noise Impact Assessment prepared by Parsons Brinckerhoff dated July 2008, except as varied by commitments made in this section.

C3. With respect to airborne noise, a construction noise goal within the Construction Environmental Management Plan will be determined in accordance with the Acoustic Consultants report and within DECCs Noise Control Guideline Construction Site Noise during the hours of construction noted above.

C4. With respect of vibration impacts, where practicable, the vibration resulting from construction and operation will not exceed the evaluation criteria presented in

Environmental Noise Management – Assessing Vibration: A Technical Guideline (Dec, 2006).

C5. The Construction Environmental Management Plan referred to above will include following mitigation measures:

- Machinery and equipment would be well maintained to assist in minimising noise levels.
- Mobile plant such as excavators and other diesel operated machinery would be fitted with mufflers and other silencing equipment as far as practical.
- All entry and departure of heavy vehicles to and from the site would be restricted to the nominated construction hours.
- Noisy activities would occur in as short a time space as possible with minimum delays.

C6. Appropriate OH&S procedures and protective equipment would be in place during construction and operation.

C7. A "1 800" number will be available during construction for members of the public to phone and lodge any complaints they may have in relation to the construction activity.

C8. All waste disposal will occur in accordance with the *Protection of Environment Operations Act* and Regulations and EPA Environmental Guideline: Assessment, Classification and Management of Liquid and Non-liquid Wastes (1995).

C9. All wastes generated by the project shall be beneficially reused, recycled or directed to a waste facility lawfully permitted to accept the materials.

C10. All waste to be managed in accordance with best practice measures described in the Environment Protection Authority's Construction & Demolition Waste Action Plan (Nov. 1998).

C11. The work site will be left clean and free of debris and other rubbish at the end of the works.

C12. All wastes would be securely stored to minimise the risk of pollutants escaping.

C13. Erosion and Sediment Control will be implemented in accordance with the Erosion and Sedimentation Plan contained Appendix K of this report.

C14. Disturbed areas will be stabilised as soon as possible following completion of the works at each location.

C15. Stockpiles will be covered or established to prevent transport of sediment from the worksites.

C16. At completion of construction and stabilisation of the land surface all stormwater control devices will be removed.

C17. Construction works will not take place during or immediately after high intensity or prolonged rainfall.

C18. There will be a Tree Protection Zone for all trees that are being retained within the site.

C19. All worksites to be left clean and tidy and the site maintained in an orderly manner.

C20. Excavated trenches to be back filled, levelled and established as soon as practicable.

C21. Works would be completed and worksite rehabilitated within the shortest possible timeframe.

C22. All work equipment and materials would be contained within the designated boundaries of the work site.

C23. On completion of the works all vehicles, construction equipment materials and refuse relating to the works would be removed from the work areas and all areas would be restored to a level which matches as close as possible to the pre work period condition.

C24. If during the course of construction unexpected Aboriginal object(s) are discovered, all work likely to affect the object(s) will cease immediately and the DECC informed.

C25. If during the course of construction unexpected historical relic(s) are discovered, all work likely to affect the relic(s) will cease immediately and the Heritage Office notified.

C26. Spill response kits and other spill absorbent and containment products would be available on site to contain any spill events.

C27. Appropriate WorkCover certificates will be obtained where required.

C28. Separate chemical storage area with appropriate signage will be established.

6.3 During Operation

O1. Noise emitted from the RNSH Zone Substation shall not exceed the noise goals' outlined in the Acoustic consultants report and in accordance with the EPA standards.

O2. Surface water from the transformer bays will be sent to an oil containment system, where it will be treated and discharged to stormwater. Approval for discharge to Sydney Water's stormwater will be attained prior to the connection to stormwater.

O3. An Emergency Response Plan will be prepared prior to commissioning of the substation.

O4. A Fire Safety Certificate will be obtained for all of the items listed in the Fire Safety Schedule prior to operation of the substation.

O5. Closed Circuit Television Cameras will be installed if required to monitor security.

7. Conclusion

This Project Application has been prepared in accordance with Director Generals Environmental Assessment Requirements issued under Part 3A of the EP&A Act on 30th January 2008 to assess the potential environmental impacts associated with the proposal. A range of detailed investigations were undertaken during the preparation of the Project Application to assess potential environmental impacts.

The Royal North Shore Hospital Zone Substation has been designed to be sympathetic to the amenity of the locality. Specifically, the built form responds to the nature of the surrounding buildings and specific design features put in place to limit EMF levels and operational noise. The proposal is consistent with existing approvals for the site and addresses the principles of ecologically sustainable development. Parking and access to the site and the proposals impact on the surrounding area have been investigated with measures adopted to minimise these impacts.

Although these mitigation measures increased the project costs, the result is a better environmental and social outcome.

It is considered the potential environmental impacts can be adequately mitigated by implementation of the mitigation measures. The proposal is unlikely to have a significant affect on the environment. On that basis, we look forward to the Minister's favourable consideration.