Part 3A Application

FINAL ENVIRONMENTAL ASSESSMENT

Distribution & Storage Facility (Data Centre)

Eastern Creek, Blacktown

October 2010

CBRE
CB RICHARD ELLIS

Contents

Appendices

List of Figures

List of Tables

Authors Certification of Environmental Assessment

Part 3A Environmental Assessment	
Prepared pursuant to the Environmental Planning and Assessment Act 1979	
Environmental Assessment prepared by:	
Name	Mark Grayson
Position	Senior Director, CB Richard Ellis
Qualifications	Bachelors of Town Planning (Hons)
Address	Suite 1401, Level 14, 100 Pacific Highway North Sydney NSW 2060
Project to which Part 3A applies	
Application Number	10_0142
Project	The Hewlett Packard Data Storage Project, including the construction, fit out and operation of a data storage facility and associated infrastructure
Applicant Name	Hewlett Packard Australia Pty Limited
Applicant Address	353 Burwood Highway Forrest Hill VICTORIA 3131
Land to be developed	Lot 554 DP 1110447 Eastern Creek, Blacktown
Certificate	I certify that I have prepared the contents of this document, and to the best of my knowledge the assessment: - has been prepared in accordance with the requirements of Part 3A and the Regulations; - does not contain any false or misleading information.
Signature	
Name	Mark Grayson
Date	8th October 2010

This Environmental Assessment Report and specialist reports have been prepared on behalf of Hewlett Packard by the following consultant team:

Discipline	Consultant
Town Planning	CB Richard Ellis
Site Survey Noise Geology, Soils & Groundwater Infrastructure and Services Contamination	AECOM
Traffic & Access	Colston Budd & Kafes Pty Ltd
Urban Design Landscaping	Woodhead

Executive Summary

Hewlett Packard Australia Pty Ltd (HP or Proponent) is proposing to construct and operate a distribution and storage facility (data centre) at Eastern Creek, Blacktown (Project).

The Project will be located on a Site at the corner of Roberts Road and Capicure Drive, Eastern Creek described as Lot 554 DP 1110447 (Site).

HP is seeking Project approval from the Minister for Planning (Minister) under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the Project.

The Minister declared on 12 August 2010 that Part 3A of the EP&A Act applies to the Project because it is development of a kind described in Schedule 1 to *State Environmental Planning Policy (Major Development) 2005,* being development for the purposes of container storage facilities, or storage and distribution centres with a capital investment value of more than $30 million.

The Site forms part of Precinct 2 (Eastern Creek) and is zoned IN1 General Industrial under *State Environmental Planning Policy (Western Sydney Employment Area) 2009* (SEPP WSEA). Development for the purposes of the Project is permissible with consent within the IN1 General Industrial Zone under SEPP WSEA.

The Project is generally consistent with the Eastern Creek Precinct Plan – Stage 3 which was adopted by Blacktown City Council in December 2005 and applies to the Site. In addition, an existing Developer Agreement applies to the Site which makes adequate provision for the delivery of regional transport infrastructure services and the matters that may be the subject of any future Section 94 contributions plan for the Eastern Creek Precinct. The Project is also consistent with the Sydney Metropolitan Strategy and North West Subregional Planning Strategy.

The Project incorporates environmentally sustainable design guidelines and principles. Implementation and management practices to be employed during construction of the Project will ensure that the environment is protected for future generations.

The Project will make a positive contribution to the economy, locally and more broadly; is purposely located to effectively build on the strengths of an established and well serviced employment lands cluster and minimises its ecological footprint by developing an already highly modified Site.

The development of the Site will require a capital investment in the order of $119 million. The Project will create an estimated 200 jobs during construction and support 5 full time technical support jobs during the operation of the Project.

This Environmental Assessment (EA) provides a Project description and examines the existing environmental conditions of the Site and surrounds. In addition the EA addresses the compliance of the Project with the applicable statutory planning framework and undertakes an assessment of the potential environmental impacts of the Project.

Environmental impacts of the construction and operational phases of the Project have been identified and a draft Statement of commitments forms part of the Project Application. These commitments acknowledge the Proponent's strategy to mitigate environmental impacts arising from development of the Site.

This EA concludes that the Project is appropriate for the Site and is of acceptable environmental impact.

Part A Introduction

1 Introduction

1.1 Background

In 2009 the NSW Government released the State Environmental Planning Policy (Western Sydney Employment Area) (**SEPP WSEA**) which 'promotes economic development and the creation of employment in the Western Sydney Employment Area by providing for development, including major warehousing, distribution, freight transport, industrial, high technology and research facilities'.

The Site is situated within Precinct 2 (Eastern Creek) under SEPP WSEA. HP intends to develop the Site as a distribution and storage facility for the purposes of data (Data Centre).

1.2 Key Features of the Project

This application is for Project approval to construct and operate a data centre comprising of the following key components:

- A data centre building of single storey construction comprising of two (2) data cells;
- An administrative/technical support office building ancillary to the data centre;
- Hard standing access/manoeuvring areas on Site;
- Mechanical cooling equipment associated with the operating of the data centre;
- Electricity supply infrastructure comprising of service to the Site and the construction of an electrical switch station (75MW);
- Security infrastructure including fencing and restricted access;
- Site works to create a proper building platform for the data centre and potential future expansions; and;
- Landscaping of the Site.

The Site layout and arrangement of infrastructure and services on the Site will provide for a potential subsequent second stage involving a second data centre building (or similar development). This second data centre building however does not form part of this Project and has been identified as a future expansion area on all drawings.

The Site was previously used as a shale/brick pit. The quarrying operations ceased in 2003 with rehabilitation by filling and modification of the Site conditions largely completed.

1.3 The Location of the Project

The Site is located within the area of land known as the M7 Business Hub on the corner of Roberts Road and Capicure Drive, Eastern Creek and is described as Lot 554 DP 1110447. Access to the Site is provided from Capicure Drive via Old Wallgrove Road. The Site is located in the Blacktown Local Government Area. Refer to Figure 1.1.

The Site has an approximate area of 14.2 hectares and comprises of two separate sections being:

- A section for the proposed data centre including admin area comprising of approximately 14,731 m^2;
- A section set aside for a potential future expansion.

The balance of the Site comprises of associated infrastructure (including electrical switching station), manoeuvring and landscape areas.

The M4 is located approximately 2 km to the north and the M7, which provides the link between the M2 and M5, is directly to the east of Wallgrove Road. The Site is located approximately 7.8 km south west of the Blacktown CBD and 14.9 km east of the Penrith CBD.

Figure 1.1 – Regional Context (Eastern Creek Area)

Source: NSW Department of Planning, *SEPP WSEA*

1.4 Purpose of the Environmental Assessment

The Environmental Assessment (EA) has been prepared by CB Richard Ellis in conjunction with AECOM to support an application under Part 3A of the EP&A Act seeking Project approval from the Minister for Planning for the Project.

This assessment provides:

- Information on the Project, including the Project justification and alternatives considered;
- An assessment of the potential environmental impacts of the Project in accordance with the Director General's Requirements refer to Appendix I); and
- Information on the mitigation of impacts identified, including the proponent's commitments in terms of measures to minimise and manage potential environmental impacts.

1.5 The Proponent

Hewlett Packard Australia Pty Ltd (HP) is the proponent of the Part 3A application. HP was founded in 1939 and serves more than one billion customers in more than 170 countries on six continents. HP has approximately 304,000 employees worldwide.

1.6 Structure of the Environmental Assessment

The EA is structured as follows:

- **Part A** Introduction – provides an introduction to the environmental assessment (Chapter 1); information on the assessment requirements under relevant legislation and environmental planning instruments (Chapter 2); a description of the location and existing environmental features of the study area (Chapter 3) and a summary of the consultation that occurred during the assessment process of the draft EA (Chapter 4);
- **Part B** The Project – includes a detailed description of the Project (Chapter 5);
- **Part C** Consideration of Environmental Impacts – based on the Project described in Part B. This part provides an assessment of the potential environmental impacts of the Project. It describes the results of the assessment of environmental issues identified by the NSW Department of Planning Director General's Requirements (Chapters 6 - 15); and
- **Part D** Justification and Conclusion – for the Project described in Part B, and considering the results of the assessment summarised in Part C, this part provides a statement of commitments made by the proponent in relation to mitigation, management and monitoring of potential environmental impacts (Chapter 16); and the Project justification and conclusion to the environmental assessment (Chapter 17).
- **Appendices** - contains the specialist reports prepared during Project development and as part of the environmental assessment.

2 Planning Framework and Context

2.1 Overview

The following section provides an overview of key environmental legislation, statutory and strategic plans and policies relevant to the Project.

2.2 NSW Statutory Planning Framework and Approvals Process

2.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) provides the framework for the assessment and approval of development proposals in New South Wales. Part 3A of the EP&A Act relates to the assessment of major development proposals and other Projects which, in the Minister's opinion, are of State or regional planning significance.

Section 75B of the EP&A Act provides that the Minister may declare development to be a Part 3A Project by way of a State Environmental Planning Policy.

HP has sought a declaration from the Minister under clause 6 of *State Environmental Planning Policy (Major Development) 2005* (SEPP Major Development) that the Project is development of a kind described in Schedule 1 to SEPP Major Development, being development for the purposes of a storage or distribution centre with a capital investment value of more than $30 million.

The Minister declared the Project to be a Project to which Part 3A applies on 12th August 2010 (see copy of declaration at Appendix I).

2.3 Environmental Planning Instruments

2.3.1 State Environmental Planning Policy (Major Development) 2005

SEPP Major Development identifies specific Sites and classes of development that are subject to Part 3A of the EP&A Act.

Clause 6 of SEPP Major Development provides that development that, in the opinion of the Minister, is development of a kind that is described in

Schedule 1 is declared to be a Project to which Part 3A of the EP&A Act applies.

Clause 12 of Schedule 1 to SEPP Major Development identifies the following class of development to be a Part 3A Project:

'Development for the purposes of container storage facilities, or storage and distribution centres with a capital investment value of more than $30 million.'

The Project will involve development for the purpose of a storage and distribution centre for the purposes of data (data centre) and has a capital investment value of more than $30 million.

Accordingly, HP sought a declaration from the Minister under clause 6 of SEPP Major Development that the Project is development of a kind described in Schedule 1 to SEPP Major Development. As stated above, the Minister declared the Project a Part 3A Project on 12th August 2010.

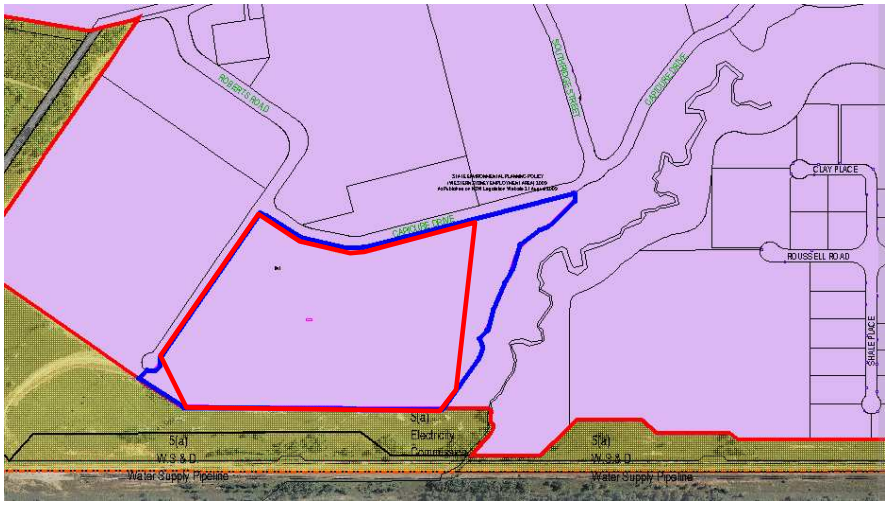
2.3.2 State Environmental Planning Policy (Western Sydney Employment Area)

State Environmental Planning Policy (Western Sydney Employment Area) 2009 (SEPP WSEA) aims to promote economic development and the creation of employment in the Western Sydney Employment Area.

The SEPP was gazetted on 21 August 2009 and replaced SEPP 59 other than for land zoned residential and open space.

The Site is situated within Precinct 2 (Eastern Creek) and is zoned IN1 General Industrial under SEPP WSEA.

Figure 2.1 – Extract from WSEA SEPP Land Use Zone Map



SEPP WSEA defines a warehouse or distribution centre as "*a building or place used mainly or exclusively for storage or handling items (whether goods or materials) pending their sale, but from which no retail sales are made.*"

Development for the purposes of a warehouse or distribution centres is permissible with consent in the IN1 zone under SEPP WSEA. The Project is permissible with consent under SEPP WSEA.

Part 5 of the SEPP WSEA contains the principle development standards applying to all Sites affected by the SEPP and these standards are addressed in Table 2.1.

Table 2.1 – Project Compliance with SEPP WSEA

Development Control	Project	Compliance
1. Ecological Sustainable Development ▪ The consent authority must not grant consent to development on land to which this Policy applies unless it is satisfied that the development contains measures designed to minimise: (a) the consumption of potable water, and (b) greenhouse gas emissions.	The proposed development has been designed with regard to Ecological Sustainable Development Principles. Section 8.2 of the EA provides an assessment of the Project against ESD principles.	Yes
2. Height of Buildings ▪ The consent authority must not grant consent to development on land to which this Policy applies unless it is satisfied that: (a) building heights will not adversely impact on the amenity of adjacent residential areas, and (b) Site topography has been taken into consideration. .	(a) The data centre will be single storey building located in a benched area of the Site (refer to Drawing W1002). Adjoining to the south is the existing riparian vegetation along Reedy Creek that acts as a visual screen. The Site is also set amongst other more substantial warehouse/distribution buildings within an established industrial precinct and is not located within close proximity to any residential area. The data centre will not adversely impact upon the visual amenity of any residential area. (b) The Site is the subject of rehabilitation works associated with its prior use as a shale quarry. The design and layout of the data centre building and associated infrastructure is intended to minimise the extent of cut/fill required beyond that necessary to rehabilitate the Site. Where cut and fill is required, measures such as soft landscaping, retaining and stepping cascade walls will be adopted to minimise Site level transition.	Yes

Development Control	Project	Compliance
3. Rainwater Harvesting ▪ The consent authority must not grant consent to development on land to which this Policy applies unless it is satisfied that adequate arrangements will be made to connect the roof areas of buildings to such rainwater harvesting scheme (if any) as may be approved by the Director-General.	The Project will incorporate on Site roof water collection via a 100,000 litre in ground storage tank (refer to Drawing W1002H). This will integrate with drip feed to turfed areas and to exotic species landscaping. Car parking will be detailed to provide water sensitive urban design. Section 5.2.6 of this report provides further details of irrigation and water sensitive urban design.	Yes
4. Development adjoining residential land ▪ This clause applies to any land to which this Policy applies that is within 250 metres of land zoned primarily for residential purposes	The Site does not immediately adjoin nor is it located within 250 metres of any land zoned residential.	Yes
5. Development involving Subdivision ▪ The consent authority must not grant consent to the carrying out of development involving the subdivision of land unless it has considered the following: (a) the implications of the fragmentation of large lots of land, (b) whether the subdivision will affect the supply of land for employment purposes, (c) whether the subdivision will preclude other lots of land to which this Policy applies from having reasonable access to roads and services.	A plan of subdivision will be submitted separately to Blacktown City Council for approval by the vendor of the Site (Goodmans). The plan of subdivision includes the subdivision to excise the Site from the two detention basins constructed during the subdivision phase of the precinct. It is understood that the proposed plan of subdivision also provides for an additional residual lot (proposed Lot 4). The subdivision will facilitate the supply of land for employment purposes by making the Site available for the data centre.	Yes
6. Public Utility Infrastructure ▪ The consent authority must not grant consent to development on land to which this Policy applies unless it is satisfied that any public utility infrastructure that is essential for the proposed	Public utility infrastructure (water, electricity and sewerage) have been provided as part of the development of the precinct for industrial purposes. The electricity supply is required to be augmented to meet the capacity and reliability requirements of the	Yes

Development Control	Project	Compliance
development is available or that adequate arrangements have been made to make that infrastructure available when required.	data centre.	
7. Development on or in vicinity to proposed transport infrastructure routes	The Site is not situated on or in vicinity to a proposed transport infrastructure route.	Yes
8. Exceptions to Development Standards	The proposed development does not seek to vary any development standards.	Yes

The Eastern Creek Precinct Plan – Stage 3 (Precinct Plan) was adopted by Council on 14 December 2005 under the then *State Environmental Planning Policy No. 59 – Central Western Sydney Economic and Employment Area*. The Precinct Plan applies to the Site and is an "existing precinct plan" for the purposes of clause 19(3) of SEPP WSEA. Accordingly, a development control plan is not required to be prepared under SEPP WSEA for the Project. The consent authority is required, however, to consider the Eastern Creek Precinct Plan – Stage 3 in its determination of the Project.

A detailed assessment of the Project's compliance with the Eastern Creek Precinct Plan – Stage 3 provisions has been undertaken as part of this Environmental Assessment. This is documented under the relevant sections of Part C of this report.

The existing Developer Agreement (addressed in section 15.0 of this report) makes adequate provision for the provision of regional transport infrastructure and services (including the Erskine Park Link Road Network) in compliance with clause 29 of SEPP WSEA.

2.3.3 State Environmental Planning Policy (Infrastructure) 2007

The provisions of State Environmental Planning Policy (Infrastructure) 2007 have been considered in the preparation of this Project application. The proposed development is not categorised as traffic generating development and accordingly is not required to be referred to the RTA.

2.3.4 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

The provisions of State Environmental Planning Policy No. 33 (SEPP 33) have been considered in the preparation of this Project application. The proposed development does not involve storage of any materials deemed to be hazardous or offensive under the SEPP. Furthermore, the processes involved in the operation of the data centre are not hazardous or offensive pursuant to the SEPP.

2.3.5 State Environmental Planning Policy No. 55 – Remediation of Land

The provisions of State Environmental Planning Policy No. 55 (SEPP 55) have been considered in the preparation of this Project application. The Site was formerly used as a shale quarry and has been extensively filled over time. In 2005 Environmental Investigation Services Pty Ltd carried out a preliminary Site contamination assessment and a salinity assessment of the land and concluded that the Site could be safely used for industrial / commercial purposes.

2.3.6 State Environmental Planning Policy No. 64 (Advertising and Signage)

The Project application does not involve the installation of business identification signage to the façade of the building.

2.4 Existing Local Environmental Plans (LEP)

Clause 3(4) of SEPP WSEA provides that Blacktown Local Environmental Plan 1988 does not apply to any of the land subject to the Policy within the Blacktown LGA. Therefore, the LEP does not apply to the Site.

2.5 Metropolitan Strategy and Sub Regional Strategy

Released in December 2005, the *City of Cities – A Plan for Sydney's Future* (Metropolitan Strategy) was developed by the NSW Department of Planning (DoP). The Metropolitan Strategy is a framework developed to promote and manage Sydney's growth and outline a vision for the future to 2031. The Metropolitan Strategy guides the process of planning for employment, transportation and other infrastructure. The Strategy sets residential and employment capacity targets for Sydney's subregions and strategic centres, as well as outlining other land-use objectives.

Economic, social and environmental sustainability are the guiding principles for the Metropolitan Strategy. Five aims outlined in the document include: to enhance liveability; strengthen economic competitiveness; ensure fairness; protect the environment; and improve governance.

Specific objectives of the strategy relating to the economy and employment are:

- provide suitable commercial Sites and employment lands in strategic areas,
- increase innovation and skills development, and
- improve opportunities and access to jobs for disadvantaged communities.

Key targets relevant to the Project include:

- A new Western Sydney Employment Area near the corner of the M4 and M7 motorways, of which the proposed development Site is located within; and
- 99,000 new jobs to be generated in the North West, of which the Blacktown LGA (and therefore the proposed development) is part of, by 2031.

The proposed distribution and storage facility by HP are considered to specifically address many of the guiding principles and economic objectives of the strategy, as noted below.

- The development will occur within a strategically important employment precinct specifically identified by the Metropolitan Strategy. The data centre represents a significant economic investment and will consolidate and further enhance the viability of the WSEA.
- The development will provide specialised employment opportunities in a key location in Western Sydney. In particular, the data centre will result in the following:
  - Peak construction estimated workforce – 200 persons
  - Estimated operational workforce – 5 persons

  Whilst only 5 full time operational staff are envisaged, they will be highly skilled in data storage operations and technical support. Ancillary employment will also be required to maintain the facility overtime.

  The operation of the facility will demand the on-going employment of additional resources related to the maintenance of the grounds, site infrastructure, landscaping and mechanical installations. Integral energy employees will also be required to provide regular maintenance of the associated electrical switch station.

  This type of facility is relatively rare within Australia and its construction will therefore require a specific skill base. The development should ensure these skills are not only harnessed for this Project, but developed for future use in similar projects in the Western Sydney Region and wider NSW.

  Any subsequent expansion or second data centre building (as discussed in Section 5.1) would also obviously result in both temporary and full-time employment during construction and on-going operations.
- The WSEA and therefore the proposed data centre is considered easily accessible to residents, strategically located close to the labour force and linked into the transport network (M4 and M7).
- The development will occur within a well established commercial precinct and largely rely upon existing specialist infrastructure.
- It will be located within the Site of a former shale quarry (now rehabilitated), will not involve the removal of any vegetation and have little or no environmental impacts.

2.6 North West Subregional Planning

The North West Subregion is made up of five local government areas: Baulkham Hills, Blacktown; Blue Mountains; Hawkesbury; and Penrith. Much of the employment growth within the subregion is planned to occur within the Blacktown LGA as the majority of the North West Growth Centre and Western Sydney Employment Area (as identified in the Metropolitan Strategy) is located within this LGA.

One of the key directions for the North Western Subregional Strategy is the location of new investment and therefore jobs in Western Sydney. According to the strategy, the North West Subregion has experienced rapid population growth that has not been matched by comparable growth in employment, resulting in relatively low levels of employment self-containment for the subregion.

The strategy makes specific provision for the Western Sydney Employment Area and notes that the "clustering of industries around the new M7 Motorway and development of the Western Sydney Employment Hub will also be integral to achieving these targets and will provide opportunities for spin-off developments in nearby centres".

The proposed data centre will satisfy many of the strategic objectives and specific actions for the region including:

- The data centre represents a relatively rare and important technological investment not only for the WSEA, but the North Western sub-region and Blacktown City Local Government Area;
- The proposed use is deemed consistent with the planning/IN1 General Industrial zoning objectives for the area and will be compatible with existing surrounding light industrial and warehousing activities;
- As noted in Section 2.5 above, construction of the data centre and its continued operation will make a positive contribution to the on-going economic viability of the employment precinct and job targets for the North Western sub-region.

2.7 Commonwealth Legislation

2.7.1 Environmental Protection and Biodiversity Conservation Act 1999

Commonwealth legislation of possible relevance is the *Environmental Protection and Biodiversity Act 1999* (EPBC Act). Under the EPBC Act, approval is required from the Commonwealth for any activity likely to have a significant impact on a matter of national environmental significance. Matters of national environmental significance include:

- Internationally important wetlands;
- World Heritage Sites;
- National Heritage items;
- Listed threatened species and ecological communities;
- Migratory species protected under international agreements.

Based on initial investigations, the Project is unlikely to impact on threatened species and ecological communities. Other matters of national environmental significance or commonwealth land are unlikely to be impacted.

2.8 Other Environmental Legislation

It is noted that Section 75V of the EP&A Act identifies particular environmental legislation and necessary approvals that must be applied consistently to the approval of a Project, whilst Section 75U(1) & (2) of the Act identifies legislation and approvals that do not apply to the approval of Part 3A Project.

The following legislation has been reviewed in preparing the Environmental Assessment and are addressed where necessary throughout this report:

- Contaminated Land Management Act 1997;
- Heritage Act 1977;
- National Parks and Wildlife Act 1974;
- Roads Act 1993;
- Threatened Species Conservation Act 1995;
- Water Management Act 2000.

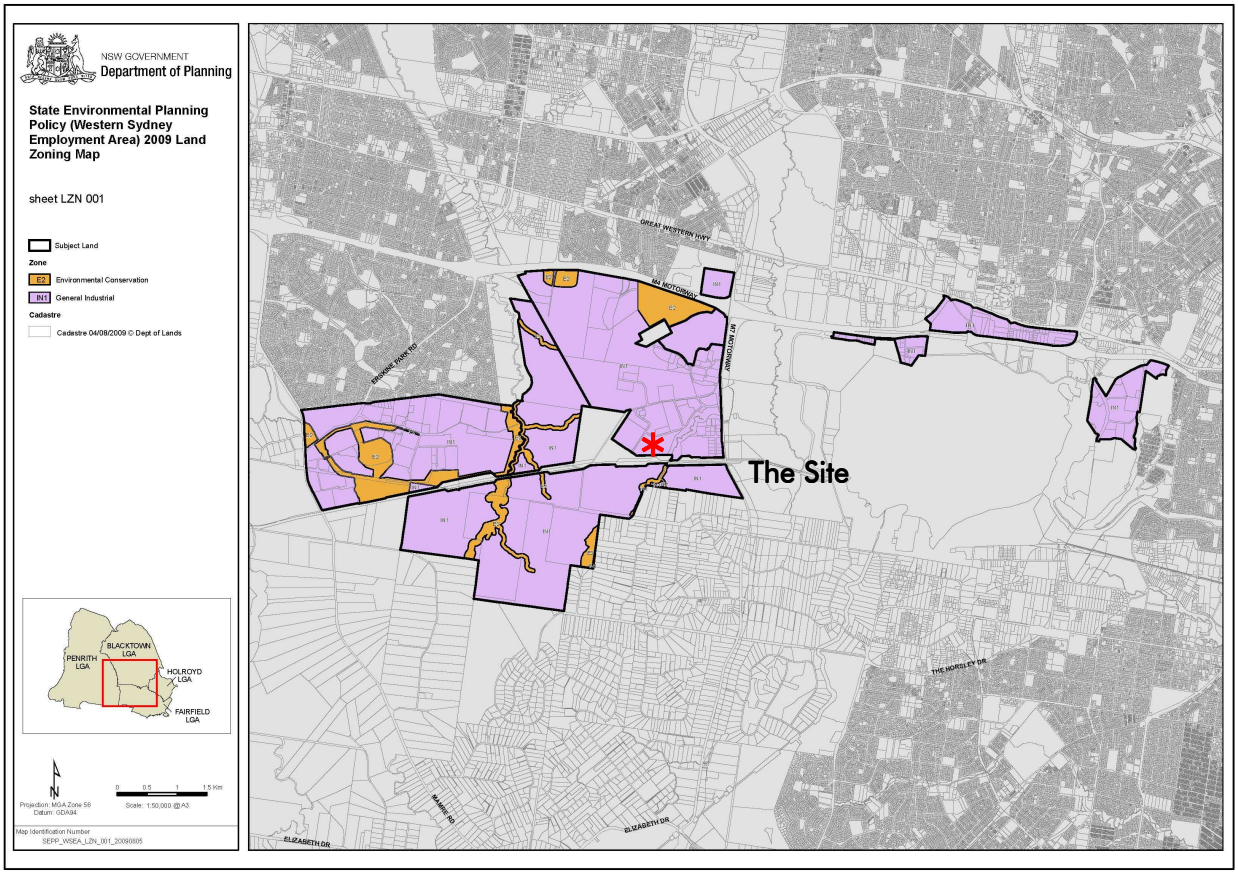
3 Site Context

3.1 Regional Context

The Site is located with the Eastern Creek Precinct of SEPP WSEA as described in section 2.3.3 of this report. The Eastern Creek Precinct covers an area of approximately 600 hectares, and is principally bounded by the M4 to the north, Wallgrove Road to the east, the Sydney Water pipeline to the south, and Transgrid transmission easement to the west. The Reedy Creek watercourse flows to the east of the Site in a south-west/north-east direction.

Figure 3.1 details the location of the Site within the SEPP WSEA.

Figure 3.1 – SEPP WSEA



Source: SEPP WSEA, 2009

Vehicular access to the M7 Business Hub is provided from Wallgrove Road and Old Wallgrove Road. Surrounding land use in the vicinity of the Site is primarily industrial, comprising a mix of warehouse, distribution and business park uses. A number of Sites within the area have been developed.

3.2 Site History and Description

The Site has previously been used for the extraction of shale resources as part of the former Austral Bricks quarry works. Development consent for the extraction of shale was granted by Blacktown City Council in December 1986 (Development Consent No. 005475).

As part of the original development consent, an Extraction and Rehabilitation Plan (ERP) was required to be submitted to the Council every 5 years from the date of consent for the subsequent 5 year period, with the last five year period commencing 2003. The ERP produced by Connel Wagner in 2003 is the final ERP for the remainder of the life of the consent (2003-2010). The ERP identifies key environmental issues and the manner in which the Site is to be rehabilitated.

The proposed development will involve Site works to ensure a proper building platform for the proposed data centre and the potential for future expansion. The Site is currently vacant and largely cleared. The aerial photograph in Figure 3.2 identifies the Site.

3.3 Surrounding Development

The Project Site is located within the M7 Business hub where a number of distribution and warehouse facilities have already been approved.

Land to the north of Capicure Drive has recently been developed by Coles for a Chilled Distribution Centre. The Coles National Distribution Centre is located to the west of the Site beyond which is the Sydney West Electrical Substation. To the south is vacant land and the Sydney Water main. To the east of Reedy Creek is the approved Coca Cola facility.

The closest residential areas are the residential suburbs of Minchbury to the north of the M4 and Erskine Park to the west.

Figure 3.2 – Aerial Photo of the Site with Indicative Boundary

Source: Near Map

3.4 Site Conditions

SEPP WSEA provides a detailed description of the Site and characteristics of the surrounding area. A summary of the Site characteristics in relation to the Precinct is provided below:

- Landscape Character and Scenic Quality – the Site has been progressively rehabilitated as a result of its former use as a shale quarry to make it suitable for development. The topography of the Eastern Creek Precinct provides several opportunities for internal views both into and out of the Precinct. The Site provides internal views to the north and east. The development of the Site will be consistent in character with that established.
- Existing Vegetation – the prior quarrying activity has left the Site devoid of vegetation other than random grass cover and several eucalypt specimens to the Roberts Road/Capicure Drive corner. These will be retained as part of the Project layout.
- Non-Indigenous Heritage – the Precinct contains 4 items of non-indigenous heritage of which none are present on the Site.
- Indigenous Heritage – 22 surface open indigenous heritage Sites, 19 surface isolated relics and a scarred tree with open artefact scatters have been recorded within the Precinct, however none on the Site.
- Hydrology and Drainage – the Precinct is part of the South and Eastern Creek catchments. Reedy Creek runs to the east of the Site draining to Eastern Creek.
- Flora and Fauna – an area of low ecological value is located to the north of Site and an area of high ecological value is located to the east of the Site which is identified as a riparian corridor associated with Reedy Creek.
- Bushfire – the Site is not within a 'Bushfire Prone Zone'.
- Easements – a number of utility easements exist along the southern boundary of the Site. These exclude the Sydney water mains and electricity lines. No easements are present on the Site.

Drawing W0102B (Site Analysis) included with this EA illustrates the key features, opportunities and constraints of the Site and its surrounds.

The design and layout of the data centre and associated works has taken into account the guiding principles and special provisions set out in SEPP WSEA. This has included consideration of the appearance of the development from within and outside of the Site from Wallgrove Road, the M4 and the M7.

The data centre has also been designed in response to other HP comparable data centres in Australia and worldwide, taking into account the Sites constraints and opportunities.

Part C of the EA describes the key environmental issues associated with the development in further detail taking into account the key features and constraints of the Site illustrated in Drawing W0102B.

4 Consultation

4.1 Consultation for the Project and Environmental Assessment

During the design and assessment of the proposed data centre consultations were undertaken with the following authorities:

- NSW Department of Planning;
- Blacktown City Council;
- Sydney Water;
- Sydney Catchment Authority;
- Transgrid;
- Roads and Traffic Authority;
- Integral Energy;
- Service and Utility Providers.

Table 4.1 details the consultations undertaken during the preparation of the EA.

Table 4.1 – Overview of EA Consultations Undertaken

Key Issues	Report Section
NSW Department of Planning:	
CBRE Town Planning has consulted with relevant Department of Planning representatives at the initial Clause 6 determination stage, following submission of the Preliminary EA, and throughout the EA process. Key issues discussed included: (i) Approvals pathway. (ii) Director-General requirements. (iii) Developer contributions/planning agreements. (iv) Applicable statutory/strategic plans and policies.	Refer Sections 2.0 – 17.0
Blacktown City Council:	
CBRE Town Planning met with Blacktown Council prior to finalisation of the Project application. The main purpose of the meeting was to outline the Project following which a number of issues were discussed. They included: (i) Drainage modelling should be consistent with subdivision. (ii) Pre-treatment of stormwater to occur on Site before discharge. (iii) Provision for roof water harvesting scheme. (iv) Design of storm water management system should take into consideration future Site requirements. (v) Additional services required should fit within existing conduits (vi) Treatment should be undertaken on substantial level differences. (vii) Project should comply with Precinct Plan.	Refer Sections 2.0 – 13.0

(viii) Substations should be located behind the building line and not visible from the street. (ix) Consideration of nearby heritage item - Southridge House. (x) ESD principles to be considered (Energy efficiency and water reuse). (xi) Lighting of car park area for safety and security. AECOM also have liaised with Council on a regular basis in relation to: (xii) Meeting to discuss on-Site stormwater detention, water quality and other requirements, and (xiii) PMF and 100 year ARI flood levels.	
Roads and Traffic Authority:	
The EA has specifically responded to the issues as raised by the Roads and Traffic Authority in the Director-General Requirements. Further inter-agency consultation will occur upon submission of the EA to the Department.	Refer Section 9.0 and Sections 3.27 – 3.36 of the Traffic Report (Appendix III)
Integral Energy:	
AECOM representatives liaised with Integral Energy on a number of occasions during the Site selection process in relation to power supply and capacity. Following preferred Site selection, further consultation was undertaken as follows: 10 August 2010 – Official application for connection of load lodged with Integral Energy. 11 August 2010 – Acknowledgement of receipt of application from integral Energy. 26 August 2010 – Meeting held between proponents, CBRE Town Planning, AECOM and Integral Energy to discuss existing and future power supply needs of HP, 'Level 3 design' approval process, land ownership issues associated with the propose sub-station, cable routes and required easements. 30 August, 2010 – Integral confirms property ownership for the easement required for the 132kV cable route along the southern extremity of the Site.	Refer Sections 5.2.3, 8.3, 16.0
Sydney Water:	
AECOM have consulted with Sydney Water (and external agents) on a regular basis in relation to the following: - Dial before you dig application. - Existing flows and pressures. - Accessed Sydney Water's InfoWorks and Hydra database.	Refer Sections 8.3 and 10.0

Service and Utility Providers:	
AECOM have liaised with Jemena (gas) in relation to the following: - Dial before you dig request. - To ascertain the location of high pressure and low pressure pipelines in the area. - Potential for secondary main (currently along Burley Road).	Refer Section 8.3

Given the location of the Site within Eastern Creek it is anticipated that nearby communities will not be affected by the Project, however adjoining landowners have been consulted.

Part B – The Project

5 Project Need and Description

This application is for a Project approval for a data centre comprising of one single storey data centre building and associated infrastructure.

5.1 Key Elements

HP is seeking Project approval to construct and operate a data centre on the Site. This application is for Project approval for a data centre comprising of one single storey data centre building and associated infrastructure including mechanical / electrical cooling facilities. An electrical switch station, driveway access, hard stand manoeuvring areas, security fencing and landscaping.

The Project will involve Site works to ensure a proper building platform for the proposed data centre.

The Site layout and arrangement of infrastructure and services will provide for a potential subsequent future development involving a second data centre building (or similar development). The second data centre building however does not form part of the Project and has been identified as a future expansion area on all drawings.

The layout of the proposed data centre building, associated infrastructure, internal arrangements, and parking areas are shown on the accompanying drawing set prepared by Woodhead. These include:

- Existing Site Plan – Drawing W0101D;
- Site Analysis – Drawing W0102B;
- Site Plan Roof Plan – Drawing W1001L;
- Site Plan Ground Floor – Drawing W1002H;
- Proposed Ground Floor Plan – Data Hall – Drawing W2001E;
- Proposed Ground Floor Plan – Admin – Drawing W2005E;
- Proposed Section – Drawing W4501C;
- Perspectives – Drawing W1021;
- Site Plan – Gate House – Drawing W1003.

All drawings are contained in Appendix VI of the EA.

Table 5.1 provides a summary of the key components of the Project. A detailed description is provided in the proceeding sections.

Table 5.1 – Major Components of the Project

Component	Description
Project Summary	Construction and operation of a data centre at Eastern Creek comprising of a data centre building with associated infrastructure
Data Storage Facility	See Data Centre Building description below.
Height	Single storey with roof top air handling facilities.
GFA	14,731 m^2 (data centre and admin area)
Supporting Infrastructure	To include; - 75MW electrical switch station - Constructed drive way ingress / egress - Hard standing manoeuvring areas including car - 28 staff/visitor parking spaces and servicing - Various components: sprinkler tanks, water storage tanks, pump rooms, diesel generators (external within acoustic enclosure) plus above ground diesel fuel tanks) - Landscape screening - Security perimeter fencing
Employment	Peak construction workforce – 200 (estimate) Estimated operational workforce – 5 Estimated visitor numbers - 10
Capital Value	$119 million AUS
Construction	Construction of the facility is expected to take approximately 12 months
Hours of Operation	Operations will take place 24 hours a day, 7 days a week

5.1.1 Data Centre Building

The HP data centre will comprise a building area of 11,528m^2 (14,731 m^2 including the admin area) and would be used as a data storage facility including associated infrastructure and office space. Refer to Drawing W1002H.

One single storey, two (2) cell data centre building, each cell of IT floor space with dedicated infrastructure to support each as a stand-alone cell. Each cell will have independent mechanical and electrical systems.

The data centre building will be constructed with a variety of materials and finishes to achieve a modern visually pleasing elevation to the public domain. Perspectives of the proposed buildings taken from the eastern, northern (Capicure Drive) and western (Roberts Road) boundary is provided in Drawing W1021.

The data centre has been located on the Site to meet all Project and fire safety requirements whilst occupying the minimum amount of Site area.

Other factors relevant to the siting of the data centre building include:

- Location of the exterior utility yard along the southern portion of the Site to facilitate the routing of the electrical service;
- Allowance for the potential future expansion of the data centre and associated mechanical and electrical spaces (refer to Drawing W1002H);

- Provision of sufficient space for NSW Fire Brigade access to all points on the exterior of the building; and
- Allowance for a potential future second data centre building (refer to Drawing W1002H).

5.1.2 Site Access

The principal access to the Site is available via the existing sealed entrance along the western boundary of the Site off Roberts Road (refer to Drawings W 1001L and 1003A).

It will serve as the main access point for both car and truck traffic for employees, visitors, and deliveries. The Site circulation design is based upon a full 18 wheel, semi-trailer delivery truck.

All vehicles will be required to stop at the security check point and rejected vehicles will be turned around using the turnaround area provided on the unsecured side of the entrance. All sides of the Site will have security fencing and monitoring 24 hours / 7 days / 365 days a year.

The primary Site access control will occur at the security entrance to the Site. Upon clearance to the Site, no additional Site access control is planned except through building perimeter security doors.

Service vehicles that need to access the utility yard, such as fuel trucks or maintenance employees, can be escorted through a locked gate by facilities staff or by use of a contractor access key.

A separate access off Roberts Road may be provided for Integral Energy to service and carry out maintenance of the switching station. This is subject to further negotiation with Integral Energy.

5.1.3 Associated Infrastructure

5.1.3.1 Electrical Switch Station

The electrical switch station will provide for an ultimate load of 75MVA (Mega Volt Amp) with the first data centre building requiring 35MVA.

75MVA is a substantial power requirement and requires a complete 132kV /11kV substation on Site. This switch station will consist of:

- A 132kV high voltage switching station (which will be owned and maintained by Integral Energy);
- An 11kV switch station;
- 132kV/11kV transformers which will be owned and maintained by HP; and
- A Site curtilage of 100 x 100 m with perimeter security fencing.

The Site layout positions the switch station in the south eastern corner of the Site. In doing so, the switch station will be largely screened and not visible from Capicure Drive or Roberts Road (refer to Drawing W1002H). An agreement has been reached for the handover of the constructed and commissioned 132kV high voltage switching station to Integral Energy.

5.1.3.2 Other Parts

Associated infrastructure to be provided includes:

- Security check point (at Roberts Road entrance) (refer to Drawings W1001L and W1003A);
- Fire Sprinkler tanks and pump room (similar to the neighbouring Coles Distribution Centre tanks in size and profile) (refer to Drawing W1002H) ;
- Above ground diesel generators (for use in power failure only) (refer to Drawing W1002H);
- Above ground diesel tanks (refer to Drawing W1002H).

5.1.4 Parking

Section 9.6.2 of this report provides further details regarding parking requirements. All parking areas will be paved. Accessible parking will be provided near the primary building entrance for handicapped and security personnel. Refer to Drawings W1001L and 1003A.

5.1.5 Cut and Fill

Earthworks are proposed in order to accommodate the building platform, site stormwater drainage and overland flow. The approximate levels of the existing lower and middle tiers are RL61.00 and RL68.00 respectively. The top tier along Roberts Road, at an average level RL77.00 will need to be excavated to match the proposed Site levels to facilitate works.

The general approach to the cut and fill design is as follows:

- Grading the lower tier from west to east at 2% with average level at RL61.00;
- Minor earthworks associated with the existing batter between the lower and middle tiers. Ultimately this batter would be designed with 1(v) to 3(h) slope;
- Grading the middle tier from west to east at 2% with an average level at RL68.00;
- Utilising the upper/top tier material to fill the existing quarry;
- Balanced approach i.e. no double handling of spoil / fill.

Material used for filling will be Virgin Excavated Natural Material (VENM). This has been used to fill Pits 1 and 2. Refer to Figure 5.1.

Table 5.2 - Earthworks Quantities

Cut (m^3)	Fill (m^3)	Balance (m^3)
206,270	300,270	94,000

Refer to Figure 5.2 for cut vs. fill isopach sketch plan. It should be noted that of the above earthworks, 266,200m^3 of fill is required to pack the existing quarry up to the proposed finished surface levels.

5.1.6 Landscaping

The Site is being progressively filled as part of a separate approval by the Vendor of the land to form three platforms, stepping from the west at its highest point to the east. The quarry excavation to the south west of the Site is still to be filled.

There will be redistribution of existing fill to the Site to achieve two level building platforms at RL 61 and RL 68. Each platform will batter into the adjacent platform or to the adjoining property levels. Maximum embankment slopes will be 1 in 3 to enable secure landscape treatment. Retaining walls where levels do not allow embankments to perimeter of Site will be provided up to a maximum 3m in height prior to adopting 1.5m step with planting. Retaining walls will comprise coloured split face concrete blockwork similar to that already installed to Reedy Creek/ Capicure Drive locations.

There is minimal natural ground remaining on Site. Prior to quarry works being undertaken the Site was of rural character (grassland with minimal tree canopy). The Site would have been typified by Cumberland Plain Vegetation prior to clearing for agricultural purposes.

The proposed landscape design will be developed to provide a simple and robust landscape setting for the development and related servicing, car parking and manoeuvring areas of the Site. Landscape treatments will aim to compliment the character of the existing adjacent development's landscape setting, and establish an appropriate native identity and amenity for new elements in particular streetscapes in accordance with SEPP WSEA.

5.1.6.1 Road Frontage

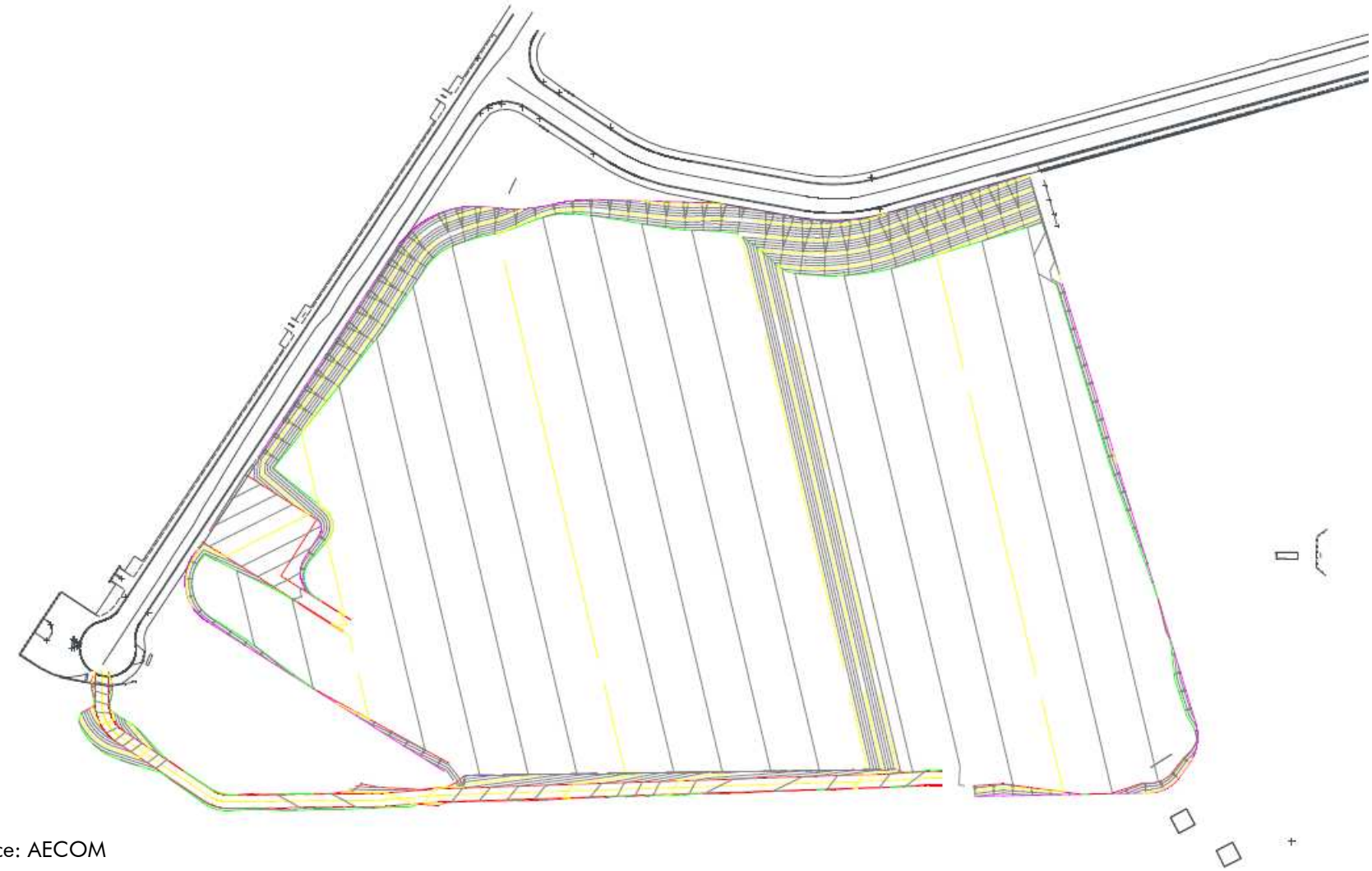
Streets trees and related streetscape treatments are to be installed by the Vendor of the Site in accordance with SEPP WSEA for Local Roads and Standard Collector Roads to Capicure Drive and Roberts Road.

5.1.6.2 Setback Planting

Site boundaries are proposed to be planted with mass plantings of native landscaping combined with earth beaming to form an articulated visual barrier to Capicure Drive and Roberts Road. Feature planting to the main entrance and along these roadways will be provided to enhance the streetscape. Low level mass planting to building setback zones will ensure that substantial level changes between boundary and building are addressed in a visually integrated manner. Landscaping to setback zones and proposed internal access roads are proposed to include native buffer tree plantings of *Eucalyptus tereticornis* and *Bursaria spinosa* shrub plantings with *Lamandra 'Tanika'* native grass groundcovers.

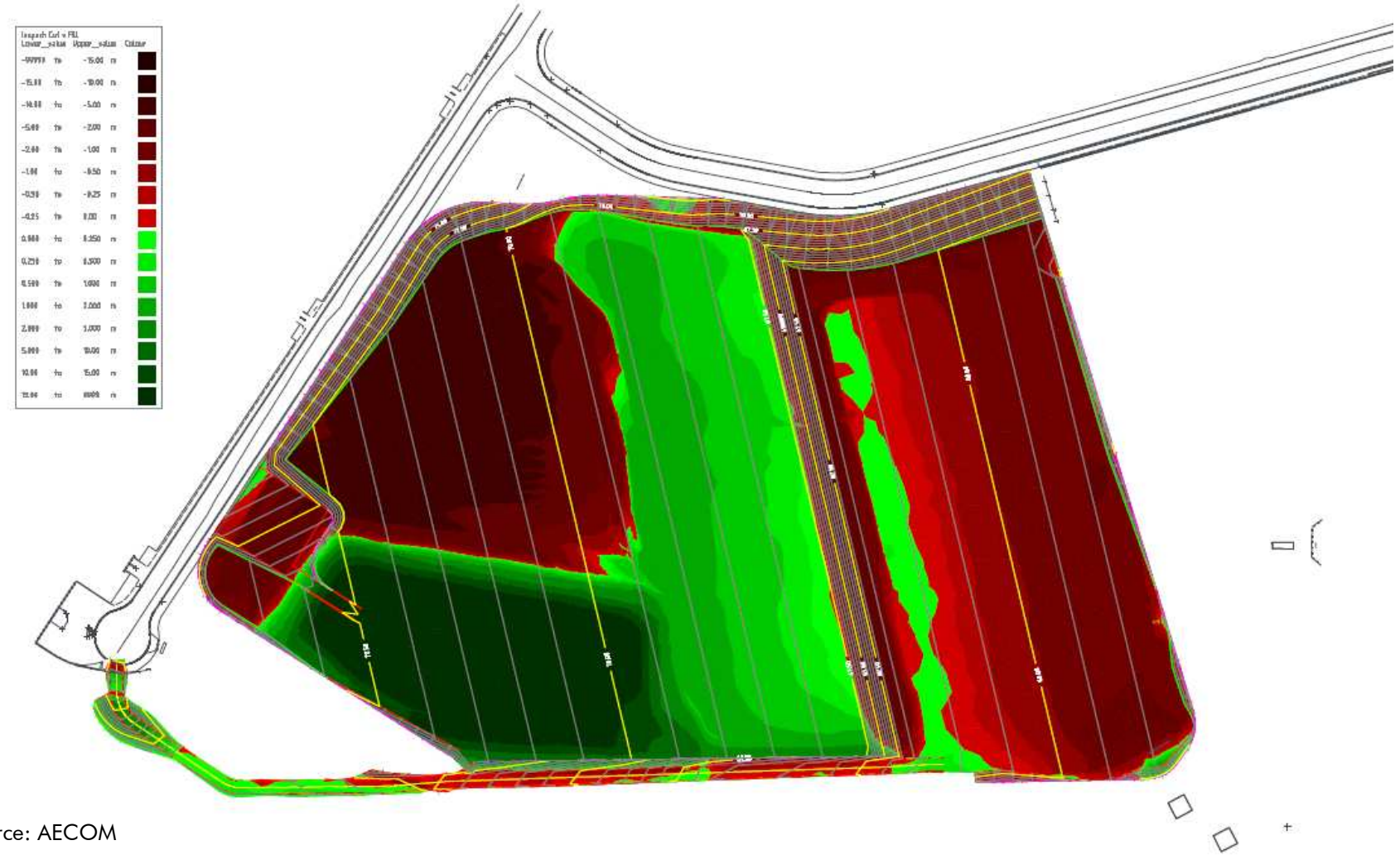
Plant species proposed for the Site are listed in Tables 5.3 to 5.5.

Figure 5.1 – General Site Grading



Source: AECOM

Figure 5.2 – Site Grading Isopach



Source: AECOM

Table 5.3 - Proposed tree planting list

Botanical name	Common name
Trees:	
Eucalyptus amplifolia	Cabbage Gum
Eucalyptus molucanna	Coastal Grey Box
Eucalyptus tereticornis	Forest Red Gum
Eucalyptus reticulatus	Blueberry Ash
Melaleuca decora	Paperbark
Jacaranda mimisifolia	Jacaranda
Sapium sebiterum	Chinese Tallow Tree

Table 5.4 - Proposed understory planting to garden beds

Botanical name	Common name
Shrubs:	
Acacia falcata	Hickory Wattle
Banksia ericifolia	Heath Leafed Banksia
Bursaria spinosa	Blackhorn
Dodonea viscose	Sticky Hop-bush
Doryanthes excelsa	Gymea Lily
Phormium tenax	New Zealand Flax
Westringia fruticosa	Coastal Rosemary

Table 5.5 - Proposed native grasses and low level plantings:

Botanical name	Common name
Grasses:	
Carex appressa	Tussock Sedge
Juncus usitatus	Common Rush
Isolepsis nodosa	Knobby Clud-rush
Lomandra longifolia	Mat Rush
Lomandra longifolia 'Tanika'	Mat Rush
Microleana stipoides	Rice Grass
Poa poiformis 'Kingsdale'	Tassock Grasses
Themeda australis	Kangaroo Grass
Agapanthus Orientalis	Agapanthus
Photinia Robusta	Photinia
Tracheiospermum jasminodes	Star Jasmine

Native Buffer Planting is proposed to shield major on-site service installations including sprinkler tanks and Diesel Generators.

5.1.6.3 Car Park Island Planting

Landscape car park islands are proposed to accommodate shade tree planting of Cabbage Gum (*Eucalyptus amplifolia*) with native grass groundcover such as *Lamandra 'Tanika'* and feature shrub plating such as *Doryanthes excelsa*. This landscape treatment will extend around the perimeter of the car park.

5.1.6.4 Staff Outdoor Area

A staff outdoor area of approximately 100m² is proposed as a turfed and paved (urban stone coloured pavers) area with peripheral garden bed areas (refer to Drawing W1001L). Tree plantings of *Eloeaocarpus reticulates* supplemented by exotic tree species (Sapiums and Jacaranda) and shrub plantings against adjacent building walls of *Westringia fruiticosa, Phormium tenax* and *Tracheliospermum jasminoides*. The same species will extend through planting beds adjoining the car park area.

5.1.6.5 Allotment Boundary: East and South

The landscaped area adjoining adjacent allotments to the east and south is proposed to be provided with native tree shrub and native grass plantings to provide a buffer to adjoining properties. Trees will be grouped in clusters of 5 to 7 to buffer required Data Centre plant and services e.g. sprinkler tanks, diesel generators etc.

Tree buffer planting:-

- *Eucalyptus amplifolia;*
- *Eucalyptus molucanna;*
- *Eucalyptus tereticornis;*
- *Melaleuca decora.*

Shrub buffer planting:

- *Banksia ericifolia;*
- *Bursaria spinosa;*
- *Acacia falcata;*
- *Acacia implexa.*

Group planting of native grasses:

- *Lomandra 'Tanika';*
- *Poa poiformis 'Kingsdale'.*

5.1.7 Irrigation and Water Sensitive Urban Design

The Project will incorporate predominately Australian native planting pallete with some deciduous feature exotic species (e.g. Jacaranda) as entry and staff outdoor features.

On site roof water collection will be provided via a 100,000 litre in ground storage tank. This will integrate with drip feed irrigation to turfed areas and to exotic species landscaping. Car parking will be

detailed to provide water sensitive urban design. This together with timer control to irrigation will ensure a well developed car park, staff outdoor area and entry landscaped environment.

5.1.8 Security Fencing and External Lighting

Due to security concerns, the data centre has been carefully designed to ensure that it has optimal security in place and reduced vulnerability to vandalism and damage.

Fencing to Capicure Drive and Roberts Road will comprise a 2.1m high fence powdercoated "Diplomat" style fence. Fencing to southern and eastern boundaries will comprise 2.1m chain with barbed wire over. Refer to Drawing W1001L.

The utility yard will be protected by a 2.1m high chain link fence with barbed wire over, which will enclose the exterior generators, utility transformers/switches, and load bank. Access to the utility yard will be by a padlocked rolling gate on the east and west side of the yard. A separate personnel gate with secured panic bar will be provided for exiting as required. On site staff will escort service vehicles into the utility yard.

The outdoor lighting of the data centre site will be the minimum necessary for occupational health and safety and to also meet the requirements of Australian Standard AS/NZS 1158.3.1: 2005 *Lighting for Roads and Public Spaces* Part 3.1: *Pedestrian Area (Category P) Lighting* – Performance and design requirements and Australian Standard AS/NZS 1680 *Interior Lighting* (for access points), as well as security lighting aspects required by the HP Security Standards document.

Outdoor lighting is required for the following areas:

- Building façade (only for CCTV surveillance of the integrity of the building perimeter as well as access and egress points).
- Gate houses
- Loading Dock Exterior
- Open Areas
- Open Parking Lot
- Outer Perimeter
- Pedestrian Entrances
- Pedestrian Walkways
- Perimeter Fence
- Vehicle Entrances

An equally essential aspect will be limitation of light spill by compliance with Australian Standard AS 4282 – 1997 *Control of the obtrusive effects of outdoor lighting*. To further eliminate/minimise the impact of outdoor lighting, light directly from luminaires will only be directed below the horizontal unless building perimeter security circumstance can only be achieved by up-lighting of an elevation in which case the major portion of direct light will be designed, positioned and aimed to only strike the intended target.

Security lighting of perimeter fence zones adjoining adjacent environmentally sensitive areas in relation to fauna will require appropriate positioning and aiming and the use of back-light shields combined with limited mounting height (4.5 to 6.0 metres) in addition to the criteria specified above.

The lighting will provide the minimum performance stated above whilst using energy efficient lighting and minimising potential visual and environmental impacts.

5.2 Operation of the Project

The data centre will be used to house computer systems and associated components, such as telecommunications and storage systems. It includes back up power supplies and environmental controls (e.g. air cooling systems, fire suppression) and security devices.

The physical environment of the data centre is rigorously controlled by:

- Air cooling equipment – this is used to control the temperature and humidity in the data centre;
- Backup power in the form of diesel generators and associated diesel tanks;
- Fire detection and fire protection systems (i.e. pre-action fire sprinklers, fire walls) in all critical zones of the building;
- Physical access to the Site is restricted to selected personnel, with security fencing and permanent security guards provided in a purpose built gatehouse adjacent to Roberts Road.

5.3 Project Timing and Implementation

The timing and implementation of development will depend on a number of factors including the approval of the Part 3A application and the timing of infrastructure provision.

5.4 Project Alternatives

A number of alternative sites in the surrounding employment areas and wider Sydney Region were investigated for their potential to accommodate the proposed data centre.

They included land within the following locations:

- Riverstone – Marsden Park,
- Smeaton Grange – Hoxton Park,
- Camden,
- Erskine Park, and
- Eastern Creek.

The following key criteria were examined in the site selection process:

	Site Criteria	Issues Considered
1	Accessibility	- Direct vehicular access to major transport corridors including M4 and M7. - Centrally located within Sydney Metropolitan context. - Distance from CBD and other major centres.
2	Environmental Constraints	- Bushfire risk. - Flooding. - Topographic. - Flora and fauna. - Heritage/archaeological. - Geotechnical/Seismic activity. - Soil contamination. - Mines and subsidence. - HAZMAT report (if available).
3	Site Area and Characteristics	- Physical location within subject industrial/employment precinct. - Covenants, easements and other restrictions. - Land use context and compatibility with surrounding users. - Proximity of residential development (existing and proposed)
4	Planning Context	- Strategic land use context and policy framework. - Statutory planning context. - Permissibility and consistency with zoning provisions. - Site specific development controls.
5	Availability of Infrastructure and Services	- Electrical supply and capacity to accommodate data centre needs over time. - Sewer and water supply. - Stormwater and drainage. - Telecommunications. - Gas. - Road network - suitability of vehicular access.

Following a detailed examination of other potential locations within Sydney Region (referred to above) against the needs of HP, Eastern Creek became the favoured alternative particularly given the availability of the Site and access to reliable utility services.

The location was also chosen because of its suitability for large scale distribution and storage purposes and identification of the subject area by State government as an important economic and employment area.

Key reasons why the subject site was preferred included:

- The Site is located within the Eastern Creek Precinct Employment Lands;
- The Site has access to reliable utility services;
- The Site is conveniently located to major transport corridors (M4 and M7);

- The Site is located within an existing industrial precinct which is readily available for development;
- The land has been extensively remediated in response to its former use as a shale quarry;
- The land has no other significant site constraints;
- There is no residential areas in close proximity to the Site;
- Services are, or can be, made available to the Site.

The alternative to the Project not proceeding in the Eastern Creek location would be to instigate another market review of available sites elsewhere in Sydney Metropolitan area and Australia, and to then undertake detailed site suitability investigations.

The implementation of the Project is likely to occur in the following manner:

- Site establishment including provision of on-Site services, internal road and drainage arrangements;
- Construction of the data centre building and associated infrastructure including the sub-station.

As noted in section 5.1 of the EA, the Site layout and arrangement of infrastructure and services on the Site will provide for a potential subsequent future development involving a second data centre building (or similar development). The second data centre building however does not form part of the Project and has been identified as a future expansion area on all drawings.

The Project will be constructed between October 2010 and October 2011.

Part C – Consideration of Environmental Impacts

6 General Environmental Risk Assessment

6.1 Overview

The purpose of this Part of the EA is to address the Director-General's requirements for a '*general environmental risk analysis*'. The EA also addresses matters raised by the RTA and Blacktown City Council in advice accompanying the Director General Requirements.

The aim of the risk assessment is to identify environmental matters that may have the potential to cause significant environmental impact as a result of the proposed data centre and that warrant further assessment in the EA. The risk assessment comprises of a qualitative assessment based on information gathered during preliminary investigations and due diligence of the Project Site.

The level of environmental risk was assessed by considering potential environmental impacts of the Project and the ability to manage those impacts in a way that minimises harm to the environment. The risk assessment assisted in the scoping of further environmental investigations and assessments; development of the Project design; and the identification of possible mitigation measures and management responses.

This Part of the report addresses the key issues outlined in the Director Generals Requirements (Appendix I).

6.2 General Environmental Risk Assessment

Table 6.1 provides the general environmental risk analysis for the Project. The purpose of the general risk assessment is to identify any other potential impacts that warrant further assessment in the impact assessment chapters.

Table 6.1 – General Environmental Risk Assessment

Potential Issues / Impacts	Comment
Issues Identified in Director-General / RTA / BCC Requirements	
Visual and Design - The height, bulk and scale of the Project; - Design quality; - Impacts on environmental amenity; - Any signage, fencing and lighting.	The Director-General's requirements identify visual and design as a key assessment requirement. Appropriate urban design controls have been incorporated into the design to respond to the visual impact of the height, bulk and scale of the Project. Visual impact of the sub-station has also been addressed through appropriate landscape screening and Site layout. This issue is assessed in Chapter 7.0.
Sustainable Development - An assessment of energy use of the Project; - A description of how the Project will incorporate ecologically sustainable development design principles; - Description of measures to minimise consumption of resources.	The Director-General's requirements identify sustainable development as a key assessment requirement. This issue is assessed in Chapter 8.0 together with an overview of utilities and services required for the Project.

Potential Issues / Impacts	Comment
Transport and Parking - Details of availability of non-car travel modes and measures to encourage greater use of these modes; - Predictions of traffic volumes and impacts on safety and capacity of surrounding network; - Access and parking.	The Director-General's requirements identify traffic and parking as a key assessment requirement. The Project is not considered to be a major traffic generating activity. Suitable access and parking provision has been provided. This issue is assessed in Chapter 9.0.
Soil and Ground Water - Sediment and erosion controls during construction and stormwater management during operations; - Consideration of potential contamination, salinity and groundwater impacts.	The Director-General's requirements identify soil and water as a key assessment requirement. Soil and water erosion may occur during construction. This issue is assessed in Chapter 10.0. Stormwater is addressed in Chapter 8.0.
Noise - Construction and operation noise.	The Director-General's requirements identify noise as a key assessment requirement. The operation of the data centre is envisaged to a 24 hour 7 day per week operation. This issue is assessed in Chapter 11.0.
Hazards (including waste) - Storage and use of hazardous materials; - Fire risk and management;	The Director-General's requirements identify hazards as a key assessment requirement. This issue is assessed in Chapter 12.0 together with risks associated with bushfires and flooding. Detailed regarding how waste on Site will be managed is also included.
Construction Management	The Director-General's requirements require a description of the measures that would be implemented to avoid, minimise and if necessary offset the potential impacts of the Project. Chapter 13.0 details measures to avoid / minimise such risks during construction of the Project. The provision of a Construction Management Plan will be detailed in the Statement of Commitments.
Issues addressed in Preliminary Investigations	
Heritage	During preliminary investigations/due diligence of the Project a desktop environmental heritage assessment was undertaken. The results of the assessment indicated that no Sites or items of heritage significance are present on Site. As a result, the proposed development is not expected to have a direct or indirect impact on heritage during construction or operation. Therefore no further investigation on heritage issues was considered warranted. The Planning Certificate (Appendix II) provided by Blacktown City Council under section 149 of the EP&A Act also confirmed that the Site does not contain any items of environmental heritage.

Potential Issues / Impacts	Comment
Biodiversity	A terrestrial flora and fauna impact assessment was undertaken as part of the preliminary investigations/due diligence of the Project. The Site is almost completely cleared of vegetation as a result of extensive quarrying activities on the Site and extensive Site modifications The assessment concluded that the Project is not likely to have any impacts on any protected areas, on any threatened species or populations listed under TSC Act or the EPBC Act.

The impact assessment chapters that follow consider those issues identified in the NSW Director-General's requirements and address the issues identified by the general risk assessment as requiring further assessment.

7 Visual and Design

7.1 Overview

The data centre has been designed taking into account other HP comparable data centres in Australia and overseas and the Site's constraints and opportunities (Figure 3.3). The building will be a high quality development consistent with the Stage 3 Precinct Plan. Once built this data centre will be HP's benchmark for sustainable design of such centres.

Section 5.1 of the EA provides a detailed description of the Project.

7.2 Assessment against Eastern Creek Precinct Plan – Stage 3

An assessment of the Project against the requirements of the Stage 3 Precinct Plan urban design development controls is provided below.

Table 7.1 – Assessment against Urban Design Development Controls

Issue	Comment	Compliance
Site Analysis	A Site analysis based on the survey and contour plan has been prepared and is included in Drawing W0102B included with the EA.	✓
Subdivision	Not applicable. A separate plan of subdivision will be lodged separately by the vendor (Goodmans) with Blacktown City Council for approval.	✓
Entrance treatment	The development has a legible entry point visible from the Roberts Road frontage on the western boundary of the Site. This is defined by architectural features. Internal roadways will be clearly defined by appropriate signposting to car park areas or truck loading areas.	✓
Siting and Setbacks	The proposed data centre location is in compliance with the minimum setbacks of SEPP WSEA, adopting a minimum setback to the main buildings of between 30m to Roberts Road and 40m to Capicure Drive. Due to placement of the data centre on Site and significant setbacks to south and west boundaries there will be no overshading of neighbour's buildings. Similarly data centre does not obstruct views from neighbouring premises or residential areas due to general Site levels being lower than Capicure Drive or adjacent Coles Distribution Centre on Roberts Road.	✓
Building Height & Design	The data centre has an eaves height of 7m and an overall height of 12m. The Data Centre is proposed to be constructed at existing earthworks platform levels of RL 61 and RL 68 which are significantly below the level of Capicure Drive (RL 75). As such there is no issue of view loss from neighbouring buildings	✓

Issue	Comment	Compliance
	or from the Southridge House heritage cartilage. A high level of landscape planting is proposed to soften and enhance the development and the surrounds of the building to the office component. Any rooftop mechanical plant will be suitably screened from public view.	
External Building Materials & Colour	A variety of materials and finishes will be employed in the primary elevations to Roberts Road and Capicure Drive to provide visual interest and articulation. The proposed finishes include an architecturally designed façade treatment consisting of coloured concrete panels with feature cladding to the office component. The building has been designed with materials and finishes to create visual interest and achieve articulation. Proposed finishes are subject to design development but will comply with SEPP WSEA. The proposed development will not detract from the established character of the industrial precinct.	✓
Ancillary Buildings, Storage & Service Areas	The proposed data centre and associated plant and equipment will be confined to a single building. Ancillary structures including sprinkler tanks and pump rooms will be screened by a metal clad screen and softened by landscape planting and earth beaming where visible from roadways or adjacent properties. A switching station is proposed to the south-east corner of the Site. The switching station will in effect be screened from the street frontages by the proposed data centre. The switching station yard will be screened by significant tree planting (installed at 1.8m in height) and Australian native trees (15m mature height) being provided along the east boundaries Further screening through the planting of landscaping around the north west and east boundaries of the Site will also assist in screening the switching station from all readily viewable aspects of the Site.	✓
Cut & Fill	In addition to the current rehabilitation works, any additional cut and fill is expected to be minor adjustments to levels and modifications to current batter slopes proposed.	✓

Issue	Comment	Compliance
	There will be redistribution of existing fill to the side to achieve two level building platforms at RL 61 and RL 68. Each platform will batter into the adjacent platform or to match the adjoining property levels. Maximum embankment slopes will be 1 (V) in 3 (H) to enable secure landscape treatment. Retaining walls where levels do not allow 1 in 3 embankments to perimeter of Site will be provided up to a maximum 3m in height prior to adopting 1.5m step with planting as per SEPP WSEA. Retaining walls will comprise coloured split face concrete blockwork similar to that already installed to Reedy Creek/ Capicure Drive locations.	
Fencing	Security fencing is to be in accordance with the Precinct Plan requirements. The rear and side boundaries will feature security fencing being black plastic coasted chain wire 2.1m in height with barbed wire over. To Capicure Drive and Roberts Road fencing is to be integrated with the landscaping and will be black powder coated "Diplomat" style 2.1m high. The fence is to be provided on the boundary rather than within the 1m setback for ease of landscape maintenance and to facilitate security.	✓
Signage & Lighting	No signage proposed as part of the Project application. The lighting will provide the minimum performance necessary, whilst using energy efficient lighting and minimising potential visual and environmental impacts as discussed in Section 5.1.8.	✓
Private Open Space	As required by SEPP WSEA an area equivalent to 100m² has been provided as an external open space area for employees. This area will comprise turfing, coloured segmental "urban stone" coloured pavers as well as feature shade planting, integrated with shade structures and heavy duty external street furniture (tables and chairs) to provide a high quality outdoor staff recreation area. The area will comprise 5% of total office area.	✓
Safety and Security	Security fencing is proposed to all boundaries. External lighting and CCTV is proposed is to all pathways and carparking areas. A 24 hour manned security check point is proposed to control access to the Site from	✓

Issue	Comment	Compliance
	Roberts Road and ensure high levels of staff security. Access internally to the facility will be controlled via a dedicated access lobby and reception area to the administration portion of the development. Landscape treatment around the immediate vicinity of the data centre and to car park areas will provide for clear sight lines and night time security surveillance.	

The design is consistent with recent approvals within Eastern Creek Economic and Employment Lands Area in terms of urban form, scale and massing.

8 Sustainable Development

8.1 Energy Use

Data Centres are generally considered to be high electricity consumers. The Project has been designed to reduce energy use and minimise greenhouse gas emissions by incorporating the following measures:

- The data centre will use the latest industry cooling methods which provide an approximate 50% reduction in cooling energy over a traditional chilled water system;
- The exterior environment is completely isolated from the interior environment;
- The cooling system to be utilised reduces the need for pumps and cooling towers and chillers and has the following benefits:
  - Requires less infrastructure equipment to maintain and service;
  - Reduces the water requirements;
  - The evaporative component of the system can be balanced down to less waste water than a traditional cooling tower system.

The cooling systems planned for the facility utilize an air to air heat exchanger system with indirect evaporative cooling media to aid in energy conservation. Utilizing these cooling concepts while employing hot aisle containment within the data center enables a foundation for good energy conservation.

To establish a baseline we reference modern day data centres which typically utilize chilled water systems to cool their data centers. Efficient systems of this type normally have Power usage effectiveness (PUE's) in the range of 1.5 to 1.45.

PUE is a measure of data centre energy efficiency calculated by dividing the total data centre energy consumption by the energy consumption of the IT computing equipment.

HP has evaluated the nearest weather data available to the Project Site provided to HP by AECOM. Upon reviewing this data it is calculated that the proposed data centre will have a PUE below 1.2. At this time the Eastern Creek data centre is believed to be the most energy efficient data centre planned for the region.

This data centre will be one of the most energy efficient centres in Australia once completed. The proceeding sections describe the utilities and services required for the Project. These include electricity, sewer, water, stormwater and telecommunications.

8.2 Ecologically Sustainable Development

The EA has been prepared with regard to principles of ecologically sustainable development as summarised below:

8.2.1 Integration principle

The Project will be a positive contribution to the economy, locally and more broadly; is purposely located to effectively build on the strengths of an established and well serviced employment lands cluster and minimises its ecological footprint by developing an already highly modified Site. The Project effectively integrates economic, social and ecological outcomes.

8.2.2 Precautionary principle

Relevant environmental issues have been identified and where appropriate, relevant measures have been identified and "commitments" made to mitigate and manage their impacts during the course of the development. No serious or irreversible harm to the environment is likely or anticipated from approval of the Project.

8.2.3 Climate change

The Site is not affected by sea level changes. Climate change is not anticipated to significantly render any element of this Project invalid or inappropriate. The operation of the data centre is intended to minimise greenhouse gas emissions and maximise energy efficiency

8.2.4 Inter-generational Principle

The Project incorporates environmentally sustainable design guidelines and principles and implementation and management practices to be employed during construction of the Project will ensure that the environment is protected for future generations. As described in section 5.2.6 of the EA the Project will also incorporate an on-Site roof water collection.

8.2.5 Biodiversity Principle

There are no endangered ecological communities' present on the Site.

8.2.6 Valuation Principle

The identification of the Site for employment land uses and the development of the data centre will promote economic activity and improve the value of existing valuable transport and utility infrastructure, and enable residents to work in proximity to their work, and leisure opportunities.

8.3 Utilities and Services

8.3.1 Methodology

In order to review the existing utilities present, the following investigations were undertaken:

- Dial Before You Dig (DBYD) application;
- Contact with local authorities including a meeting with Blacktown City Council drainage engineers to discuss Site stormwater drainage;
- Desktop literature review of service authority requirement documents;
- Discussions with Integral Energy and Sydney Water; and
- Review of servicing documents from the Site vendor (Goodman).

8.3.2 Existing Services and Utilities

8.3.2.1 Electricity

Discussions have been held between AECOM and Integral Energy (IE) regarding the power requirements.

The data centre will be regarded as a high voltage customer. IE have provisionally confirmed that 75MVA is available. For the purposes of reliability of critical service and redundancy two separate power sources to the Site are required. Two 132kV supplies are available, one from the Eastern Creek Zone substation (owned by IE) and the other from TransGrid's Sydney West. Once on Site, the electricity supply is required to be stepped down for use in the data centre. This will occur in the proposed switching station.

8.3.2.2 Sewer

Trunk sewer supply, provided by Sydney Water is currently available to serve the M7 Business Hub Precinct. Based on the results of the DBYD application, discussions with Sydney Water, and a review of the Sydney Water Hydra and Info-Works databases, the following sewer infrastructure is local to the development:

- 300mm PP (Polypropylene) sewer gravity main in Capicure Drive upstream of the Site;
- 375mm PP sewer gravity main in Capicure Drive downstream of the Site;
- 225mm PP sewer gravity main connection to the Site under Capicure Drive.

It is anticipated that the 225mm PP sewer main under Capicure Drive will be the proposed connection point for this development. The capacity of the immediate connection (DN225 pipe) is anticipated to be sufficient to carry the expected domestic (i.e. toilet flushing, basins etc) sewer load from the Site to the downstream system.

8.3.2.3 Water

Potable water mains provided by Sydney Water are available to service the Site. The M7 Business Hub is serviced by the Minchinbury Water Supply System. Based on the results of the DBYD application, discussions with Sydney Water, and review of the Sydney Water Hydra database, the following infrastructure is adjacent to the development:

- 200mm PVC potable water main in Capicure Drive;
- 200mm PVC potable water main terminating in Roberts Road.

It is anticipated that the 200mm PVC water main terminating in Roberts Road will be the connection point for this Site.

8.3.2.4 Stormwater

A development wide approach to the M7 Business Hub stormwater drainage network has been adopted and is already in place. Key features of the network are large detention ponds designed to mitigate post-development flows from the Eastern Creek Precinct. Three local stormwater detention basins have been provided for the area. These ponds have been designed to reduce post-development Site stormwater discharge to flow rates equivalent to pre-development conditions.

Basin 1 is located to the east of the proposed development Site. Blacktown City Council Drainage Engineers have advised that this is the required discharge point for the development. This detention basin controls the outflow into Reedy Creek. Blacktown City Council Drainage Engineers have also advised that no further On-Site Stormwater Detention facilities are required in order to attenuate post development flows given the capacity of the existing eastern detention basin (1). Any additional stormwater controls structures will be contained on Site and as such there will be no adverse impact on the adjoining existing detention basins. Pending review of the proposed site stormwater discharge velocities, energy dissipation structures may be provided to limit potential erosion of the basin embankments.

The existing Basin 1 incorporates 13,500m^2 of bioretention. This was required to comply with Blacktown City Council's Water Quality Control Policy. Advice received from the vendor (Goodman) suggests that this has been sized for the whole upstream catchment (which encompasses the subject Site).

8.3.2.5 Gas

Jemena is the local natural gas supply authority. Based on the DBYD response and discussions with Jemena, there are no high pressure gas mains within or adjacent to the development area. The nearest high pressure gas main is located along Burley Road and terminates at Old Wallgrove Road. At this point in time it is anticipated that gas is not required by the proposed data centre.

8.3.2.6 Telecommunications

The Site is in close proximity (i.e. south west) to an existing industrial warehouse development on Capicure Drive, Eastern Creek, which has existing telecommunications infrastructure from Telstra. Presently, there are no other major telecommunications carriers (i.e. AAPT, Optus, etc) which are servicing this region.

8.3.3 Capacity of Services and Utilities

8.3.3.1 Electricity

A formal application for connection was lodged with IE and a letter of acknowledgement received on the 11th August 2010. A Project Definition outlining the scope and requirements for the power supply to the Site will be prepared by IE. This work will be deemed to be contestable by IE and an accredited ASP level 3 designer and an accredited ASP L1 constructor will be engaged to carry out this work.

The 132kV power supplies will be achieved using high voltage cables adequately rated for the ultimate load capacity. These cables are expected to be placed in conduits that run either under roads or in cases where there are no roads, in adjacent properties.

The switching station is expected to occupy an area of not more than 10,000 m². The switching station will consist of 132kV Air Insulated outdoor switchgear and at least two 132kV/11kV transformers with an indoor substation building to accommodate the 11kV metal clad air insulated switchgear and the respective control and protection gear.

The 11kV distribution system will be designed to accommodate construction and staging. All 11kV distribution will be achieved through the use of adequately sized cables either in conduits or in cable trenches/tunnels. The switching station and all electrical equipment will be designed to meet Australian and International standards.

The entrance to the substation will be on the northern boundary. This entrance will cater for vehicular (heavy and light duty) access for both Integral Energy and HP (subject to Integral Energy's approval). This access will accommodate the delivery of the transformers and switchgear as well as for maintenance purposes.

The landscaping design will take into account the surrounding environment and will aim to screen the switching station from surrounding areas.

The switching station and distribution network will be designed to ensure that the entire Site is electrically safe and meets all the applicable safety standards, codes and best practices and fire safety arrangements.

8.3.3.2 Sewer

The proposed Site sewer load was estimated using the methodology outlined in Water Supply Code of Australia – Sydney Water Edition 1 (Water Services Association of Australia, 2003). An assumed population of 50 people was used for these calculations. Based on an estimated design flow of 7.57 L/s the existing DN 225 PP connection pipe will be sufficient to convey the sewer load from the Site.

Further consultation with Sydney Water is required in order to ascertain the capacity of the existing downstream system.

8.3.3.3 Water

Based on the HP preferred method of cooling for the data halls and an estimation of the peak domestic water demands as outlined in the Water Supply Code of Australia – Sydney Water Edition 1 (Water

Services Association of Australia, 2003) and an assumed population of 50 people have been combined to give an estimated maximum peak flow rate of 7.23L/s (for the ultimate development of five data halls).

It is not known whether the existing water main will have sufficient capacity to cater for this peak demand and it is anticipated that upgrades to the existing infrastructure may be required. Furthermore, given only one source of mains supply is available at this particular site, it is envisaged that supplementary storage tanks would be required to meet the Proponent's operational requirements (subject to further detailed analysis).

The ability to meet the proposed Site demands will also depend on the capacity of the Minchinbury Reservoir which are yet to be determined. AECOM has submitted an application to Sydney Water in order to determine the pressure in and capacity of the existing main in Capicure Drive and are currently awaiting their response.

Further investigation is required in order to fully understand the Site water demands and options available to service the site i.e. water recycling, alternative methods of cooling etc.

8.3.3.4 Stormwater

The capacity and design details for the existing stormwater detention Basin 1, located to the east of the development Site, can be found in Table 8.1 below.

Table 8.1 – Basin 1 Details

Detail	Value
Floor Level (m)	RL 55.50
Spillway Level (m)	RL 56.70
Crest Level (m)	RL 57.20
Top Water Level (m)	RL 56.70
Volume (m^3)	32 500
Floor Area (m^2)	27 200
Catchment Area (ha)	62.2
Bio-retention Facility (m^2)	13 500
Bio-retention Ponding 400mm (m)	RL 55.90

The existing basin incorporates a bio-retention facility and an outlet control structure that discharges to Reedy Creek.

This basin was designed to capture runoff from 4 areas within the Eastern Creek Precinct and have a crest level above the PMF (Probable Maximum Flood). Blacktown City Council has advised that additional on-Site detention (OSD) facilities will not be required on the Site.

The Coles Myer Chilled Distribution Centre Stormwater Management Report (CDC SMP) (dated 13 December 2007) states that a bio-retention area of 13,500m^2 will be provided in Basin 1. This document has been approved by Blacktown City Council and is reflected in the Basin 1 Construction Certificate drawings.

8.3.3.5 Gas

There is no gas infrastructure available for immediate connection to the development Site.

8.3.4 Potential Upgrades to Services and Utilities

8.3.4.1 Electricity

Refer to section 8.3.3.1 above.

8.3.4.2 Sewer

Trunk sewer infrastructure has been provided to service the Eastern Creek Precinct. It is not expected that upgrades to the sewer system will be required; however as connection to the Sydney Water network is necessary, a Water Servicing Coordinator (to be engaged during the detailed design) will be required to confirm whether the existing main and downstream infrastructure has sufficient capacity to cater for the proposed development.

Pending review of the final surface levels, a gravity connection to this existing sewer may not be hydraulically possible. In this case, any on site sewer pumping station or pump out pit and sewer rising main would be required.

8.3.4.3 Water

Trunk potable water infrastructure has been provided to service the Eastern Creek Precinct. As with the sewer, a Water Servicing Coordinator (to be engaged during the detailed design) will be required to confirm whether the existing main has sufficient capacity to supply the development. The delivery of the required flowrate to the Site is dependent on the available capacity of the Minchinbury Reservoir and the pressure available.

The fire water demand for the Site requires two water sources for redundancy purposes. Only a single water reticulation main is provided by Sydney Water and while multiple connections to this main may be permissible (subject to formal application and confirmation from Sydney Water) the water will be supplied from the same reservoir. Where multiple source points are not available, a minimum 60 minute fire water tank is required. Based on the quantity of water required for the fire system, it is doubtful that Sydney Water's main water supply will have sufficient capacity. Therefore the fire water supply for the Site is to be provided by a tank system with the Sydney Water's main supplying top up water to the tanks.

Similarly to fire water demands, the Proponent's preferred method of cooling for the data halls requires a significant quantity of water. It is unknown whether Sydney Water's main water supply will have sufficient capacity and therefore it is anticipated that alternate methods of water supply or cooling will need to be investigated in the coming design stages (subject to further detailed analysis).

8.3.4.4 Stormwater

Blacktown City Council has advised that no additional on-Site-detention (OSD) facilities will be required provided that the Site is under 92% impervious. This provision will be met as landscaped setbacks are to be provided around the Site. An energy dissipation structure within Basin 1 will be required in order to reduce erosion caused by potentially high inflow velocities (e.g. stilling pond with rock rip-rap protection) as stated

in the M7 Business Hub Stormwater Management Report (Connell Wagner, 2007).

A MUSIC model was prepared Aurecon for the M7 Business Hub Development in order to compute the Water Quality Requirements for the development. Advice received from the vendor (Goodman) suggests that provided a Gross Pollutant Trap (GPT) and buffer strips are included within the subject Site stormwater drainage design, the bio-retention area within the existing detention basin (1) has been sized to meet the Blacktown City Council Water Quality Control Policy requirements for the entire upstream catchment (which subsequently includes the subject site area). Therefore it is not envisaged that further bio-retention ponds will be required for the proposed development in order to meet the above requirements.

It is recommended that further detailed review of the MUSIC modelling associated with the above report be undertaken during future design stages.

The Site stormwater drainage system will consist of a network of pits and pipes to collect and convey surface runoff and will be designed to Blacktown City Council guidelines. The Blacktown City Council Stormwater Quality Control Policy identifies a number of design requirements and Water Sensitive Urban Design (WSUD) elements that must be considered as part of the drainage design. The WSUD principles include vegetated open channels and Gross Pollutant Traps and are designed to improve the properties of the water that is being discharged from Site. The proposed drainage will meet the requirements of the policies and aim to include the WSUD principles where practical.

A Drainage Catchment Plan / Stormwater Management Plan will be prepared and submitted to Blacktown City Council for approval prior to the release of the Construction Certificate. This will compliment the Stormwater Management Plan Policy already in place for the M7 Business Hub (prepared by Connell Wagner, 2007).

8.3.4.5 Gas

If gas supply is required for the Site, further consultation with local service provider Jemena will be required to confirm developer contributions for potential upgrades. It is not anticipated that a gas supply will be required.

8.3.4.6 Telecommunications

The proposed Project Site can be supported by two (2) telecommunications exchanges to satisfy the need for telecommunications redundancy. The Site can be supported via an exchange at Arndell Park (Corner of Vangelli Street and Kenoma Place) and another exchange at Rooty Hill (115 Rooty Hill Road, Rooty Hill), which can provide diverse telecommunications services.

Consistent with redundancy supply options, a secondary exchange for diversity of redundancy of supply, regardless of the telecommunications carrier, is a cost that is fully borne by the end user.

The impact on the environment will be minimal, as services will primarily utilise existing infrastructure. It should be noted that there is a

section of reticulation run that is common to both exchanges, if this is deemed an issue then alternative conduit and pits will need to be provided.

The proponent will coordinate landscape and other services to minimise the impact of any trenching. Carriers are required to meet the obligations of the Telecommunications Act when planning routes.

9 Transport and Parking

9.1 Overview

The traffic issues relevant to this development are traffic generation, Site access and the provision of parking. The impact of the proposed Project in relation to traffic issues are discussed in detail in the Traffic Report contained in Appendix III, a summary is provided below.

9.2 Road Network

The road network in the vicinity of the Site includes the M4 and M7 Motorways, Wallgrove Road, Old Wallgrove Road, Roberts Road, Capicure Drive and Southridge Street. The M4 Motorway is located to the north of the Site and provides a major east-west arterial (RTA State Road) traffic route running from Strathfield in the east to the Blue Mountains in the west. It provides a divided carriageway with three traffic lanes in each direction. The M4 intersects with the M7 Motorway at a major grade separated interchange.

The M7 Motorway is located to the east of the Site and provides a major north-south arterial (RTA State Road) traffic route running from the M2 Motorway at Baulkham Hills in the north east to the M5 Motorway at Casula in the south. It provides a divided carriageway with generally two traffic lanes in each direction.

Wallgrove Road is located to the east of the Site adjacent to the M7 Motorway. It provides a north-south traffic route from the Great Western Highway to Elizabeth Drive at Cecil Hills. Adjacent to the industrial precinct, it provides a two lane undivided road. To the north of Old Wallgrove Road, it provides an undivided road with two traffic lanes in each direction, clear of intersections. Wallgrove Road intersects with Old Wallgrove Road at a traffic signal controlled intersection.

Old Wallgrove Road is located to the north of the Site and provides access to the northern part of the industrial precinct. It provides an undivided two-way road with one traffic lane in each direction, clear of intersections. Old Wallgrove Road intersects with Roberts Road and Southridge Street Drive at unsignalised priority controlled intersections.

Roberts Road is located adjacent to the western boundary of the Site and provides an undivided industrial road with one traffic lane in each direction, clear of intersections and provides access to the Site. Roberts Road intersects with Capicure Drive at an unsignalised intersection with priority given to Roberts Road. A turn around facility for large service vehicles is available at the southern end of Roberts Road.

Capicure Drive is located adjacent to the northern Site boundary. Capicure Drive combines with Southridge Street to connect between Old Wallgrove road to the north and Roberts Road to the west. It provides an undivided industrial road with one traffic lane and one traffic lane in each direction, clear of intersections.

Southridge Street is located to the east of the Site and provides a north-south traffic route between Old Wallgrove Road and Capicure Drive. It provides access to a number of industrial developments and intersects with Capicure Drive at a roundabout controlled intersection.

9.3 Traffic Flows

Previous studies for the M7 Business Hub at Eastern Creek have identified road works and public transport requirements to cater for future development of the Site. This assessment concentrates on local implications with respect to access, parking provision, servicing and internal layout. Traffic generated by the development is considered to be minor given the function and operation of the data centre as detailed in the proceeding sections.

In order to establish existing traffic conditions, traffic counts were undertaken during the weekday morning and afternoon peak periods at the following intersections:

- Old Wallgrove Road/Roberts Road;
- Old Wallgrove Road/Southridge Street; and
- Capicure Drive/Southridge Street.

The results of the surveys are shown in Figures 2 and 3 of the Traffic Report (Appendix III), and summarised in Table 9.1.

Table 9.1 shows that traffic flows on Old Wallgrove Road, east of Roberts Road, are some 350 to 550 vehicles per hour two-way during the morning and afternoon peak hour periods. West of Roberts Road traffic flows are lower at some 150 to 200 vehicles per hour two-way during peak periods.

Table 9.1 – Existing Two Way Peak Hour Traffic Flows (sum of both directions)

Road/Location	Morning Vehicles/Hour	Afternoon Vehicles/Hour
Old Wallgrove Road		
- east of Southridge Street	555	550
- east of Roberts Road	340	365
- west of Roberts Road	180	190
Roberts Road		
- south of Old Wallgrove Road	170	190
Southridge Street		
- south of Old Wallgrove Road	185	185
- north of Capicure Drive	40	75
Capicure Drive		
- west of Southridge Street	10	45

Traffic flows on Roberts Road and Southridge Street, south of Old Wallgrove Road, are some 150 to 200 vehicles per hour two-way during peak periods. Peak period traffic flows on Capicure Drive are less than 50 vehicles per hour two-way.

9.4 Intersection Operation

The capacity of the road network is largely determined by the capacity of its intersections to cater for peak period traffic flows. The surveyed intersections have been analysed using the SIDRA computer program.

The SIDRA program simulates the operations of intersections to provide a number of performance measures. The most useful measure provided is average delay per vehicle expressed in seconds per vehicle. Based on average delay per vehicle, SIDRA estimates the following levels of service (LOS):

For traffic signals, the average delay per vehicle in seconds is calculated as delay/(all vehicles), for roundabouts the average delay per vehicle in seconds is selected for the movement with the highest average delay per vehicle, equivalent to the following LOS:

0 to 14	=	"A"	Good
15 to 28	=	"B"	Good with minimal delays and spare capacity
29 to 42	=	"C"	Satisfactory with spare capacity
43 to 56	=	"D"	Satisfactory but operating near capacity
57 to 70	=	"E"	At capacity and incidents will cause excessive delays. Roundabouts require other control mode.
>70	=	"F"	Unsatisfactory and requires additional capacity

For roundabouts, give way and stop signs, the average delay per vehicle in seconds is selected from the movement with the highest average delay per vehicle, equivalent to following LOS:

0 to 14	=	"A"	Good
15 to 28	=	"B"	Acceptable delays and spare capacity
29 to 42	=	"C"	Satisfactory but accident study required
43 to 56	=	"D"	Near capacity and accident study required
57 to 70	=	"E"	At capacity and requires other control mode
>70	=	"F"	Unsatisfactory and requires other control mode

It should be noted that for roundabouts, give way and stop signs, in some circumstances, simply examining the highest individual average delay can be misleading. The size of the movement with the highest average delay per vehicle should also be taken into account. Thus, for example, an intersection where all movements are operating at a level of service A, except one which is at level of service E, may not necessarily define the intersection level of service as E if that movement is very small. That is, longer delays to a small number of vehicles may

not justify upgrading an intersection unless a safety issue was also involved.

The SIDRA analysis found that the unsignalised intersections of Old Wallgrove Road with Southridge Street and Roberts Road are operating with average delays, for the movement with the highest average delay, of less than 15 seconds per vehicle during the morning and afternoon peak periods. This represents a level of service A/B, which is a good level of intersection operation.

The roundabout controlled intersection of Capicure Drive and Southridge Street is also operating at a good level of service during peak periods. Average delays per vehicle, for all movements through the intersection, are less than 15 seconds during the morning and afternoon peak periods. This represents a level of service A, which is a good level of intersection operation.

9.5 Public Transport

Local bus services are provided by Busways. Bus route 738 – Mount Druitt to Eastern Creek Business Park, operates Mondays to Fridays and links the Eastern Creek industrial precinct to Mount Druitt Railway Station. The bus service operates along Wallgrove Road and Old Wallgrove Road linking to Horsley Park. This bus service operates on a 20 to 30 minute service frequency during peak periods.

Passengers can transfer from bus to rail services at Mount Druitt Railway Station, allowing access to the surrounding Sydney metropolitan rail network.

9.6 Implications for the Proposed Project

Vehicular access for staff, visitors and service vehicles will be provided from Roberts Road (refer to Drawings W1001L and 1003A). A separate access on Roberts Road may be provided for Integral Energy to carry out ongoing maintenance of the sub-station (subject to Integral Energy's approval). On-site parking is proposed for 28 spaces (refer to Drawing W 1001L). Provision has been made for on-site manoeuvring by service vehicles including arriving and leaving the Site in a forward direction.

The implications of the proposed development are assessed through the following sections:

- Public transport;
- Work place travel plan
- Parking provision;
- Access, internal layout and servicing;
- Traffic effects;
- Principles of construction traffic management; and
- Summary.

9.6.1 Public Transport

The proposed development would not significantly increase employment densities in the area given that the Project only proposes 5 employees.

9.6.2 Work Place Travel Plan

In association with the development of the overall M7 Business Hub and to encourage travel modes other than private vehicles for the industrial precinct, a work place travel plan should be developed to meet the needs of future industrial uses and their employees. The specific requirements and needs of the tenants and employees, hours of work, shift times, etc., is proposed to be incorporated in the work place travel plan to encourage the use of public transport.

9.6.3 Parking Provision

Blacktown City Council's Eastern Creek Precinct Plan specifies the following requirements for the provision of on-Site parking for industrial developments:

- Buildings 7,500m^2 or less – 1 space per 100m^2 GFA;
- Buildings greater than 7,500m^2 – 1 space per 200m^2 GFA only for the area in excess of 7,500m^2 where there is a specific end user which would not demand a higher rate and where employee parking is adequately catered for.

Application of these rates would lead to a requirement for 111 spaces. However, considering the proposed development will have a small number of employees on-site (approximately 5 employees), a provision of 111 spaces would be excessive. The proposed provision of 28 spaces is considered more appropriate and would readily cater for the parking demands of employees and visitors. Refer to Drawing W 1001L.

9.6.4 Access and internal layout

Vehicular access will be provided via a combined entry and exit driveway from Roberts Road, along the western boundary of the Site. Refer to Drawings W 1001L and 1003A.

A separate access may be provided to the south of the main access on Roberts Road at the south-western corner of the site to the switching station. This is subject to negotiation with Integral Energy.

Boomgates and a security control office will control access to the Site. A turn around area for unauthorised vehicles is located adjacent to the entry driveway. This turning area will allow unauthorised vehicles to recirculate back to Roberts Road.

The entry and exit boomgates and access controls would be located some 20 to 25 metres within the Site. This provides queuing area for one articulated truck or three to four cars. The driveway will be used by employee vehicles and service vehicles.

The driveway will provide appropriate sight lines for exiting vehicles and will be designed to accommodate two-way traffic. The driveway will be designed to accommodate the swept paths of semi trailers, the largest vehicles expected to service the Site, in accordance with the Australian

Standards for Parking Facilities (Part 2: Off-street commercial vehicle facilities), AS2890.2-2002.

The internal layout will provide for maintenance and service vehicles to circulate within the development. Internal circulation roads will be provided around the data centre storage facilities. Loading docks will be provided adjacent to these buildings. The loading facilities and internal circulation roads will provide for articulated vehicles to enter the Site, manoeuvre within the Site and exit in a forward direction.

Parking is proposed to be provided in an at-grade car park adjacent to the administration building. Within parking areas, parking bay dimensions and aisle widths will be provided in accordance with the Australian Standard for Parking Facilities (Part 1: Off-street car parking) AS2890.1-2004. Parking bay dimensions will be a minimum of 2.4 metres wide by 5.4 metres long. Circulation aisles will be a minimum of 5.8 metres wide (where parking spaces are accessed) and wider where service vehicles will circulate and manoeuvre. Disabled parking spaces will be 2.4 metres wides with an additional 2.4 metres adjacent to the space, by 5.4 metres long.

These dimensions are considered appropriate being in accordance with AS2890.1-2004 and AS 2890.2-2002.

9.6.5 Traffic Effects

9.6.5.1 Construction Traffic

Construction traffic will primarily consist of two types being passenger vehicles and trucks both rigid body and double axle prime movers. As a general note, all vehicles will enter and exit the site through the one main entrance gate, park and/or be unloaded/loaded within the confines of the site boundary. Refer to Drawings W 1001L and 1003A.

Passenger Vehicles:

The number of passenger vehicles accessing the site will vary at the stage of the works being undertaken. From the start of the project the number of passenger vehicles would range from approx 50 vehicles per day rising up to a peak of 160 vehicles. The vast majority of these movements would be on average before 7.00am and after 3.30pm.

Heavy Vehicles:

As with the passenger vehicles the stage of the works will determine the number of truck movements per day. Initially an average of approx 40 movements would be required, increasing up to an average peak of 70-80 trucks per day. During times of specific works (such as large concrete pours) there would be a short term increase up to approx 95 trucks per day for 1-2 days per week for a 3-4 week period.

The majority of truck movements will be during the approved hours of site operation with the exception of any specialist truck movements for oversize plant and equipment. These will be co-ordinated and carried out in line with the RTA, Police, and Blacktown Council requirements.

The envisaged construction traffic will be appropriately managed in accordance with a construction traffic management plan, which is to be prepared in conjunction with the *Construction Environmental Management Plan* (refer Section 13).

9.6.5.2 Operational Traffic

The proposed development forms part of the overall M7 Business Hub at Eastern Creek. Previous studies have identified appropriate road and transport works to cater for development of the overall industrial precinct.

The proposed development is expected to generate relatively low volumes of traffic. Estimated typical daily traffic movements (in plus out) will comprise:-

- staff and visitor vehicles – estimate 10 to 20 movements per day;
- maintenance vehicles – estimate 10 to 20 movements per day; and
- delivery vehicles – estimate 5 to 10 movements per day.

The majority of staff vehicle movements will occur during the morning and afternoon peak periods (some five vehicles per hour two-way), with maintenance and delivery vehicle movements generally spread out over the day (typically less than five vehicles per hour two-way). This is a low traffic generation equivalent to only one vehicle every six minutes during peak periods.

The surrounding road network and intersections in the vicinity of the Site, with the additional development traffic flows, will continue to operate at the same levels of service, with similar average delays compared to those currently experienced.

Traffic from the proposed development will be considerably less than that assumed for the Site in previous studies. Thus the traffic effects of the proposed development will not be to the detriment of the overall traffic planning of the area.

9.6.6 Principles of Construction Traffic Management

The appointed building contractor will be responsible for the preparation of a construction traffic management plan.

Construction of the development will commence with Site preparation works and excavation. Construction access will be provided to/from Roberts Road, via a combined entry/exit driveway. It is anticipated that on-Site materials handling will occur at the northern end of the Site and a works zone will be required on the north-eastern part of the Site. Mobile cranes will be used to transport material on the Site.

Class A construction fencing will be erected around the perimeter of the Site. Openings in the construction fencing and the construction access driveway will be managed and controlled by traffic controllers. The movement of trucks entering and exiting the Site will be managed and controlled by traffic marshals.

The overall principles of traffic management during construction are as follows:

- provide a convenient and appropriate environment for pedestrians/workers;
- minimise effects on pedestrian movement and amenity;

- manage and control construction traffic on the adjacent road network and truck movements to and from the construction activity;
- construction work will commence with the construction of the internal access roads and its connection onto Roberts Road and Capicure Drive;
- security gates and appropriate construction fencing will be located around the perimeter of the industrial area;
- construction access will be controlled onto Roberts Road/Capicure Drive adjacent to the northern boundary of the Site;
- construction vehicles to enter and exit the Site in a forward direction;
- traffic capacity will be maintained at intersections and mid-block on the surrounding road network in the vicinity of the Site;
- maintain safety for workers;
- restrict construction activity to designated truck routes through the area;
- work zones to be managed and controlled by qualified Site personnel;
- provide appropriate parking adjacent to the construction compound for construction workers; and
- construction activity to be carried out in accordance with the approved hours of work.

The preparation of the construction traffic management plan, signage detail, traffic management measures, control of pedestrians and control and management of construction activity/vehicles in the vicinity of the Site will be the responsibility of the appointed building contractor.

9.7 Summary

The Traffic Report concludes that the development is supportable on traffic planning grounds and will operate satisfactorily.

In summary, the main points relating to the transport implications of the proposed data storage centre are as follows:

- previous studies have identified appropriate road works to cater for development traffic;
- parking provision is considered appropriate;
- access, internal layout and servicing will be provided in accordance with Australian Standard for Parking Facilities Part 1: Off-street car parking facilities (AS2890.1-2004) and Part 2: Off-street commercial vehicle facilities (AS2890.2-2002) to cater for cars and service vehicles;
- the surrounding road network can cater for the traffic generated by the proposed development;

- provision for regional and state transport infrastructure have been provided for under the existing Developer Agreement (refer to Chapter 15 of the EA for further details).

10 Soils and Ground Water

This chapter provides a summary of the soils, contamination and groundwater assessment undertaken by AECOM based on available information. A copy of the assessment is included in Appendix IV.

10.1 Methodology

The methodology for the assessment included:

- A search for and review of available information including soil landscape and geological maps, topographical maps, searches of online databases, relevant legislative requirements, historical aerial photographs, Certificates of Title, hydrogeological maps, land capability maps, acid sulphate soil maps and databases on contaminated land;
- A desktop assessment to investigate the existing environmental setting in terms of landscapes, geology, soil, groundwater and potential contaminated land;
- A walkover of the Site was conducted by AECOM to record the general site conditions and to identify any potential areas of contamination (if any); and
- A Phase 1 Contamination Survey was undertaken for the Site.

10.2 Existing Environment

A review of environmental factors is required to better understand the landscape of the Project Site. These include topography, geology and soils, vegetation and hydrology. A summary of these environmental factors is provided below, including a review of past landscape disturbances.

10.2.1 Geology and Soils

Reference to the 1:100000 scale Department of Mineral Resources – Geological Survey of NSW Geological Sheet for Penrith, indicates that the area is underlain by two major lithological units, namely Bringelly Shale (a subgroup of the Wianamatta Shale group) and Quaternary Alluvium. A brief description of each lithological unit is given below:

- Bringelly Shale (Rwb) – claystone, siltstone and laminate with sporadic sandstone bodies throughout. The base of the formation is defined by a persistent sandstone horizon named "Minchinbury Sandstone". The shales are typically overlain by residual clay soils which are typically of medium to high plasticity.
- Quaternary Alluvium (Qal) – associated with a fluvial deposition of the Reedy Creek, comprising unconsolidated gravel, sand, silt and clay.

The soil landscape comprises the active floodplain of many drainage networks of the Cumberland Plain. This includes the South Creek, Eastern Creek, Rickabys Creek and Prospect Creek systems. Soils comprise of deep layered sediments over bedrock or relict soils (Bannerman & Tille 1990).

The closest watercourse to the Project Site is Reedy Creek. Reedy Creek is a 3rd order creek which lies outside the Site immediately to the east and runs in a north-easterly direction, feeding into Eastern Creek. Stands of trees are located along the banks of this creek, including Casuarinas and various species of Eucalypts.

10.2.2 Ground Conditions

Based on observation of existing excavations, plus a review of previously drilled borehole data (R W Corkery & Co, Val Smith), it is evident that the majority of the Site is underlain by Bringelly Shale except for a corridor of alluvium deposits following the course of Reedy Creek[1].

Subsurface geotechnical investigations were carried out for the original Environmental Impact Assessment and Austral have undertaken borehole drilling over the life of the mine to date to determine the location of best resources (especially cream burning clays). These investigations went to a maximum depth of 18m below ground level and have shown that areas to the north, northwest and northeast of the vineyard pits are underlain by significant bands of massive or high strength sandstone, breccia (igneous intrusion) and lower grade shale.

The area to the south east has been previously mined for the upper level clay; however the presence of abundant siderite nodules and sandstone bands within the underlying claystone rendered deeper extraction in this area uneconomic[2].

During the period between May 2005 and February 2009, Vineyard Pit No.1 (a previous shale quarry mined for the manufacture of bricks) was progressively backfilled with approximately 1,784,000 m^3 of filling that comprised VENM (Virgin Excavated Natural Material), sourced from 140 Sites across Sydney[3].

Fill materials comprised granular ripped shale, ripped sandstone and ravely clay materials sourced from other development Sites with an excess of VENM excavation spoil. Filling was placed in the pit in layers and was compacted to a minimum dry density ratio of 98%, relative to standard density whilst maintaining a moisture content of 3% dry to 2% wet of standard optimum moisture content. Filling was placed on the pit base, which comprised various benches with different surface levels, all exposing in-situ shale.

Due to the variable base level of the pit and the inclined pit walls around its perimeter, the thickness of the filling also varies. The total filling thickness at the Site varies between approximately 0 m and 39 m below ground level (ref 3).

[1] R W Corkery & Company Pty Ltd (1983). *Descriptive Geological Logs of Diamond Drill Holes at Wallgrove*. A report prepared for Austral Brick Company Pty Ltd, August 1983.
[2] Austral Bricks Extraction and Rehabilitation Plan 'Vineyard' Property – Wallgrove Road, Horsley Park 28 August 2003 Ref 1149/01 Revision 2
[3] *REPORT ON SETTLEMENT MONITORING VINEYARD PIT No.1 OLD WALLGROVE ROAD EASTERN CREEK Prepared for AUSTRAL BRICK COMPANY PTY LTD Project 37893 June 2010*

10.2.3 Ground Water

Registered groundwater bore information was obtained from the NSW Department of Natural Resources (DNR) website. Nine bores were identified within a 2 km radius of the Site. The registered bore details are summarised in Table 10.1. A location map of the bores and groundwater works summaries for each bore are provided in Appendix E of the Contamination Assessment (Appendix IV).

Table 10.1 – Registered Groundwater Bores

Bore ID	Depth of Bore (m bgs)	Standing Water Level (m bgs)	Distance from Site	Purpose
GW100290	80	-	2 km SE	Monitoring Bore
GW104060	24.6	-	1 km E	Monitoring Bore
GW104061	24.5	-	1.3 km E	Monitoring Bore
GW104062	24.4	17.0	1.8 km E	Monitoring Bore
GW104063	27.4	-	2 km E	Monitoring Bore
GW110311	100	31.60	2 km N	Monitoring Bore
GW110312	100	39.80	2 km NW	Monitoring Bore
GW110313	150	40.30	2 km N	Monitoring Bore
GW110314	151	40.30	2 km NW	Monitoring Bore

While the available regional hydrogeological information suggests that groundwater is likely to be present at depths of approximately 17 to 40 m bgs, consideration of potential impacts to groundwater should be made. It is possible that shallow and/or perched groundwater could be present (e.g. in the vicinity of Reedy Creek), however in the absence of detailed groundwater investigations at the Site this is currently unknown.

A contractor was engaged to make a series of eight (8) borehole (BH) investigations across parts of the site. During the course of these investigations ground water information was obtained. Groundwater seepage was encountered during the drilling of BH5 at a depth of 7.5m and in BH6 at a depth of 33m. Groundwater was measured on completion of auger drilling of BH5 at a depth of 9.8m.

No groundwater was encountered within the remaining boreholes during drilling. BH3 and BH5 were left open following drilling and groundwater was measured in BH3 at a depth of 7.1m after 3 days, and in BH5 at a depth of 7.9m after 2.5 days. However, these groundwater readings may have been affected by water introduced into the boreholes for coring.

Groundwater measurements were made within the standpipes installed in BH2 and BH4 on 23 September 2009 (6 days after standpipe installation) and the ground water was measured at depths of 19.3 and 22.2m respectively, which tends to align with the data in Table 10.1.

10.2.4 Salinity

The potential impact of adverse soil pH / sulphate / chloride concentrations and ground water levels is that it will be necessary to increase the durability of the foundation solution through a more robust design including footing type and material specification.

The design of structural foundations, in accordance with Australian Standard Concrete Structures (AS3600) and the Australian Standard Piling - Design and Installation (AS2159), requires that the effects of the soil pH / sulphate / chloride concentrations and ground water are used to determine concrete strength and cover to reinforcement.

Providing engineered solutions to ground with problematic pH / sulphate / chloride concentrations or high ground water levels is not uncommon. "A contractor was engaged to make a series of eight (8) borehole investigation to provide an indication of soil pH, sulphate and chloride content. The results are indicated in Table 10.2 below..

Table 10.2 – Soil pH, Chloride and Sulphate Contents (Certificate of Analysis 46054) ***Source: Geotechnical Investigation for Proposed EC Data Centre by Jeffery Katauskas Pty Ltd, October 2010***

Miscellaneous Inorg - soil									
Our Reference:	UNITS	46054-1	46054-2	46054-3	46054-4	46054-5	46054-6	46054-7	46054-8
Your Reference	----------	1	2	3	4	5	6	7	8
Depth	----------	13.5-13.95	3.0-3.45	7.5-7.95	4.5-4.95	7.5-7.95	34.5-34.95	4.5-4.95	21.0-21.45
Date Sampled		10/09/2010	15/09/2010	10/09/2010	15/09/2010	10/09/2010	14/09/2010	16/09/2010	14/09/2010
Type of sample		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/9/2010	22/9/2010	22/9/2010	22/9/2010	22/9/2010	22/9/2010	22/9/2010	22/9/2010
Date analysed	-	22/9/2010	22/9/2010	22/9/2010	22/9/2010	22/9/2010	22/9/2010	22/9/2010	22/9/2010
pH 1:5 soil:water	pH Units	7.8	8.0	8.1	5.8	7.1	8.2	6.9	8.4
Chloride, Cl 1:5 soil:water	mg/kg	160	350	150	210	1,646	200	150	190
Sulphate, SO4 1:5 soil:water	mg/kg	190	120	280	50	88	220	220	84

The results give an indication of the chloride and sulphate levels, none of which cannot be addressed by carrying out structural design in accordance with the above Australian Standards.

Based on extensive experience at the M7 Business Hub, consultants Douglas Partners have found that saline conditions are found adjoining creeks or riparian areas, or on lower slopes. There are no riparian zones, nor creeks located in the Project Site.

Salinity on the Project Site is not anticipated to pose any constraint upon Site development subject to the preparation of suitable management plans, including:

- Salinity Management Plan;
- Erosion & Sediment Control Plan.

The preparation of these plans has been addressed within the draft Statement of Commitments contained in Chapter 16.

A Salinity Management Plan will be prepared and submitted to Blacktown City Council for approval prior to construction commencing. The plan will outline measures which will ensure that salinity problems are not created on Site.

10.3 Impact Assessment and Proposed Mitigation Measures

The Project Site has been subject to significant landscape disturbance. Topsoil has been stripped from the entire Site, except one small 10 x 20 m area in the north-west, and all mature vegetation removed. Sections of the Site are now covered with an engineered base material. The natural landform has been modified, replaced with artificial benching

(Plate P 1). Much of the Site, in particular the southern section, has previously been used as a shale quarry and has since been remediated.

The prior use of the Site as a quarry is clearly identifiable from the large quarry pit construction in the south and deep trenching throughout the Site (Plate P 2).

The Phase 1 Contamination Survey concluded that the Site is unlikely to pose unacceptable risk to human health and the environment in its current condition. A copy of the results of the survey is provided in Appendix IV.

10.3.1 Erosion and Sediment Control

The Site's close proximity to the existing Reedy Creek strengthens the need for an effective sediment and erosion control plan to be provided by the contractor in order to prevent and mitigate issues caused by the proposed construction activities on the local and downstream environment.

Sediment and erosion control during construction for the proposed development will be designed in accordance with the Environmental Protection Authority (EPA) requirements. It is envisaged that the following elements would be implemented (but not limited to):

- Diversion drains;
- Sediment fences and / or straw bale filters;
- Stockpile management;
- Check dams (where required to reduce velocities within diversion drains);
- Temporary sediment basins sized to accommodate the areas of active construction activity;
- Outlet rock rip rap or similar velocity dissipating structures;
- Surface Pit inlet filters.

An Erosion and Sediment Control Plan will be prepared and agreed with the EPA prior to construction commencing.

10.3.2 Contamination

The Phase 1 contamination assessment provides detail on the potential contamination risks at the site (Appendix IV).

Based on review of available information and observations made during the site inspection, potential sources of contamination and potential contaminants of concern have been identified and are shown in the following table.

Table 10.3 - Summary of Potential Sources and Contaminants of Concern

Potential Source	Potentially Contaminating Activities	Comments	Potential Contaminants of Concern
Pit 1 Fill	Unapproved fill materials not certified as VENM being placed in pit.	Refer to Section 3.1.1 of the Contamination Assessment (Appendix IV) for detailed comments and potential limitations of the infilling works conducted.	TPH/BTEX, Heavy Metals, PAHs, OCPs, PCBs, VHCs, Asbestos.and acid sulphate soils.
Pit 2 Fill	As above.	Filling of Pit 2 ongoing and is to be conducted in accordance with the *Environmental Pit Infill Control Plan and Environmental Quality Control System* prepared by DP, and any additional requirements of the Site Auditor. Refer to Section 3.1.2 of the Contamination Assessment (Appendix IV) for detailed comments and potential limitations of the infilling works conducted.	As above.
Wider Site*2	Historical agricultural land use (grazing, vineyard) including the application of herbicides and/or pesticides. Storage/use/handling of fuels, oils and degreasers for operation and maintenance of farming vehicles, equipment and machinery.	Limited information on agricultural use of the Site.	Pesticides/herbicides (prior to 1967), TPH/BTEX, Heavy Metals, PAHs, VOCs
Pit 2 Site Office	Storage of unleaded fuel in a shipping container. Storage of old quarry machinery. Storage and/use of a large diesel generator on unsealed ground surface. Refuelling of trucks and equipment used for filling activities near the site entrance.	Minor surface staining noted on the outside of the shipping container used to house unleaded fuel and beneath two old pieces of machinery. No diesel stored on the Site. No evidence of accidental spillage of fuel near the site entrance.	TPH/BTEX, Metals and PAHs.
Imported Fill	Imported fill reportedly located in the southern portion of the larger site.	Connell Wagner's (2003) ERP prepared for the larger	TPH/BTEX, Heavy Metals, PAHs, PCBs, OCPs and Asbestos.

Potential Source	Potentially Activities	Contaminating	Comments	Potential Contaminants of Concern
			Austral landholding indicates that imported fill was placed in the southern portion of the site. The reference indicates that the imported fill may have contained contaminated soils. No indication of the specific location of imported fill materials has been provided and it is unclear as to whether the area of imported fill may have since been mined during the extraction of materials from Pit 2.	

There is evidence to suggest that due process has been undertaken with regards to the infilling of the site. For example, an *Environmental Pit Infill Control Plan* has been prepared and an *Environmental Quality Control System* has been established for the infilling of Pits 1 and 2 on the site, while an independent auditor has been engaged to oversee and endorse the infilling of the site.

As the infilling and validation works are currently being undertaken at the site, a Site Audit Statement (SAS) for the pits, which would determine the risk of contamination at the site and the suitability of the site for industrial development.

The SASs would be provided to the Department of Planning (DoP) once available, and any conditions of the SASs would be carried out prior to construction of the data centre.

11 Noise Impact

This chapter provides a summary of the noise assessment undertaken by AECOM. A copy of the full report is included in Appendix V.

11.1 Methodology

The following environmental impacts were assessed against the relevant NSW legislation and guidelines.

- Operation noise;
- Construction noise; and
- Construction and operational road traffic noise.

A background noise survey was undertaken on 26 August 2010 at 6 locations representative of the ambient noise environment.

The Site location, noise monitoring locations and key sensitive receivers are shown in Figure 11.1. The nearest residential receivers are located to the south and south-west in Horsley Park, with additional nearby residential receivers located in Erskine Park, and Minchinbury. The closest residential receivers are located at 138-140 Burley Rd, Horsley Park, approximately 690 metres away from the proposed nearest boundary of the Site, refer to Figure 11.1.

The nearest commercial receivers are located with the M7 Business Hub to the north-west (Coles), north (Toll), and east (Coca-Cola) of the proposed development site.

11.2 Existing Noise Environment

11.2.1 Noise Monitoring Locations

In order to establish the existing noise environment adjacent to the project area, ambient noise monitoring was conducted at a location (refer to Figure 11.1). The chosen monitoring location is representative of other assessment locations within the area, this was determine from the site inspection, attended noise measurements and from aerial photographs depicting land use surrounding the site.

The noise monitoring was conducted in accordance with the NSW Department of Environment, Climate Change and Water (DECCW) Industrial Noise Policy (INP) requirements. These locations were selected after a detailed inspection of the project area taking into consideration sensitive locations and other noise sources which may influence the measurements.

Table 11.1 presents the selected monitoring location, whilst Figure 11.1 shows these noise monitoring locations.

Figure 11.1 – Site location, attended and unattended noise monitoring locations and noise sensitive receivers

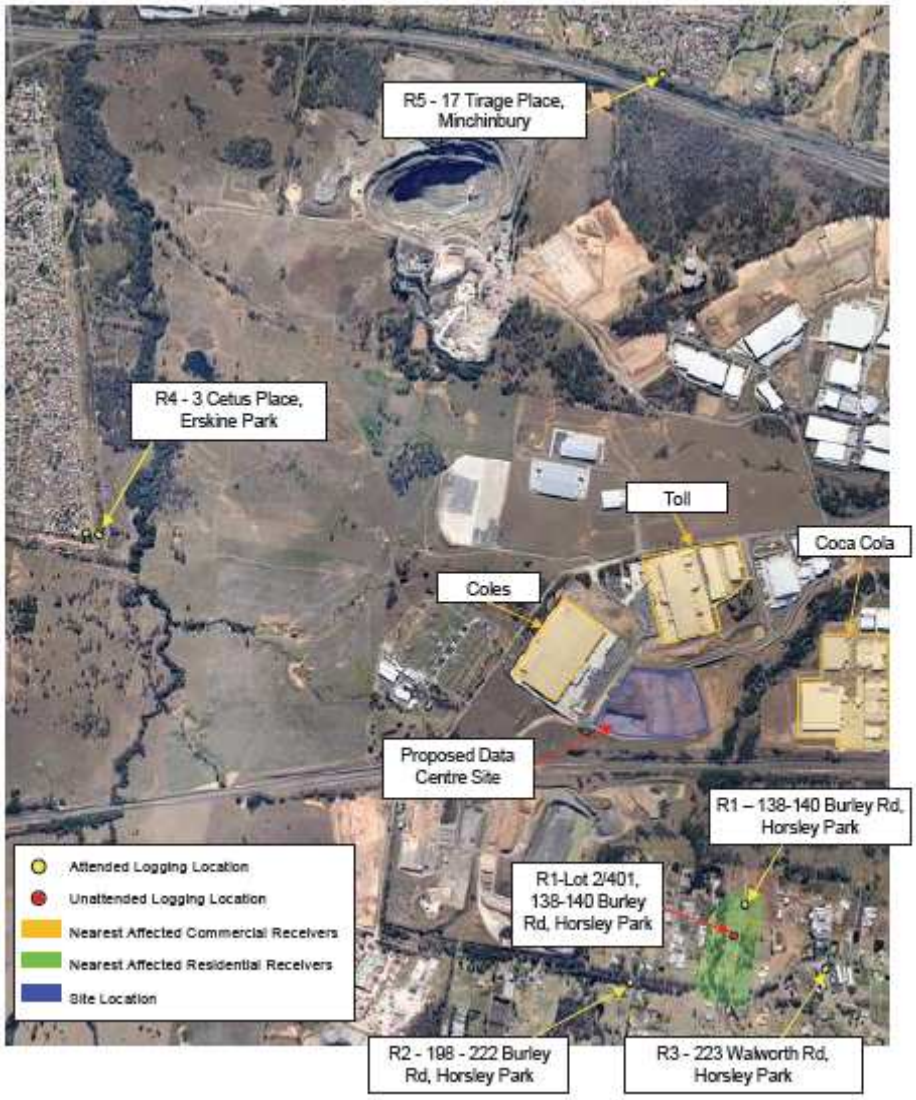


Table 11.1 – Ambient Noise Monitoring Location

Location Noise Monitoring Survey Duration	Description / Address Land Use Zoning	Instrumentation	Comments
Lot 2/401 138-140 Burley Road, Horsley Park Start: 6:45am 26/8/10 Finish: 6:30am 2/9/10	Suburban	SVAN 948 Serial Number:8800	• Noise sensitive residential receiver. • Chosen to determine operational and construction noise emissions criteria. • Assessment location to determine noise levels impacting on residential receivers. • Noise logger located approximately 1.5 m above ground level and approximately 1 m from a facade.

11.2.2 Unattended ambient noise logging

Unattended noise monitoring of the existing ambient noise levels was undertaken at a location representative of the residential receiver most likely to be adversely affected. An unattended noise logger was installed at Lot 2/401 138-140 Burley Road, Horsley Park for a period of seven days between Thursday 26 August 2010 and Thursday 2 September 2010. The location of the noise logging location is shown in Figure 11.1 and described in Table 11.1. Graphical representation of the logging results are shown in Appendix B of the Noise and Vibration Impact Assessment.

A noise logger measures the noise level over the sample period and then determines L_{A1}, L_{A10}, $L_{A90,}$ L_{amax} and L_{aeq} levels of the noise environment. The L_{A1}, L_{A10} and L_{A90} levels are the levels exceeded for 1%, 10% and 90% of the sample period respectively. The L_{amax} is indicative of maximum noise levels due to individual noise events.

The L_{A90} is taken as the background noise level. The L_{aeq} level is the equivalent continuous sound level and has the same sound energy over the sample period as the actual noise environment with its fluctuating sound levels.

The background noise level is defined by the DECCW as "*the underlying level of noise present in ambient noise when all unusual extraneous noise is removed*". It can include sounds that are normal features of a location and may include birds, traffic, insects etc. The background noise level is represented by the $L_{A90,15\ min}$ descriptor. The noise levels measured at the three noise logger locations were analysed to determine a single assessment background level (ABL) for each day, evening and night period, in accordance with the DECCW's NSW Industrial Noise Policy (INP) for each of the noise catchment areas (NCAs).

The ABL is established by determining the lowest tenth-percentile level of the L_{A90} noise data acquired over each period of interest. Table 11.2 presents the individual ABL's for each day's assessment periods. The background noise level or rating background level (RBL) representing the day, evening and night-time assessment periods is based on the median of individual ABLs determined over the entire monitoring duration. Table 11.2 also presents the existing L_{aeq} ambient noise level, for each day, evening and night-time period, in accordance with the INP. An overall representative L_{aeq} noise level is determined by logarithmically averaging each assessment period for the entire monitoring duration.

The results are presented in Table 11.2 with all data affected by adverse weather conditions being excluded from the results.

Table 11.2 – Unattended Noise Logging Results Summary

Logger Location	LA90			Laeq		
Lot 2/401 138-140 Burley Road, Horsley Park	Day	Evening	Night	Day	Evening	Night
Thursday 26 August, 2010	-	-	33	-	-	42
Friday 27 August, 2010	-	-	31	-	-	52
Saturday 28 August, 2010	35	35	31	59	46	50
Sunday 29 August, 2010	-	32	28	-	48	43
Monday 30 August, 2010	34	35	32	54	47	44
Tuesday 31 August, 2010	32	38	39	48	47	44
Wednesday 1 September, 2010	-	29	32	-	45	38
RBL	34	35	32	-	-	-
Log Average Laeq	-	-	-	56	47	47

Notes:

1. Day is defined as 7:00am to 6:00pm, Monday to Saturday and 8:00am to 6:00pm Sundays & Public Holidays.
2. Evening is defined as 6:00pm to 10:00pm, Monday to Sunday & Public Holidays.
3. Night is defined as 10:00pm to 7:00am, Monday to Saturday and 10:00pm to 8:00am Sundays & Public Holidays.
4. Where the RBL is calculated to be less than 30 dB(A), then the RBL is set to 30 dB(A) in accordance with DECCW's INP recommendations.

11.2.3 Attended Noise Monitoring

Attended noise monitoring was undertaken at a number of relevant locations on 13 August 2010 between 1:15am and 4:15am the result of which are shown in Table 11.3. The attended noise monitoring locations are shown on Table 11.3. The attended measurements were made to assist in quantifying the contributing noise sources at the different monitoring locations and validation of the monitoring data.

Table 11.3 – Attended Noise Monitoring Results Summary

Monitoring location	Date of measurement	Time of measurement	Laeq, 15min	LA90, 15 min (Background Noise Level)	Existing noise environment
R1 – 138-140 Burley Rd, Horsley Park	13 August 2010	03:15	39	37	Traffic Noise (M7 to SSE), Environmental noise (e.g. Crickets, Dogs), Industrial noise to NNE (e.g. Fan noise, reversing alarms)
R2 – 198-222 Burley Rd, Horsley Park	13 August 2010	03:45	38	36	Traffic Noise (M4 to N, and M7 to SSE), Environmental noise (e.g. Crickets, Frogs), Industrial noise to NNE (e.g. Fan noise, reversing alarms)
R3 – 223 Walworth Rd, Horsley Park	13 August 2010	04:05	39	37	Traffic Noise (M7 to SE), Environmental noise (e.g. Crickets, Frogs, dogs), Industrial noise to W (e.g. Fan noise)
R4 – 3 Cetus Place, Erskine Park –East of houses	13 August 2010	02:10	39	36	Industrial Noise (trucks, reverse alarms, engine noise) from SW, Environmental noise (e.g. Crickets)
R4 – 3 Cetus Place, Erskine Park –In Culde- sac	13 August 2010	02:30	36	33	Industrial Noise (trucks, reverse alarms, engine noise, fan noise) from SW, Trucks to N (airbrakes and engines), Environmental noise (eg. Crickets)
R5 – 17 Tirage Place, Minchinbury	13 August 2010	01:30	53	46	M4 vehicle traffic noise, Environmental noise (eg. Frogs).

11.3 Impact Assessment

11.3.1 Construction Noise

Construction noise in NSW is assessed with consideration to the Department of Environment and Climate Change *NSW Interim Construction Noise Guidelines (ICNG): July 2009*.

The recommended standard hours for construction activity as specified in the construction noise guidelines are as follows:

- Monday to Friday: 7 am to 6 pm;
- Saturday: 8 am to 1 pm; and
- No work on Sunday or public holidays.

Predicted noise levels at nearby sensitive receivers (residential, commercial and industrial premises) are compared to the levels provided in Section 4 of the *ICNG*. Where an exceedance of the criteria

is predicted the *ICNG* advises that the proponent should apply all feasible and reasonable work practises to minimise the noise impact.

Construction noise management levels (NMLs) for residential receivers are set using the information in Table 11.4.

Table 11.4 – Noise Management Levels at Residences

Time of Day	Management Level Laeq (15min)1	How to Apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured Laeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or midmorning or mid-afternoon for works near residences. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see section 7.2.2 of the ICNG.

Notes:

1. Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Construction noise management levels for the nearest affected residential receivers are shown in Table 11.5.

Table 11.5 – Construction Noise Management Levels (Residential Receivers)

Residential Receivers	Daytime RBL L_{A90} dB(A)	Daytime Noise Management Levels L_{Aeq} dB(A)	Evening RBL L_{A90} dB(A)	Evening Noise Management Levels L_{Aeq} dB(A)	Night-time RBL L_{A90} dB(A)	Night-time Noise Management Limit L_{Aeq} dB(A)
R1 – R5	34	44	34	39	32	37

Noise management levels for other sensitive land uses around Eastern Creek, such as schools, places of worship are shown in Table 11.6. However, it is noted that there are no sensitive receivers in close proximity to the proposed development site.

Table 11.6 – Construction Noise Management Levels (Sensitive Land Uses other than Residential)

Land Use	Management Level, Laeq (15 min) (applies when properties are in use)
Classrooms at schools and other educational institutions	Internal noise level 45 dB(A)
Places of worship	Internal noise level 45 dB(A)
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level 65 dB(A)
Passive recreation areas(characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level 60 dB(A)
Community centres	Depends on the intended use of the centre. Refer to the recommended 'maximum' internal levels in AS2107 for specific uses.

Criteria for industrial (e.g. Distribution Centres) and commercial premises (e.g. general retail), are shown below:

- Industrial premises: external Laeq (15min) 75 dB(A), and
- Offices, retail outlets: external Laeq (15min) 70 dB(A).

Two key noise producing typical construction phases have been modelled at the Site to give an indication on the noise emissions that the nearest residential and commercial receivers will experience. The two important construction phases that have been modelled are the site preparation and the erection of the buildings structure.

Table 11.7 – Eastern Creek Data Centre – Construction program

Eastern Creek Data Centre Construction Program
Site establishment
Site establishment includes the set up of facilities and services to support the construction activities. The main activities are to establish facilities such as access roads, offices, amenities, construction camp, initial storage areas and stores buildings, security arrangements, etc and arrange critical services such as power, water, communications, etc. During this early stage, any additional geotechnical investigations are completed to enable detailed foundation designs to be finalised.
Site preparation
Site preparation involves primarily civil works to clear and level the main site and surrounding areas as applicable, establish drainage systems, install facilities for underground services (e.g. reticulated water, electrical conduits), etc ready for erection of the equipment.
Excavation and construction of foundations and underground services
Depending on the final foundation design, excavation for foundations will be undertaken. Formwork is assembled, concrete is poured and completed foundations are back-filled. Once the major foundations are complete, foundations for other structures, plant and equipment can commence. Where specific underground services are required these services are installed in conjunction with the foundation works to avoid subsequent excavation and disturbance of the foundations.
Erection of building structure
Generally once the foundations are complete, erection of building structure can commence. First the basic "shell" of the building is completed to allow access for lifting and installation of equipment into the building. It also maximises the space available for site-run minor pipework and cabling. Once the equipment is installed, the construction of the building can be completed.
On-site pre-assembly of component parts and installation
Equipment and components will be progressively delivered to site. The size of most deliveries will be dictated by the method of transport and any associated limitations. Larger equipment will be delivered in modules or components for pre-assembly at site prior to installation.

Two construction scenarios have been modelled, for the purpose of this assessment. The two construction scenarios modelled are considered to be the nosiest activities and are described below:

- Site preparation which will include large civil construction equipment noise sources such as vibratory rollers, concrete mixer trucks, graders, excavators, trucks; and
- During steelwork/equipment which will include cranes, flat bed delivery trucks, generators, concrete saws and grinders.

The acoustic impact at sensitive receptors resulting from construction activities has been assessed based on a likely construction scenario. The assumed scenario is considered to be representative of likely site activities and the impact has been assessed based on the 'worst case' i.e. the shortest distance between source and receivers.

The predicted construction noise levels at nearby sensitive receivers are shown in Table 11.8.

Table 11.8 – Predicted construction noise levels – Site Preparation

Receiver	Location	Construction Noise Management Levels dB(A)	Predicted Laeq Noise Levels, dB(A)	Predicted Exceedance dB(A)
		Day	Day	Day
R1	138-140 Burley Rd, Horsley Park	44	41	-
R2	198-222 Burley Rd, Horsley Park	44	39	-
R3	223 Walworth Rd, Horsley Park	44	38	-
R4	3 Cetus Place, Erskine Park	44	<20	-
R5	17 Tirage Place, Minchinbury	44	<20	-

Table 11.9- Predicted construction noise levels – Erection of structure

Receiver	Location	Construction Noise Management Levels dB(A)	Predicted Laeq Noise Levels, dB(A)	Predicted Exceedance dB(A)
		Day	Day	Day
R1	138-140 Burley Rd, Horsley Park	44	40	-
R2	198-222 Burley Rd, Horsley Park	44	38	-
R3	223 Walworth Rd, Horsley Park	44	37	-
R4	3 Cetus Place, Erskine Park	44	<20	-
R5	17 Tirage Place, Minchinbury	44	<20	-

Construction activities associated with the two construction scenarios do not result in any predicted exceedance of the noise management level at nearby sensitive residential locations during the daytime (i.e. DECCW's standard construction hours).

11.3.2 Operational Noise

The acoustic criteria have been determined directly from the SEPP WSEA and are presented in Table 11.10. The optimum noise level goals presented in Table 11.10 represent the optimal noise contribution from each zone to protect the acoustic amenity of residential areas surrounding the Precinct.

Table 11.10 – Optimum noise level goals as specified in the SEPP WSEA

Period	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Day	57 dBA	54 dBA	56 dBA	54 dBA	49 dBA	52 dBA
Evening	47 dBA	44 dBA	46 dBA	44 dBA	39 dBA	42 dBA
Night	42 dBA	40 dBA	40 dBA	39 dBA	34 dBA	37 dBA

The Site is located within Zone 6 of the noise emission zones specified in the SEPP WSEA. It is understood that the noise emission criteria presented in the report was derived from predicted noise contributions from a number of noise zones within the M7 Business Hub, and the limiting noise goals that have been adopted within the SEPP WSEA have been derived to be assessed at the nearest affected residential location.

The zone noise level goals specified in the SEPP WSEA are for the total contribution of a zone to the nearest residential receiver. As a result, it is necessary to take into consideration the other operational sources within Zone 6, so that the proposed Project does not contribute an uneven share and takes up all the allowable noise quota allocate to Zone 6.

The Project Site is one of four industrial sites within the designated Zone 6 under the SEPP WSEA. Accordingly, it is reasonable to assume that the Site should contribute a quarter of the noise quota from the Zone, and as such should contribute 6 dB below the zone limits, refer to Table 11.10. The final noise goals to comply with SEPP WSEA requirements are specified in Table 11.11.

In addition, it should be noted that a similar facility may be constructed in the future. As a result it is important to take into consideration the total contribution that the Site may make on the nearest affected receiver when the site is fully developed. To take this into consideration the noise emissions from the Project should be designed to 4dB below the required total noise contribution from the site when the Project and a similar facility (second data centre) are completed. This is based upon the assumption that similar facility will have similar noise levels to that of the Project.

Table 11.11 – Environmental noise emission criterion under the SEPP WSEA– Normal Operations

Period	Zone 6 Criterion, dB(A)	Quarter contribution of Zone 6 Criterion
Day	52	42
Evening	42	32
Night	37	27

11.3.2.1 Emergency Plant and Equipment

It is understood that brown-outs and black-outs are extremely rare for the area and in addition redundancy has been built into the incoming power supply, and as result of this the use of the emergency generators will be extremely rare.

For this reason and in the absence of any relevant NSW guideline for emergency generators and equipment, it is therefore recommended that noise limits for emergency plant equipment be relaxed. It is recommended that the noise emission from emergency plant and equipment be set to 10 dB(A) above the background (RBL). It is also recommended that all emergency plant and equipment be tested during the day (7am to 6pm).

The following assessment is based upon the ten backup emergency generators to be installed to the eastern side of the data centre. This assessment has been based upon the acoustic characteristics of a CAT C175-16 2.4MW Generator, with an enclosure and exhaust silencers attached, to model the spectrum of a typical similar sized generator with attenuation.

Information provided to AECOM by Hewlett Packward Engineers stated that the backup generator is to be installed with an acoustic enclosure that will produce a sound pressure level of 65dB(A) at 5 feet from the entire installed unit, including both the exhaust and mechanical noise of the generator. The modelled spectrum has been adjusted accordingly to comply with this specification. The assessment has been conducted assuming the standby generator has been fitted an acoustic enclosure that will achieve this noise emission. The sound power levels as used in the assessment are provided in Table 11.13.

The proposed function of this standby generator is as follows:

- Provide backup power in emergency and power failure situations.

The following Table presents the sound power levels for the standby generator at maximum load that have been used for this assessment.

Table 11.12 – Generator with attenuation sound power level

Description	Octave band noise levels, dB								
Frequency, Hz	dB(A)	63	125	250	500	1000	2000	4000	8000
Backup Generator with Acoustic Enclosure, SWL, dB	93	84	81	74	74	81	85	88	88

The Project is to include 80 Model 36D4 TCVA Axial Fan Units, as part of the Indirect Air-Side Economizer (IASE) Cooling Systems, which are to be installed on the roof of the development for the purposes of cooling of the Data Centre. The operational acoustic assessment has been based upon the fans each having the sound power levels presented in Table 11.13.

Table 11.13 – Model 36D4 TCVA Axial Fan Sound Power Level (SWL)

Description	Octave band noise levels, dB								
Frequency, Hz	dB(A)	63	125	250	500	1000	2000	4000	8000
36D4 TCVA Axial Fan – Inlet SWL, dB	80	82	80	80	79	75	68	64	65

11.3.2.2 Project Specific Noise Criteria

A summary of the environmental noise criteria that applies to the subject site is given in Table 11.14, and has been compiled with reference to the SEPP WSEA, and the DECCW INP intrusive and amenity criteria. As the noise emissions from the data centre would be dominated by a relatively steady-state mechanical services noise, the L_{aeq} period has been assumed to be equal to the assessed $L_{aeq,15min}$ for the worst case operational scenario. This represents a conservative assumption.

In summary, the project specific noise emission criterion established by the SEPP WSEA for this site is 27 dB(A) during the night-time period. Since operation of plant and equipment is the same during the day as it is at night a conservative approach of using the night-time limit for other periods (day-time and evening) will be used.

Compliance with night-time criteria will ensure compliance with the day and evening period.

Table 11.14 schedules the noise limits for the proposed site. Noise emission from the site should not exceed these levels at the boundary of any residential receptor and commercial premises.

Table 11.14 – Summary of environmental noise criteria, L_{aeq} – dB(A)

Receiver	Time of Day	Operational noise limit, Laeq, dB(A)	Emergency plant and equipment noise limit, Laeq dB(A)
Residences	Day	39	44
	Evening	32	44
	Night	27	42
Commercial premises	When in use	65	70

The noise emission of the combined noise producing equipment to be installed as part of the Project is predicted to comply with the night-time noise impact criterion at the noise sensitive receivers most likely to be affected, located to the south and south-west of the subject site along

Burley Road, Horsley Park. The results of this assessment are presented in Table 11.15 and the contour maps in Appendix C of the Noise and Vibration Impact Assessment (Appendix V of this report).

Table 11.15 – Noise contribution at worst affected residential receivers during worst case operational conditions

Receiver	Location	Neutral (Night time)			Worst Case Wind Conditions 3 m/s From All Directions (Evenings)		
		Result	Criterion	Exceed	Result	Criterion	Exceed
R1	138-140 Burley Rd, Horsley Park	26	27	-	30	32	-
R2	198-222 Burley Rd, Horsley Park	24	27	-	N/A	N/A	-
R3	223 Walworth Rd, Horsley Park	23	27	-	N/A	N/A	-
R4	3 Cetus Place, Erskine Park	<20	27	-	N/A	N/A	-
R5	17 Tirage Place, Minchinbury	<20	27	-	N/A	N/A	-

The noise emission of the combined emergency noise producing equipment to be installed as part of the Project is predicted to comply with the night-time noise impact criterion at the noise sensitive receivers most likely to be affected, located to the south and south-west of the subject site along Burley Road, Horsley Park. The results of this assessment are presented in Table 11.16.

Table 11.16 – Noise contribution at worst affected residential receivers in worst case emergency operations conditions

Receiver	Location	Neutral (night-time)		
		Result	Criterion	Exceed
R1	138-140 Burley Rd, Horsley Park	28	42	-
R2	198-222 Burley Rd, Horsley Park	24	42	-
R3	223 Walworth Rd, Horsley Park	24	42	-
R4	3 Cetus Place, Erskine Park	<20	42	-
R5	17 Tirage Place, Minchinbury	<20	42	-

The noise emission of the combined noise producing equipment to be installed as part of the Project is predicted to comply with the noise impact criterion at the most likely affected commercial receiver, located to the west of the subject site along on Roberts Road, Eastern Creek. The results of this assessment are presented in Table 11.17.

Table 11.17 – Noise contribution at worst affected residential receivers in worst case operational conditions

Noise source	Assessment Period	Noise contribution, dB(A)		
Normal Operations		Commercial receiver (Coles, M7 Business Park, Eastern Creek)	Criterion	Compliance
Roof Top Fan Units	During Use	43	65	Yes

The noise emission of the combined noise producing equipment to be installed as part of the Project is predicted to comply with the noise impact criterion at the most likely to be affected commercial noise receiver, located to the west of the subject site along on Roberts Road, Eastern Creek. The results of this assessment are presented in Table 11.18.

Table 11.18 – Noise contribution at worst affected residential receivers in worst case operational conditions

Noise source	Assessment Period	Noise contribution, dB(A)		
Normal Operations		Commercial receiver (Coles, M7 Business Park, Eastern Creek)	Criterion	Compliance
Roof Top Fan Units plus Backup Generators	During Use	47	70	Yes

The Noise and Vibration Impact Assessment provided in Appendix V of this report also provides an overview of meteorological effects, sleep disturbance and vibrational impacts.

11.3.3 Road Traffic Noise Levels

The main road providing access to the Project is Wallgrove Road. This road would be classified as an existing collector road. Table 11.19 presents the road traffic noise criteria from the DECCW for land use developments with a potential to create additional traffic on existing collector roads. The external noise criteria are applied 1 m from the external facade of the affected building.

Table 11.19 – Road traffic noise criteria – Collector roads

Period	Parameter	Criterion
Collector Roads		
Day	(7:00 am – 10:00 pm)	Laeq (15hr) 60 dB(A)
Night	(10:00 pm – 7:00 am)	Laeq (9hr) 55 dB(A)

Note that where the criteria have already been exceeded the DECCW recommends that:
"Where feasible and reasonable, existing noise levels should be mitigated to meet the noise criteria.
Examples of applicable strategies include appropriate location of private access roads; regulating times of use; using clustering; using quiet vehicles; and using barriers and acoustic treatments.
In all cases traffic arising from the development should not lead to an increase in existing noise levels of more than 2 dB."

Traffic generated during the construction and operation phase of the Project are predicted to be insignificant, therefore the construction and operational traffic impact on local roads would be minimal.

11.4 Conclusion

The acoustic impact assessment undertaken by AECOM to assess the noise and vibration emissions from the proposed data centre has found that the construction and operational noise and vibration emissions from the site will be compliant with all established noise and vibration guidelines at all nearby receivers.

11.4.1 Construction noise and vibration

Two key noise producing typical construction phases have been modelled at the site to give an indication of the noise emissions that the nearest residential and commercial receivers will experience. The two important construction phases that have been modelled are the site preparation and the erection of the buildings structure.

The construction noise and vibration assessment was conducted in accordance with NSW Department of Environment, Climate Change and Water (DECCW) *'Interim Construction Noise Guidelines' (ICNG)*.

The construction noise assessment indicates compliance with DECCW's ICNG acoustic requirements at all assessment locations during the daytime (i.e. DECCW's standard construction hours). The construction vibration assessment indicates that due to the large buffer distance between the Project Site and nearby residential receivers, the risk of discomfort, regenerated noise and structural damage impacting on receivers is extremely low.

11.4.2 Operational noise and vibration

The operational noise impact assessment indicates compliance under neutral and prevailing meteorological conditions at all assessment locations during the daytime, evening and night-time periods.

No items of plant and equipment used in operation of the data centre are expected to generate significant levels of vibration and therefore,

operational vibration impacts are consequently expected to be negligible.

11.4.3 Sleep Disturbance

The sleep disturbance assessment was conducted in accordance with the NSW DECCW's Industrial Noise Policy guidelines. The assessment indicates compliance at all assessment locations during the night time period.

11.4.4 Road traffic noise

The road traffic noise assessment was conducted in accordance with NSW DECCW's Environmental Criteria for Road Traffic Noise (ECRTN) guidelines.

The road traffic noise assessment associated with construction and operational phase of the Data Centre indicates compliance with DECCW ECRTN acoustic criteria.

12 Hazards

This chapter provides an assessment of the potential hazards and risks of undertaking the Project.

12.1 Methodology

12.1.1 Bushfire

A review of NSW bushfire planning requirements was undertaken by AECOM to determine the likely risk of bushfire to the Project.

12.1.2 Flooding

A desktop flood review of current data and previous studies was undertaken by AECOM to determine the Site's susceptibility to flooding. The following Information was used in the desktop flood review:

- Blacktown City Council's online Digital Cadastral Data accessed on 12 August 2010;
- Letter from Blacktown City Council Floodplain officer (dated 17 August 2010) regarding approximate 100 year ARI and Probable Maximum Flood levels associated with Reedy Creek east of the subject Site;
- Connell Wagner Flood Investigation Report – M7 Business Hub for Macquarie Goodman Revision 3 (dated 12 April 2005);
- Planning Certificate under Section 149 by Blacktown City Council Certificate Number 10-4573 dated 5 August 2010;
- Topographic Contour information obtained through the NSW Department of Lands; and
- M7 Basin 1 Civil Works Construction Certificate Drawings by Connell Wagner (approved and signed by BCC on 07 November 2007).

12.1.3 Hazardous Materials

An audit of hazardous materials to be used during the operation of the Project was undertaken.

12.2 Existing Environment

12.2.1 Bushfire Hazards

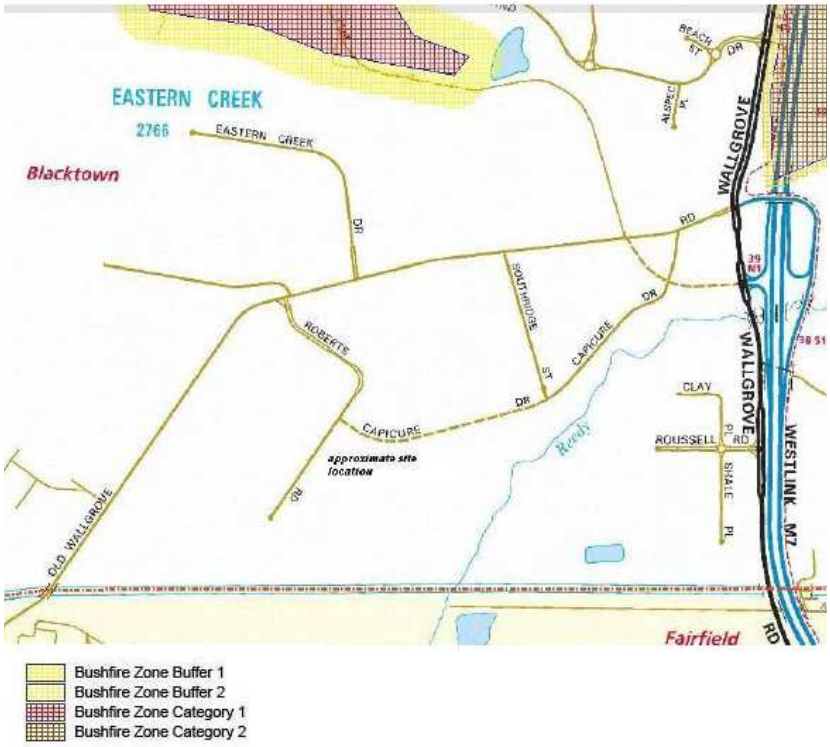
The Project Site is not mapped or adjoins land mapped as bushfire prone land by Blacktown City Council (Figure 12.1) and as such, a detailed Bushfire Assessment has not been undertaken.

The nearest bushfire prone land (Category 1) is located approximately 1.5 km to the north of the Project Site.

The bushfire threat at the Project Site is minimal due to the lack of vegetation in and surrounding the Site.

Furthermore, the vegetation that occurs to the east of the Project Site comprises a narrow linear strip of riparian vegetation that is not likely to pose a bushfire threat to future development of the Project Site.

Figure 12.1 – Section of Blacktown Council Bushfire Map



12.2.2 Flooding

The Project Site is located adjacent to Reedy Creek, a tributary of Eastern Creek. The Site generally drains in an easterly direction towards Reedy Creek. Based on 2m contour information available from the NSW Department of Lands, the catchment area above the Site (i.e. the existing Coles Development) is divided by Roberts Road/Capicure Drive. Therefore it has been assumed that the runoff associated with any overland flow to the north of the Site, will be directed away from the Site either towards the Basin 1A (western detention pond) or towards Capicure Drive where it would subsequently outlet into either the Basin 1 (eastern detention pond) or Reedy Creek.

12.3 Impact Assessment and Mitigation Measures

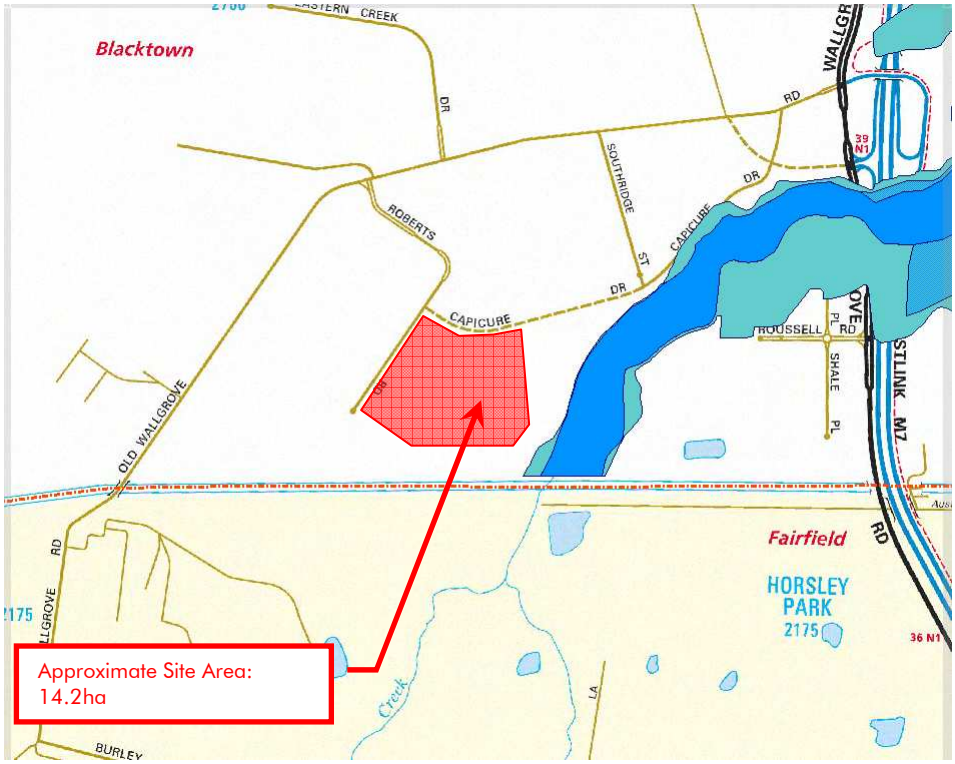
12.3.1 Bushfire Risk

The bushfire threat at the Project Site is minimal due to the lack of vegetation in and surrounding the Site.

12.3.2 Flood Risk

Information available on the Blacktown City Council's online Digital Cadastral Data suggests that the Site is located outside the Reedy Creek Probable Maximum Flood (PMF) zone (illustrated by the Low Flood Risk hatched area in the Figure 12.2 below).

Figure 12.2 – Blacktown City Council Flood Extents



A summary of the information provided is shown in Table 12.1 and Table 12.2 below.

Table 12.1 – BCC Approximate 100 year ARI Flood Level

Location/Description	River Station/Chainage	100 year ARI Water Surface Elevation (mAHD)
South East corner of the subject Site	1169.61	56.60
North East Corner of Subject Site	984.40	56.33

Table 12.2 – BCC Approximate PMF Flood Level

Location/Description	River Station/Chainage	PMF Water Surface Elevation (mAHD)
South East corner of the subject Site	1169.61	57.46
North East Corner of Subject Site	984.40	57.22

Blacktown City Council Development Engineers have also provided the approved Construction Certificate Drawings associated with the M7 Business Hub Basin 1 Development (Eastern Detention Pond) by Connell Wagner. The typical section through the spillway on drawing C112 revision 8 suggests that the PMF level is approximately RL57.17 which approximately correlates to River Station / Chainage 949.16 flood data provided by Blacktown City Council.

It should be noted that according to the spillway section on drawing C112 of the above set, the crest of the eastern detention pond is approximately RL57.20. Given the Site steps up over 3 tiers approximately 5m each elevation, it is not anticipated that the Site will be subject to the PMF associated with Reedy Creek.

The Section 149 Planning Certificate Number 10-4573 dated 5/08/2010 (Appendix II) which suggests in clause 7A that *"There are currently no mainstream or backwater flood-related development controls adopted by Council that apply to the land subject to this Certificate"*.

Given the above, at this point in time it is recommended that a freeboard of 1.0m above the PMF level be adopted. This would allow for potential discrepancies or accuracies within the existing flood modelling (i.e. ± 0.7m) and a freeboard of 0.3m. Given that the existing lower tier of the Site has an approximate elevation of 61.00 this will be achievable.

Adopting this freeboard would also reduce the affect caused by the Reedy Creek on the proposed drainage infrastructure (i.e. tailwater).

12.3.3 Storage of Hazardous Materials

There is potential to cause minor contamination of soils during construction of the Project, resulting from oil and/or fuel leaks from operating construction equipment. To minimize the likelihood of spill or fuel leak occurring, all construction and transport vehicles would be kept in a clean condition and be maintained appropriately.

The operation of the data centre will entail the use and storage some hazardous materials. A summary is provided below:

- Transformer insulating oil for the 132/11KV Transformers – regular oil testing and oil conditioning will be used to minimize any waste oil. Any oil stored on Site for maintenance activities will be in closed containers in a spill containment area;
- Sealed lead acid batteries for the UPS systems – old batteries will be recycled or disposed as they fail or reach end of life through an approved disposal company;

- Diesel fuel in double contained tanks above ground – Diesel fuel will be stored in double contained storage tanks with leak detection in the secondary containment space;
- Generator antifreeze, and motor oil – used antifreeze and motor oil will be disposed or recycled through an approved disposal company, maintenance quantities will be stored in a containment area;
- Fluorescent lamps – used lamps will be recycled or disposed of through an approved disposal company;
- Metal Halide lamps – used lamps will be recycled or disposed of through an approved disposal company;
- Refrigerant for the DX systems – Refrigerant systems will be maintained in good working order with leaks repaired immediately to minimize the release of refrigerant.

Hazardous materials will be stored in appropriately bunded areas (as required) and utilized in accordance with manufacturer's recommendations, Australian Standards and Best Practice guidelines and NSW Environmental Protection Authority (EPA) guidelines and requirements. This will include lockable storage areas.

12.3.4 Waste

The Project will not generate a significant amount of waste during construction or operations.

Waste will be managed via the use of waste and recycling receptacles that will be clearly labelled for ease of on-Site management and will be collected by an approved waste collection or recycling contractor for appropriate action.

The management of waste and resources will be addressed through a detailed Project specific *Waste Management Plan* that will be part of an approved *Construction Environmental Management Plan* (CEMP) for the Site. This will be submitted to the Environment Protection Authority for consideration and approval.

It is a commitment of this Project that a *Waste Management Plan* be developed in accordance with the NSW *Waste Avoidance and Resource Recovery Strategy* prior to any construction commencing on Site.

Where possible, all material from construction works will be reused for other construction activities. Green waste will be incorporated in restoration and landscaping works wherever possible.

All other waste streams that cannot be reused/recycled on Site will be disposed of in accordance with DECCW and EPA requirements.

Any toxic waste generated during construction / operational phases will be managed in accordance with the waste management best practices and relevant Australian Standards.

13 Construction Management

The construction staging of the Project will ensure that the proposed works have a minimal impact on the operation of surrounding businesses.

A *Construction Environmental Management Plan* (CEMP) will be prepared and implemented for the Project and will include:

- Environmental policy, objectives and targets for operation;
- Identification of all statutory and other obligations, including consents, approvals and voluntary agreements;
- Identification of the roles and responsibilities of all regulators and all personnel and contractors to be employed on the Site;
- Specific procedures, including monitoring, as defined by this environmental assessment and the conditions of consent for the Project; and
- Procedures for complaints handling and on-going communication with adjoining businesses and regulatory authorities.

A *Construction Environmental Management Plan* (CEMP) will deal with the following issues:

- Construction staging;
- Construction traffic management.
- Erosion and sediment control;
- Salinity Management Plan
- Stormwater Management;
- Waste management; and
- Noise.

14 Economic Development

The development of the Site will establish a high quality data centre that provides a greater diversity in employment opportunities and economic development to benefit the Eastern Creek Precinct and Western Sydney.

The development of the Site will involve a capital investment in the order of $119 million; provide an estimated 200 specialist jobs during construction and upon occupation will support 5 full time technical support jobs.

The development of the Site for a distribution and storage facility for the purposes of data is consistent with the provisions of SEPP WSEA and takes advantage of the strategic location of the Site to major transport corridors. The data centre will further consolidate the strategic clustering of economic activities in the M7 hub.

15 Developer Agreement

The Minister for Planning entered into a Developer Agreement with Macquarie Goodman Management Pty Ltd (**MGM**), The Austral Brick Company Pty Ltd (**Austral Brick**) and Macquarie Goodman Vineyard Pty Ltd (**MGV**) on 23 June 2005.

The Developer Agreement applies to the area of land described as the M7 Business Hub, being then Lots 10 – 14 DP1072146 (**M7 Hub**). The Data Centre Site is situated within the M7 Hub.

Under the Developer Agreement, MGV is required to:

- undertake infrastructure works for the provision of water, sewer, stormwater drainage, telephone, electricity, gas and cable services;
- contribute towards the provision of regional transport infrastructure and services at a specified rate per net developable hectare;
- design and construct upgrades to Wallgrove Road and Old Wallgrove Road;
- contribute towards the upgrade of the Old Wallgrove Road/M7 Motorway Interchange at a specified rate per net developable hectare; and
- provide for the upgrade of Old Wallgrove Road, the adaptive re-use of Southridge House and conservation of the Reedy Creek Riparian Zone as material public benefits (in cash or by works), and make any additional monetary contributions under any applicable Section 94 Contributions Plan pursuant to an agreement with Blacktown City Council.

The Developer Agreement is considered to make adequate provision in relation to:

- the matters that may be the subject of a section 94 contributions plan in satisfaction of clause 270(2)(b) of the Environmental Planning and Assessment Regulation 2000; and
- the provision of regional transport infrastructure and services in satisfaction of clause 29(3) of State Environmental Planning Policy (Western Sydney Employment Area) 2009.

15.1 State Contributions

The Minister for Planning announced a new State Infrastructure Contribution (SIC) for employment development within the Western Sydney Employment Area in August 2009. The obligations for contribution in accordance with SIC are met by the Developer Agreement.

Part D – Conclusion and Justification

16 Draft Statement of Commitments

16.1 Overview

Section 75F(6) of the NSW *Environmental Planning and Assessment Act 1979* states that the Director-General may require the proponent to include in an environmental assessment a statement of the commitments the proponent is prepared to make for environmental management and mitigation measures.

The Director-General's requirements for the Project require that a draft statement of commitments be provided. In accordance with this requirement, this section provides the commitments for environmental mitigation, management and monitoring for the Project.

Table 16.1 details the proposed commitments which will be undertaken to enable the Project to proceed and to minimise and manage any potentially adverse environmental impacts.

Table 16.1 – Draft Statement of Commitments

No.	Issue	Commitment
1.	Project Management	A Construction Environmental Management Plan (CEMP) will be prepared and submitted to the Director-General prior to construction commencing on Site.
2.	Visual and Design	The landscaping design will take into account the surrounding environment; will screen the sub-station from surrounding areas and will be detailed in a specific landscape plan for the Site.
3.	Energy Use	The data centre will use cooling methods which provide an approximate 50% reduction in cooling energy over a traditional chilled water system.
		The exterior environment will be completely isolated from the interior environment.
		A cooling system will be utilised which reduces the need for pumps and cooling towers and chillers, in turn have the following benefits: - Less infrastructure equipment required to maintain and service; - Reduction in water requirements; - The evaporative component of the system will be balanced down to less waste water than a traditional cooling tower system.
		The substation and distribution network will be designed to ensure that the entire Site is electrically safe and meets all the applicable safety standards, codes and best practices and fire safety arrangements.
4.	Stormwater	A Drainage Catchment Plan / Stormwater Management Plan will be prepared and submitted to Blacktown City Council for approval prior to the release of the Construction Certificate.
		Further detailed review of the MUSIC modelling be undertaken

No.	Issue	Commitment
		during the future design stages.
5.	Water	Further investigation is required in order to fully understand the Site water demands and options available to service the site i.e. water recycling, alternative methods of cooling.
6.	Sewer	A Water Servicing Coordinator will be engaged during detailed design to confirm whether the existing main and downstream infrastructure has sufficient capacity to cater for the proposed development.
7.	Construction Traffic	A construction traffic management plan will be prepared as part of the CEMP.
		A work place travel plan will be developed to meet the needs of future industrial uses and their employees.
		Access, internal layout and servicing will be provided in accordance with AS2890.1-2004 and AS2890-2-2002.
8.	Soil & Water	An Erosion and Sediment Control Plan will be prepared prior to construction commencing on Site.
		A Salinity Management Plan will be prepared and submitted to Blacktown City Council for approval prior to construction commencing. The plan will outline measures which will ensure that salinity problems are not created on Site.
9.	Noise	All construction noise will be undertaken in accordance with the EPA's *Environmental Noise Control Manual* and *SEPP WSEA noise* requirements.
		The operation of the data centre will be accordance with DECC *Industrial Noise Policy* and the EPA requirements.
10.	Flooding	A freeboard of 1.0m above the PMF level will be adopted for the purposes of floor levels for the data centre.
11.	Hazardous Materials	All construction and hazardous materials will be stored and used on site in accordance to the manufactures recommendations, relevant Australian Standards and Best Practice guidelines.
		All construction and transport vehicles would be kept in a clean condition and be maintained appropriately to minimize the likelihood of spill or fuel leak occurring.
11.	Waste Management	A Waste Management Plan will be prepared as part of the CEMP having regard to NSW *Waste Avoidance and Resource Recovery Strategy*.

17 Project Justification & Conclusion

17.1 Justification of Undertaking the Project

The proposed Site is considered appropriate for the scale of the Project and has been selected for a number of strategic reasons:

- The Site is located within the Eastern Creek Precinct Employment Lands, an identified strategic cluster for economic development;
- The Site has access to reliable utility services;
- The Site is conveniently located to major transport corridors;
- The Site is located within an existing industrial land which is readily available for development;
- The land has been extensively remediated in response to its former use as a shale quarry and accordingly the impact on the existing natural environment is expected to be minimal;
- The Site features/landform can be accommodated in the design and layout of the development;
- There are no residential areas in close proximity to the Site;
- Services are, or can be, made available to the Site.

The construction of a new data centre in Western Sydney will have an estimated capital investment of $119 million and provide employment for 200 workers during construction and an estimated 5 full-time jobs once operational.

The location was chosen because of its suitability for large scale distribution and storage purposes and its identification by State government as an economic and employment area.

17.2 Conclusion

This EA has been prepared in accordance with the requirements of Part 3A of the NSW *Environmental Planning and Assessment Act 1979*. The assessment addresses the requirements of the Director-General of the NSW Department of Planning (the Director-General's Requirements) dated 25 August 2010.

The Project has been considered in light of relevant environmental issues, infrastructure, and the state and regional planning context. This analysis reveals no outstanding environmental issue that cannot be mitigated or managed to an acceptable level of performance. Importantly the analysis highlights the key merits of the Project which unlocks the development potential of a Site uniquely suited to employment development in a location that is consistent with the development controls contained in SEPP WSEA and the Eastern Creek Precinct Plan – Stage 3.

Appendix I – Minister for Planning Declaration and Director-General Requirements

Appendix II – Section 149 Planning Certificate

Appendix III – Traffic Report

Appendix IV – Contamination Assessment

Appendix V – Noise and Vibration Impact Assessment

Appendix VI – Architectural Drawings

- Existing Site Plan – Drawing W0101D
- Site Analysis – Drawing W0102B
- Site Plan Roof Plan – Drawing W1001L
- Site Plan Ground Floor – Drawing W1002H
- Proposed Ground Floor Plan – Data Hall – Drawing W2001E
- Proposed Ground Floor Plan – Admin – Drawing W2005E
- Proposed Section – Drawing W4501C
- Perspectives – Drawing W1021
- Site Plan – Gate House – Drawing W1003