



PwC

Westmead Hospital Redevelopment
Multi-Storey Carpark Project

Waste Management Strategy

11 November 2015

EW-JBSG-CO-RT-0013

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Appendices

Appendix 1: Westmead Redevelopment: Carpark Site Plans

1. Introduction

JBS&G Pty Ltd has been engaged by PWC on behalf of Health Infrastructure NSW to prepare a Waste Management Strategy for the State Significant Development application for the Westmead Hospital Redevelopment Project Multi-Storey Car Park (MSCP).

Pursuant to the *Environmental Planning and Assessment Act 1979*, and Regulation (2000), the MSCP project is considered a State Significant Development, requiring the preparation of an Environmental Impact Statement (EIS). This Waste Management Strategy (WMS) supplements the EIS in response to waste management requirements for the project.

1.1 Scope

This WMS has been developed to address the Secretary's Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning and Environment for the MSCP (SSD 7262 dated 1 October 2015), with regard to waste management. This is described in Table 1 below.

Table 1 SEAR 14 - Waste

| Key Issue | Requirement |
|------------------|--|
| 14. Waste | Identify, quantify and classify the likely waste streams to be generated during construction and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. |

In accordance with the SEAR, this WMS addresses the likely waste streams and indicative estimated quantities, and proposes management, reuse, recycling and disposal procedures during demolition and construction of the MSCP.

1.2 Objectives

The key objectives of this WMS are to identify the types and quantities of potential waste streams, and establish management measures to prevent environmental harm, minimise waste and maximise resource preservation.

Specific objectives addressed by this WMS include to:

- address the SEAR for waste for the MSCP;
- promote waste minimisation through avoiding and reducing waste generation;
- comply with legislative criteria and adhere to waste minimisation guidance and standards;
- apply the waste management hierarchy (Section 4.2) throughout demolition and construction; and
- specify safe and appropriate management of potentially contaminated wastes.

2. Project Description

2.1 Background

The Westmead Hospital forms part of the Western Sydney Local Health District, which covers five Local Government Areas and is responsible for providing and managing all public health care within the district.

A master planning study of the district was undertaken in November 2013 to inform planning and redevelopment of the Westmead Precinct and Westmead Hospital. The master plan identified re-provision and expansion of car parking solutions as a planning strategy to support both staff and public car spaces. The proposed new MSCP is a component of the first phase of the Westmead Precinct redevelopment.

2.2 Location

The Westmead Hospital Campus is located 26 km west of the Sydney CBD. The Parramatta CBD is located approximately 2.5 km southeast of the hospital precinct.

The proposed location for the MSCP site is on the corner of Darcy Road and Institute Road, and is situated to the north of the Oral Health building as shown in Figure 1.

2.3 Existing Environment

The natural topography of the Westmead Hospital Precinct is downwards to the north and northwest, with surface levels ranging from approximately RL 32 m AHD in the south-western corner of the campus to about RL 10 m AHD along the Toongabbie Creek and Parramatta River; and about RL 18 m AHD in the north-eastern corner to approximately RL 10 m AHD along Darling Mills Creek and Parramatta River.

The Toongabbie Creek is a natural waterway situated along the northern boundary of the precinct. According to flood mapping undertaken by Parramatta City Council, the northwest development zone is located above the 1 in 100 year flood planning level, but within the probable maximum flood event level (average recurrence interval of between 10,000 to 100,000 years).

Asbestos containing materials are known to be present at the site, and are suspected to be present in fill materials located across a large portion of the MSCP area. Asbestos containing materials are also present in hospital buildings and infrastructure. Other hazardous building materials may be present across the site such as polychlorinated biphenyls, lead based paints, fibrous insulation materials and other materials. Remediation work on the site will be Category 2 remediation work (remediation work which does not require development consent) in accordance with the State Environmental Planning Policy No. 55 Remediation of Land (SEPP 55).

2.4 Demolition and Construction Activities

The MSCP is a 1,254 space, 8 level car park at the corner of Institute and Darcy Road. The MSCP will also include an overhead walkway connecting the car park to the Dental Building from level 2.

The initial stages of the proposed works associated with the development of the MSCP will include removal of the existing on grade car parking lot. Construction of the MSCP will include the carpark itself, north and south access and egress roads, the overhead walkway and associated connective road works and widening of institute road.

A new at-grade car parking area is also proposed to the east of the MSCP, consisting of 47 car spaces. The area has already been demolished and cleared in preparation for the additional car park.


Landscaping will also be undertaken including a new landscaped zone between the existing dental building and the MSCP, and a landscaped wedge on the corner of Darcy Road and Institute Road, requiring existing tarmac to be replaced with landscaping, whilst retaining existing trees where possible. Connective footpaths will also be constructed across the site.

The cooling towers situated within the building to the north east of the site will be removed by the early works contractor. The building will remain until the commissioning of the MSCP. Following commissioning, the plant housed within the building will be transferred to the MSCP, and the building will be demolished.

2.5 Commencement


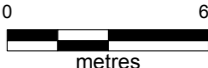
Construction of the MSCP is expected to commence during the first quarter of 2016. A detailed construction schedule will be developed upon selection of the construction contractor for the MSCP. As discussed in Section 2.4, demolition of the cooling towers building will be undertaken upon commissioning of the MSCP.



Legend:
 Approximate Boundary_MSCP



Job No: 511195
 Client: Health Infrastructure
 Version: R01 Rev 1 Date: 11-Nov-2015
 Drawn By: SE Checked By: MH

Scale 1:2,250 

 0 60
 metres

Coord. Sys. GDA 1994 MGA Zone 56

**Health Infrastructure -
 Westmead Hospital -
 Redevelopment MSCP WMS**

SITE LAYOUT

FIGURE 1:

3. Legislative Requirements and Guidelines

3.1 Legislation

This WMS has been prepared in accordance with the requirements of the NSW *Waste Avoidance and Resource Recovery Act 2001*, and the NSW *Protection of the Environment Operations Act 1997 and Amendment Act 2011* (POEO Act). These and other key legislation relevant to waste management at the site are provided in Table 2.

Table 2 NSW Waste Legislation Summary

| Legislation | Purpose |
|---|--|
| <p><i>Waste Avoidance and Resource Recovery Act 2001</i></p> | <p>The Act promotes waste avoidance and resource recovery, and is administered by Resource NSW. The Act establishes a scheme to promote extended producer responsibility in place of industry waste reduction plans, and continues the Waste Fund for the purpose of funding relevant programs and Resource NSW. Objectives of the Act include:</p> <ul style="list-style-type: none"> to encourage the most efficient use of resources and to reduce environmental harm to ensure that resource management options are considered against a hierarchy (See Section 4.2) provide for the continual reduction in waste generation to minimise the consumption of natural resources and the final disposal of waste to ensure that industry shares with the community the responsibility for reducing and dealing with waste to assist in the achievement of the objectives of the <i>Protection of the Environment Operations Act 1997</i>. |
| <p><i>Protection of the Environment Operations Act 1997 and Amendment Act 2011</i></p> <ul style="list-style-type: none"> <i>Protection of the Environment Operations (Waste) Regulation 2014</i> <i>Protection of the Environment Operations (General) Regulation 2009</i> | <p>The Act is the key piece of environment protection legislation administered by the EPA. The object of the Act is to achieve the protection, restoration and enhancement of the quality of the NSW environment.</p> <p>The Act enables the Government to establish policy instruments for setting environmental standards, goals, protocols and guidelines.</p> |
| <p><i>Environmental Planning and Assessment Act 1979</i></p> <ul style="list-style-type: none"> <i>Environmental Planning and Assessment Regulation 2000</i> | <p>The Act and the Regulation provide the overarching structure for planning in NSW. They provide for a number of other statutory documents to support the planning structure, including State Environmental Planning Policies and Local Environmental Plans.</p> <p>The objectives include:</p> <ul style="list-style-type: none"> the proper management, development and conservation of natural and artificial resources to encourage ecologically sustainable development. |
| <p><i>Contaminated Land Management Act, 1997 and Amendment Act 2008</i></p> | <p>The Act establishes a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation.</p> |

3.2 Guidelines

Guidance documents and policies considered in the preparation of this WMS are included in Table 3.

Table 3 NSW Guidance Summary

| Guideline | Purpose |
|--|--|
| NSW Environment Protection Authority (EPA) Waste Classification Guidelines (Part 1) 2014 | The Waste Classification Guidelines have been established by the NSW EPA to assist waste generators to classify wastes. Wastes are classified into groups that pose similar risks to environment and human health. Waste classifications are discussed further in Section 4.1. |
| Building Code of Australia (BCA) | The BCA contains technical provisions for the design and construction of buildings and other structures, covering such matters as structure, fire resistance, access and egress, services and equipment, and energy efficiency as well as certain aspects of health and amenity. |
| NSW EPA's Waste Avoidance and Resource Recovery (WARR) Strategy 2014-21 | The WARR strategy provides a framework for waste management for the state until 2021. Key targets include: <ul style="list-style-type: none"> • avoid and reduce waste generation • increase recycling • divert more waste from landfill • manage problem wastes better • reduce litter • reduce illegal dumping |
| NSW EPA's Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012 | The guide provides advice to assist architects, developers, council staff and building managers to incorporate better waste management practice into the design, establishment, operation and ongoing management of waste services in commercial and industrial developments. |
| NSW Government Resource Efficiency Policy 2014 | The policy aims to reduce the operating costs of NSW Government agencies through resource efficiency, and ensure that they provide leadership in resource-productivity. The policy replaces the previous NSW Government Sustainability Policy and streamlines reporting under the Waste Reduction and Purchasing Policy (WRAPP). Local government, state-owned corporations, public trading enterprises and public financial enterprises are strongly encouraged to adopt this policy's approach. |
| Waste management Guidelines for health care facilities 1998 (NSW Health) | The Guidelines provide a minimum standard for safe and efficient waste management for NSW Public Health Care Facilities. They represent the result of consultation with the Environmental Protection Authority (EPA), WorkCover, Waste Industry and health workers. |
| How to manage and control asbestos in the workplace, Code of Practice, 2011 (NSW Government) | The Code of Practice is an approved code of practice under section 274 of the <i>Work Health and Safety Act 2011</i> . The Code provides guidance on how to manage risks associated with asbestos and asbestos containing material at the workplace and thereby minimise the incidence of asbestos-related diseases such as mesothelioma, asbestosis and lung cancer. |
| Australian Government Construction and Demolition Waste Guide, 2011 | The aim of the guide is to help develop effective markets for materials diverted or derived from the construction and demolition waste stream. |
| Australian Government Sustainable Procurement Guide, 2013. | The Guide aims to reduce the adverse environmental, social and economic impacts of purchased products and services throughout their life through considerations such as waste disposal and the cost of operation and maintenance over the life of the goods. The Guide was developed to assist Australian Government purchasers to include sustainability considerations in all stages of the procurement process, from identifying the business need to disposing of goods. |

3.3 Waste Management Policy

This WMS takes account of the Sydney West Area Health Service (SWAHS) Waste Management Policy Manual (2010). The waste management policy manual has been designed to familiarise SWAHS employees with their responsibilities in waste management in order to comply with legislative requirements.

The policy is primarily focussed on waste management associated with health care facilities and, in particular, hospital waste streams. As such, management measures required for the construction and demolition activities are generally not comparable with those outlined in the policy manual for hospital waste, with the exception of general (putrescible) waste. As such, this WMS has been prepared as a stand-alone document to sit alongside the policy manual for the duration of demolition and construction works.

The management of general (putrescible) waste described in the policy manual for non-clinical areas in a hospital setting is consistent with the requirements of putrescible waste on the MSCP site. This includes management of products not able to be recycled such as food, and disposable items including foam cups and containers. The construction contractor will liaise with SWAHS to determine opportunities for storage and collection of general waste within the existing waste management system.

The SWAHS commitment to provide a sustainable future, by supporting a waste management program that is safe, efficient, cost effective and protects the environment, is maintained throughout this waste strategy.

4. Construction Waste Management

4.1 Waste Classifications and Quantities

Waste streams associated with the demolition of existing infrastructure and construction of the MSCP are considered within this WMS. Excavation of existing materials to provide for design levelling of the MSCP footprint is considered as a component of construction.

Potential waste types considered for the MSCP project are described in Table 4:

Table 4 Potential Waste Types

| Waste Type | Demolition (Cooling Tower) | Demolition (Carpark & Walkway) | Construction (Carpark and associated infrastructure) |
|---|----------------------------|--------------------------------|--|
| Concrete | Y | Y | Y |
| Bricks | Y | N | N |
| Asphalt material | Potential | Y | N |
| Soils and sands | Y | Y | Y |
| Contaminated materials (asbestos) | Potential | Potential | Y |
| Rock and excavated stone | N | N | Y |
| Metals (steel, aluminium, stainless steel, and copper piping or wire) | Y | N | Y |
| Timber | Y | N | Y |
| Plastics – packaging | Y | N | Y |
| Plastics – durables (non-packaging) | Y | N | Y |
| Plasterboard | Y | N | Y |
| Glass | Y | N | N |
| Electrical wiring | Y | N | Y |
| Green waste | N | Y | Y |
| General refuse | Y | Y | Y |

4.1.1 EPA Waste Classifications

As described in Section 3, the NSW EPA Waste Classification Guidelines (Part 1) provides for the classification of wastes into groups that pose similar risks to the environment and human health (NSW EPA, 2014b), which are defined in the *Protection of the Environment Operations Act 1997*. Classes of waste described in the guideline are:

- Special waste
- Liquid waste
- Pre-classified waste:
 - Hazardous waste
 - Restricted solid waste

- General solid waste (putrescible)
- General solid waste (non-putrescible).

Special Waste

Special wastes are wastes that pose specific regulatory requirements due to the risks of harm to the environment and human health. These wastes include clinical and related waste, asbestos waste, waste tyres, and anything classified as special waste under an EPA gazettal notice. Special wastes associated with the MSCP are described further in Section 4.4.

Liquid Waste

Liquid waste is classified as any waste (other than special waste) that meets the following criteria:

- has an angle of repose of less than 5 degrees above horizontal;
- becomes free-flowing at or below 60 degrees Celsius or when it is transported;
- is generally not capable of being picked up by a spade or shovel; and/or
- is classified as liquid waste under an EPA gazettal notice.

Pre-classified Waste

Where the waste is neither liquid nor special waste; the EPA has pre-classified other commonly generated waste types, as defined in Schedule 1 of the *Protection of the Environment Operations Act 1997*. This includes hazardous waste, restricted solid waste, general solid (putrescible) and general solid (non-putrescible) waste. Putrescible waste is the component of the waste stream that is liable to become putrid, and usually refers to vegetative, food and animal products.

A list of all currently gazetted waste classifications are provided on the EPA website at: www.epa.nsw.gov.au/waste/wastetypes.htm.

4.1.2 Demolition Waste

Waste streams likely to be generated by demolition of the existing on grade car parking and cooling towers building are shown in Table 5. Estimated volumes of key waste streams have also been calculated based on initial design information. These calculations will be revised upon engagement of a construction contractor and finalisation of detailed design for demolition and construction.

Table 5 Demolition Waste

| Waste Type | EPA Classification | Maximum Indicative Estimated Volume |
|---|--|--|
| Concrete | General solid waste (non-putrescible) | 360m ³ |
| Bricks | General solid waste (non-putrescible) | 27m ³ |
| Asphalt material (Assuming 30mm depth) | General solid waste (non-putrescible) | 210m ³ |
| Soils and sands (Topsoil and clay) | General solid waste (non-putrescible) Potentially Asbestos or asbestos waste. | Minimal |
| Rock and excavated stone (Quarry material / engineered fill) | General solid waste (non-putrescible) Potentially Asbestos or asbestos waste. | Assuming 150mm of PM 1/20: 1,000m ³ ¹ |

| Waste Type | EPA Classification | Maximum Indicative Estimated Volume |
|---|--|---|
| | | Assuming 150mm of PM 2/20: 1,000 m ³ ¹ |
| Metals (steel, aluminium, stainless steel, and copper piping or wire) | General solid waste (non-putrescible) | Unknown |
| Timber | General solid waste (non-putrescible) | Minimal |
| Plastics (durables) | General solid waste (non-putrescible) | Unknown |
| Plasterboard | General solid waste (non-putrescible) | Minimal – opening for raised walkway |
| Glass | General solid waste (non-putrescible) | Minimal – windows in cooling tower |
| Electrical wiring | General solid waste (non-putrescible) | Unknown |
| Green waste | General solid waste (non-putrescible) | Unknown |
| General refuse | General solid waste (putrescible) General solid waste (non-putrescible) | Unknown |
| Stormwater runoff | Liquid waste | Unknown |
| Sewage | Liquid waste | Unknown |

Notes: Estimates prepared by a qualified civil and structural engineer based on initial project drawings, with assumptions made to depth existing fill on site and assumptions regarding structural specifications for the cooling tower building.

1. Engineered fill may not be removed during demolition of on-grade carpark and may be left in situ.

4.1.3 Construction Waste

Waste streams and estimated volumes of waste likely to be generated during construction of the MSCP, including excavation for preparation of the subgrade, are shown in Table 6. As discussed for demolition calculations, maximum indicative estimated volumes have been calculated based on initial design information.

Table 6 Construction Waste

| Waste Type | EPA Classification | Maximum Indicative Estimated Volume |
|---|--|---|
| Concrete and bricks | General solid waste (non-putrescible) | 15 m ³ to 45 m ³ ¹ |
| Asphalt material | General solid waste (non-putrescible) | Minimal |
| Soils and sands | General solid waste (non-putrescible) Potentially asbestos or asbestos waste. | Minimal. Some sand in excavated material. |
| Rock and excavated stone | General solid waste (non-putrescible) Potentially asbestos or asbestos waste. | 5,900m ³ ² |
| Metals (steel, aluminium, stainless steel, and copper piping or wire) | General solid waste (non-putrescible) | Unknown |
| Timber (formwork) | General solid waste (non-putrescible) | Unknown. Based on construction techniques. |

| Waste Type | EPA Classification | Maximum Indicative Estimated Volume |
|-----------------------------------|--|-------------------------------------|
| Plastics (durables and packaging) | General solid waste (non-putrescible) | Unknown |
| Green waste | General solid waste (non-putrescible) | Minimal |
| General refuse | General solid waste (putrescible) General solid waste (non-putrescible) | Unknown |
| Stormwater runoff | Liquid waste | Unknown |
| Sewage | Liquid waste | Unknown |

Notes: Estimates prepared by a qualified civil and structural engineer based on initial project drawings, with assumptions made to depth existing fill on site.

1. Waste volume is dependent upon the concrete pour methods and experience of contractor
2. This value is dependent upon geotechnical engineering foundation designs for piling and engineered fill.

4.2 Waste Management

The preparation and implementation of this WMS is in accordance with the waste hierarchy, which underpins the objectives of the *Waste Avoidance and Resource Recovery Act 2001* (NSW EPA, 2014a). The waste hierarchy shown in Figure 2 demonstrates preferred approaches to waste management to ensure sustainable development and use of resources.



Figure 2 Waste Hierarchy

The hierarchy also aims to maximise efficiency and avoid unnecessary consumption of resources. This WMS seeks to implement the waste hierarchy to minimise waste disposal and promote waste reduction in order of preference:

- Reduce or avoid waste through selection of items and design.
- Reuse materials without further processing.
- Recycle and process waste for reuse as a new product.
- Recover energy through combustion of materials where acceptable and in accordance EPA regulations.

- Treat waste to stabilise the waste product for disposal or reuse.
- Dispose of waste when no other management options are appropriate.

This section describes waste management measures in line with the hierarchy, and provides specific waste management strategies for the key waste classifications described in Section 4.1.

4.2.1 Avoidance and Reduction of Waste

The construction site manager and early works contractor will be required to avoid waste generation, and endeavour to reuse waste where available. Waste will be avoided through strategic selection of materials during design and purchasing which take into account options which may reduce waste generation upon commissioning of the MSCP. This includes consideration of procurement of materials which are prefabricated, use minimal packaging, and are suitable for reuse across the site. Selection of construction materials will also consider the use of recycled items where practicable.

Opportunities to avoid wastes generated by demolition and construction include:

- Develop a procurement policy which considers waste avoidance measures such as:
 - Order site specific or prefabricated items where practicable to minimise surplus material.
 - Consider packaging material provided by suppliers during purchasing and reduce this requirement where possible, or consider returnable packaging.
 - Material selection to consider recycled items.
- Avoid removal of trees.
- Refine waste stream estimates to ensure adequate on-site storage and waste segregation.
- Refine estimated volumes of materials for construction and demolition.

4.2.2 Reuse and Recycling

To maximise opportunities for reuse of waste materials onsite, measures to separate waste streams will be implemented. This includes segregating wastes into appropriate dedicated bins or areas for reclamation on site or transportation to a designated recycling facility.

Where practicable, uncontaminated spoil will be stockpiled for use during construction. Excavated materials containing asbestos cannot be safely recycled, and direct treatment and/or disposal is the most appropriate option. The construction contractor will liaise with a licensed asbestos removalist and local council to determine a suitable disposal facility, as discussed in Section 4.4.

Procedures to manage the reuse and recycling of waste materials during demolition and construction include:

- Incorporate waste management into development staging to promote reuse of materials across the site.
- Ensure areas for waste segregation are easily accessible and clearly defined.
- Ensure contractors are familiar with onsite waste storage areas for appropriate waste segregation.
- Determine suitability of materials generated during demolition for use in construction of the MSCP.
- Consider opportunities for materials reuse in areas in proximity to the MSCP site or local construction activities where practicable.

4.2.3 Treatment and Disposal

Project wastes may require treatment to stabilise them for appropriate disposal to reduce the risk of harm to human health or the environment. These materials are not suitable for reuse or recycling, and will be segregated and disposed of via a suitably qualified contractor for the waste stream.

Wastes will only be sent to landfill or disposal facilities where the prioritised management methods in the hierarchy cannot be implemented in a cost effective or practical manner. The construction contractor will liaise with local council to determine appropriate disposal locations for potential waste streams.

Measures to manage the treatment and disposal of waste materials during demolition and construction include:

- Ensure wastes which cannot be reused or recycled and require disposal are clearly segregated from those which have the potential to be reused.
- Contractors and staff to be inducted into site waste management practices.
- Hazardous materials including asbestos to be disposed of in accordance with the handling and disposal requirements of WorkCover NSW and NSW EPA.
- General wastes to be disposed of in accordance with local council requirements.
- Toilet facilities must be regularly serviced and emptied by a licensed contractor.

4.3 Waste Stream Options

In addition to the waste management measures in Section 4.2 aligned to the waste management hierarchy, waste stream specific management options will be implemented across the site to ensure appropriate waste handling. Key waste stream management options associated with demolition and construction are described below. The numbers and size of waste storage bins, containers and stockpile areas on site will be determined by the construction contractor.

4.3.1 Concrete

Options exist for recovery of components of concrete associated with the cooling stacks and removal of kerb for construction of entry and exit lanes for the MSCP, as well as any surplus construction concrete.

Concrete can be reprocessed and may, in some instances, be reused across site, however, the general practice is to crush the concrete and arrange for disposal to a recycling facility or disposal offsite. The construction contractor will determine suitable disposal of concrete waste in accordance with the waste management hierarchy.

4.3.2 Asphalt

Asphalt is potentially 100 per cent recyclable, however, reprocessing is not as readily undertaken as concrete (DSEWPaC, 2011). Measures to identify an appropriate asphalt plant for sorting and batching will be assessed and undertaken by the construction contractor. Asphalt may also be used across the site where practicable.

4.3.3 Soils and Sand

Excavation of the site in preparation of the sub-grade for the MSCP is likely to produce soils and sand. Soils will be redistributed across the site for filling, levelling or landscaping provided they have not been in contact with asbestos containing materials. Where stockpiling is required prior to redistribution, control measures to avoid sediment and erosion will be implemented where

appropriate. This may include establishing a bund or lining of the base with an impermeable HDPE plastic liner.

Where excess soil cannot be redistributed or has been situated in proximity to asbestos containing materials, the sand and soils are required to be treated and/or disposed of, potentially as low level contaminated waste via a licensed removalist to a disposal facility.

4.3.4 Rock and excavated stone

Excavation of the MSCP site may also recover rock and stone. Depending upon the qualities and properties of the materials generated, materials may be used as aggregate or sub-base. The staging of the development as determined by the construction contractor will consider the timing of excavation and the construction of components of the MSCP to ensure availability and appropriate reuse of these materials across the site.

4.3.5 Metals

Metal wastes will most likely result from excess materials purchased for the site such as steel reinforcement, as well as demolition of the cooling towers building. The purchasing procedure will consider appropriate procurement of materials to ensure a reduction in metal wastes. Where excess materials are encountered, reprocessing of mixed steel is a straightforward and common practice in the construction industry (DSEWPaC, 2011). The construction contractor will investigate and determine appropriate storage and reprocessing of metals to reduce waste.

4.3.6 Timber

Timber associated with builder's wastes and packaging will be reduced through implementation of the purchasing procedure. Where timber framework is required for construction, items may be salvaged where safe and cost effective to do so. Reclaimed timber can be used for a variety of applications or distributed to salvage yards for reuse. The construction contractor will determine the viability of this option in consideration of the waste hierarchy. This includes liaising with a timber recycling and recovery contractor for collection and reprocessing of timber. The contractor will determine options of reuse of reprocessed timber across the site, including the use of woodchips during landscaping.

Salvaging timber from the demolition works is a difficult process due to occupational health and safety requirements and the diminished quality of the refuse timber. Where reuse of timber is not feasible, the construction contractor will organise disposal of the timber to a licensed waste facility.

4.3.7 Plastics

Plastic wastes associated with packaging for construction materials can be recycled or in some cases returned to the supplier of the materials for reuse. The construction contractor will determine the approach to management of these plastics through correspondence with suppliers. Where possible, plastic (non-durable) wastes will be reduced through the procurement process.

4.3.8 Green Waste

Waste associated with the removal of trees across the site can be processed to create mulch for landscaping. Trees will be retained on site where possible to limit the requirement for reprocessing, and mulch and woodchips will be redistributed where required.

4.3.9 General (putrescible) Waste

Wastes such as food waste, organics and biodegradable material will be created as a result of worker activity on site. Putrescible wastes are generally inert, or solid, and are not able to be composted, recycled, reprocessed or reused.

The construction contractor will liaise with SWAHS to determine an appropriate means of putrescible waste disposal, and options for disposal within the existing waste management system at the hospital. If this option is not viable, the construction contractor will determine an appropriate waste disposal facility, and ensure adequate bins are provided on site for putrescible waste. This is particularly important around worker congregation areas, site office areas and toilet facilities.

4.4 Special Waste

Soils on site are known to be impacted with asbestos. Asbestos poses a risk to human health through exposure of loose fibres when damaged or disturbed. As such, asbestos is classified as special waste under the *Protection of the Environment Operations Act 1997*, and the EPA Waste Classification Guidelines (Part 1) 2014. Special wastes pose unique regulatory requirements due to the management responsibilities to minimise risk of harm.

Where safe and practicable, a cap and contain remedial strategy will be implemented where asbestos materials are present. Encapsulation and sealing of asbestos protects the material from potential mechanical damage, and prevents the release of airborne asbestos. Encapsulation will be undertaken in accordance with the NSW WorkCover Code of practice (2011).

Where encapsulation is not possible, waste will be transported and disposed of in accordance with the requirements of the *Protection of the Environment Operations (Waste) Regulation 2014*, with disposal undertaken by a suitably qualified contractor. This includes reporting the movement of waste to the EPA where the load exceeds 100 kg of asbestos waste.

It is anticipated that asbestos waste removal may be required where excavation is necessary to reach the design subgrade level for the MSCP. Further detailed design, geotechnical and contamination assessments will determine the likelihood and potential volumes of asbestos waste.

5. Implementation

This WMS forms the basis of all waste management on site for the MSCP. It is living document which will be reviewed upon further site investigation and design following engagement of a construction contractor. Review of the WMS will provide for accurate estimates of waste quantities to ensure appropriate onsite waste management in accordance with the waste management hierarchy.

A detailed schedule and planned work staging will also provide opportunities for waste reuse across the site and determine the requirements for temporary waste storage.

5.1 Roles and Responsibilities

It is expected that all personnel will commit to the WMS and be responsible for their own actions in adhering the waste management objectives.

A Construction Site Manager will be the key person responsible for implementation of the WMS and adherence to applicable legislation, guidelines, licencing and project conditions outlined in Section 3.

Table 7 presents suggested responsibilities for waste management. These may be refined upon appointment of the construction contractor.

Table 7 Roles and Responsibilities

| Role | Responsibility |
|---|---|
| Environmental Management Representative | <p>Compliance with applicable environmental licences, legislation and project conditions.</p> <p>Ensure environmental management plan(s) across the site are adhered to and accurate to site conditions.</p> <p>Undertake inspections to ensure compliance.</p> |
| Construction Site Manager | <p>Ensuring workers and subcontractors are inducted into the WMS along with other applicable management plans.</p> <p>Responsible for undertaking procurement of construction materials in accordance with the waste management hierarchy.</p> <p>Segregation of waste streams where required to ensure appropriate use, treatment and/or disposal.</p> |
| Health and Safety Manager | <p>Safety inductions for all staff, workers and visitors.</p> <p>Work with Construction Site Manager to determine safe handling of asbestos waste in compliance with regulatory requirements.</p> |
| Site Workers | <p>Responsible for acting in accordance with the WMS and site inductions.</p> <p>Informing the Construction Site Manager of any waste management incidences and Health and Safety Manager of any safety issues associated with on site activities.</p> |

5.2 Training and Awareness

Staff present on site during the demolition and construction stages of the project will be required to undertake induction and awareness training inclusive of the WMS and site specific waste management. This includes:

- Induction to the waste management hierarchy and use across the site
- Details of responsibilities for waste management and key personnel
- Site specific waste management practices relevant to the project stage such as:
 - Waste storage and stockpiling locations

- Waste disposal requirements
- Hazardous or special wastes
- Record of waste disposal details and receipts
- Knowledge of emergency response procedures and contacts

Signage will be provided on site to ensure waste management measures are communicated across the site, particularly for contractors and visitors who are not regularly on site. Signage will highlight correct procedures for separating wastes where required, locations of bins and waste storage areas, labelling of designated bins, potential hazards associated with the waste streams and handling, and contact details should any issues be encountered.

Signage will be prepared and located on site in accordance with the Australian Standard (AS 1319) for safety signs, and the NSW EPA and Australian Standard for recycling signage.

6. Monitoring and Reporting

The WMS provides a basis for waste management across the broader site area and for future demolition or construction activities at Westmead Hospital Precinct. As such, the following activities will be undertaken to inform future onsite waste management and to determine the success of the WMS:

- Ensure waste quantities generated are recorded, including tracking of receipts from waste recycling or disposal.
- Record waste classification and testing results.
- Review the WMS in light of any changes to construction activities or further information which may alter waste management practices.
- Undertake auditing of waste management across the site as a component of broader environmental site audits.
- Undertake visual inspections daily to ensure waste management controls are implemented and maintained across site.
- Undertake final review of the WMS upon project completion to ensure information accurately reflects site activities, and to assist future waste management.

Outcomes of audits and waste tracking will be reported to Health Infrastructure NSW, potentially through weekly or monthly reporting to ensure waste management objectives are adhered to.

6.1 Corrective Action

Where formal auditing, daily visual inspections or incident reporting identify incorrect storage or disposal procedures, or maintenance or waste management issues, observations will be promptly reported to the Construction Site Manager and recorded. The Construction Site Manager will determine appropriate measures to rectify the issues in a timely manner in consultation with the Environmental Management Representative and Health and Safety Manager where required.

7. References

- DSEWPaC. (2011). *Construction and Demolition Waste Guide – Recycling and Re-use Across the Supply Chain*. Department of Sustainability, Environment, Water, Population and Communities. Australian Government, Canberra.
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- NSW WorkCover. (2008). *Working with Asbestos – Guide*. WorkCover NSW.
- NSW WorkCover. (2011). *How to Manage and Control Asbestos in the Work Place Code of Practice*. WorkCover NSW.
- Sydney West Area Health Service. (2010). *Waste Management Policy Manual*. NSW Health. Sydney, NSW.

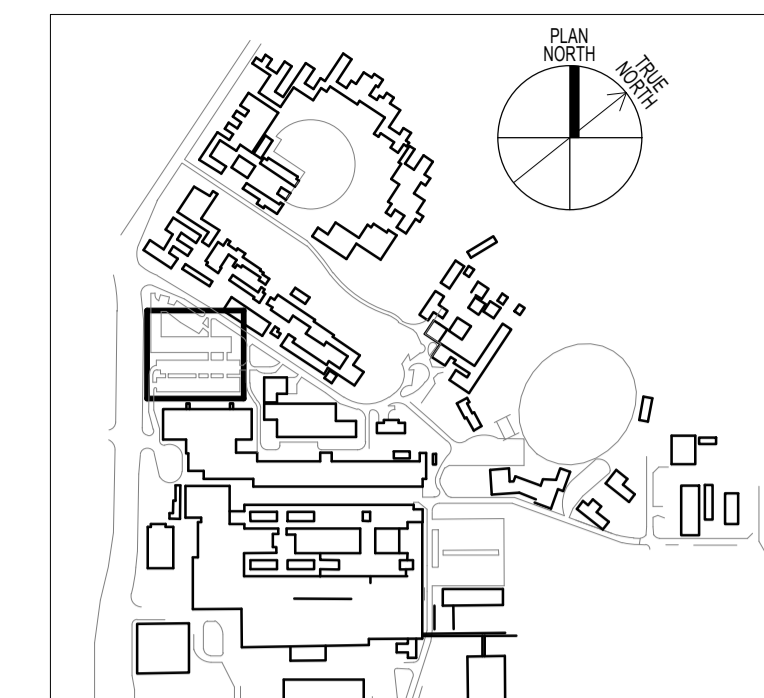
8. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

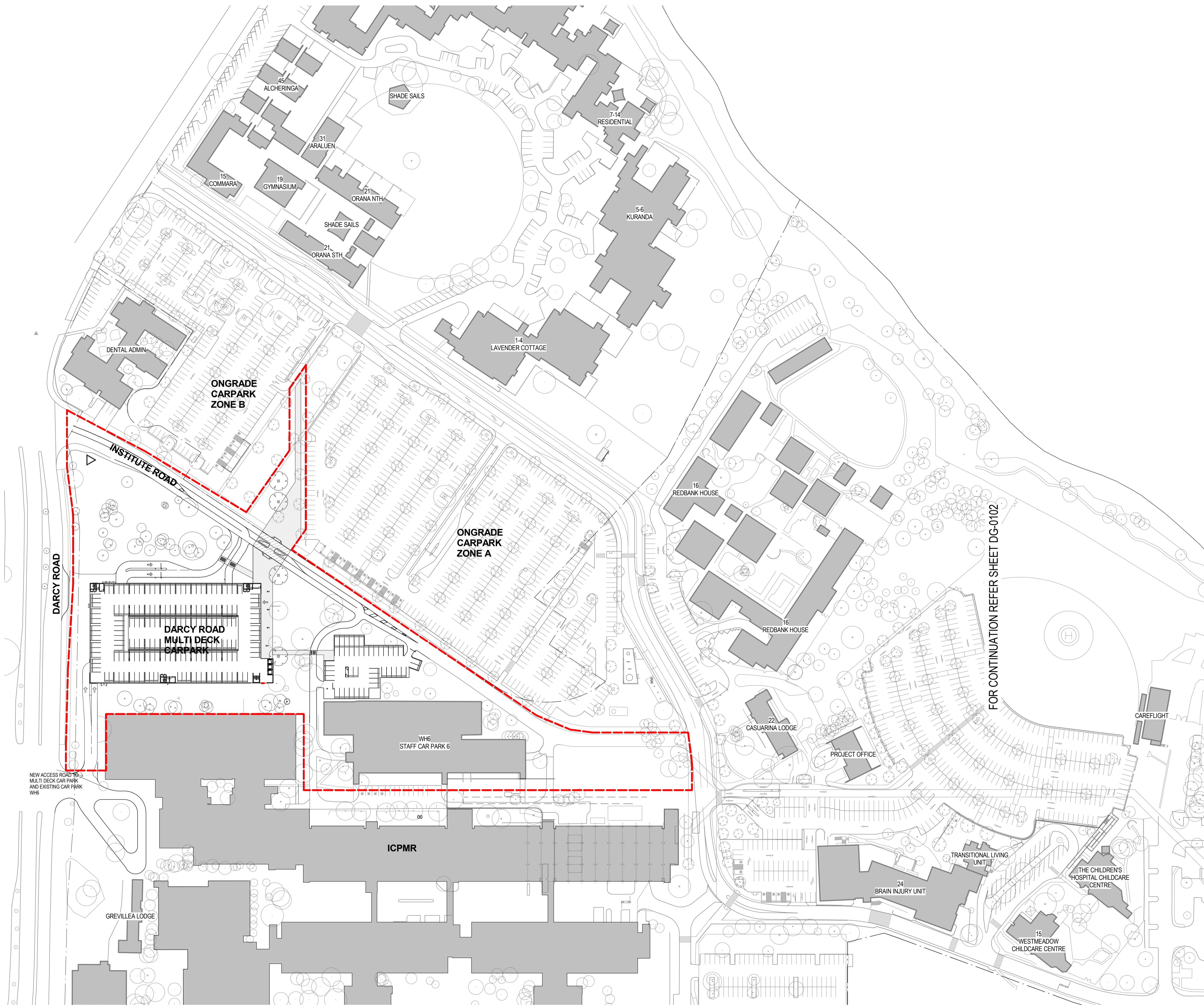
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Appendix 1 – Westmead Redevelopment: Carpark Site Plans



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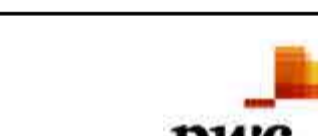
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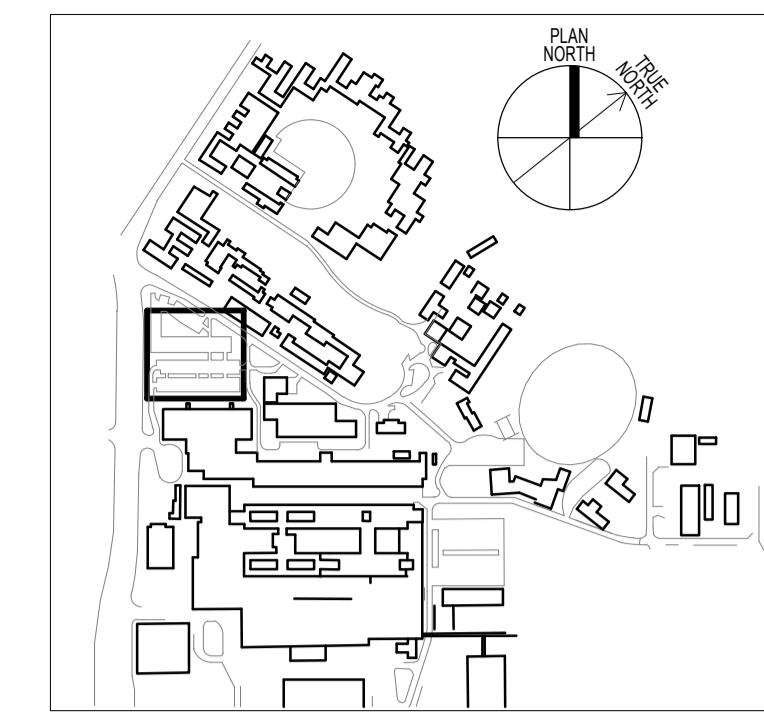


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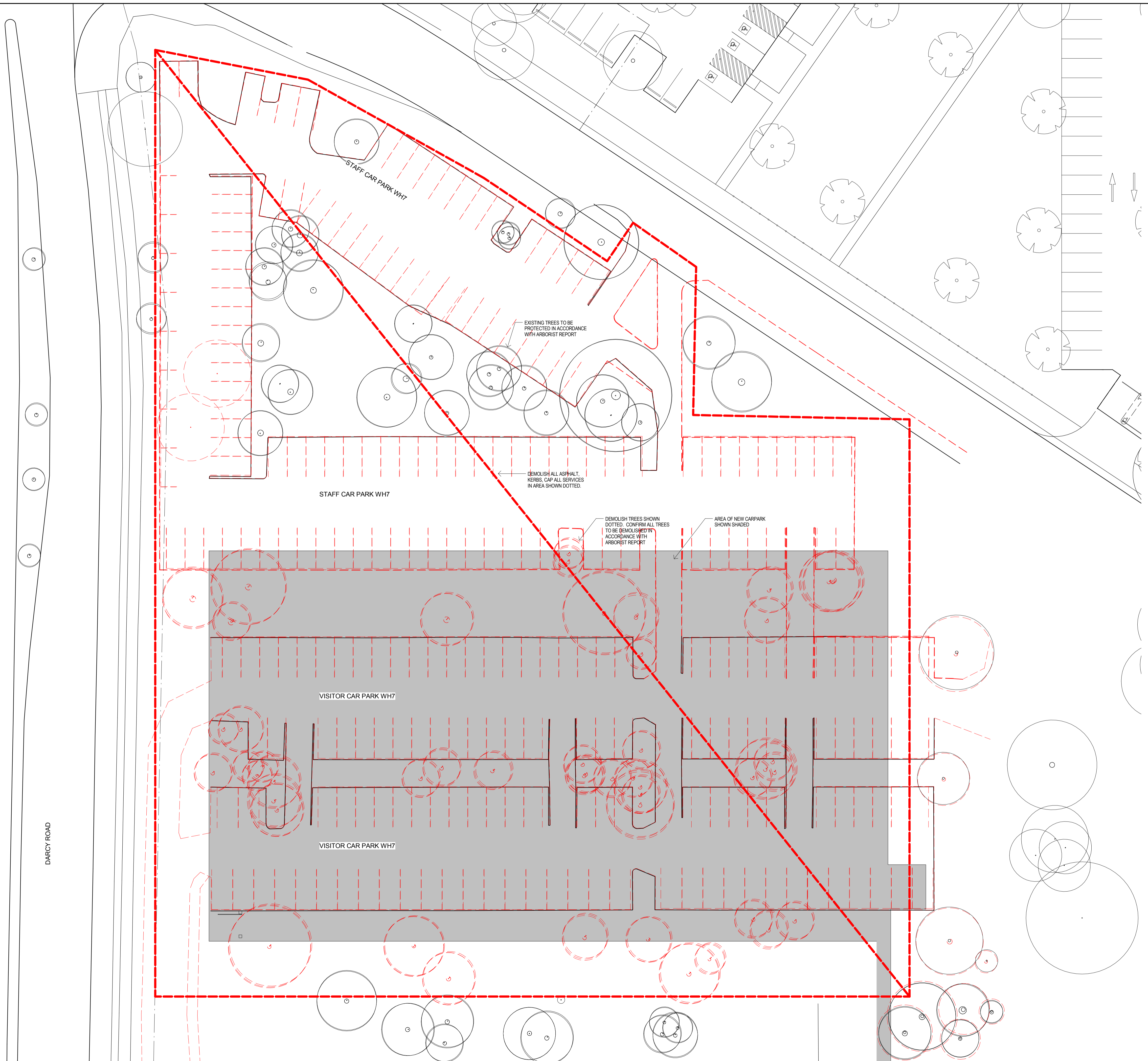
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| 3 | FINAL ISSUE | AB | AF | 08/09/2015 |
| 4 | FINAL STATUS | AB | AF | 09/09/2015 |
| 5 | FINAL STATUS | AB | AF | 11/09/2015 |
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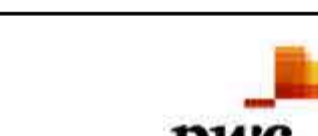
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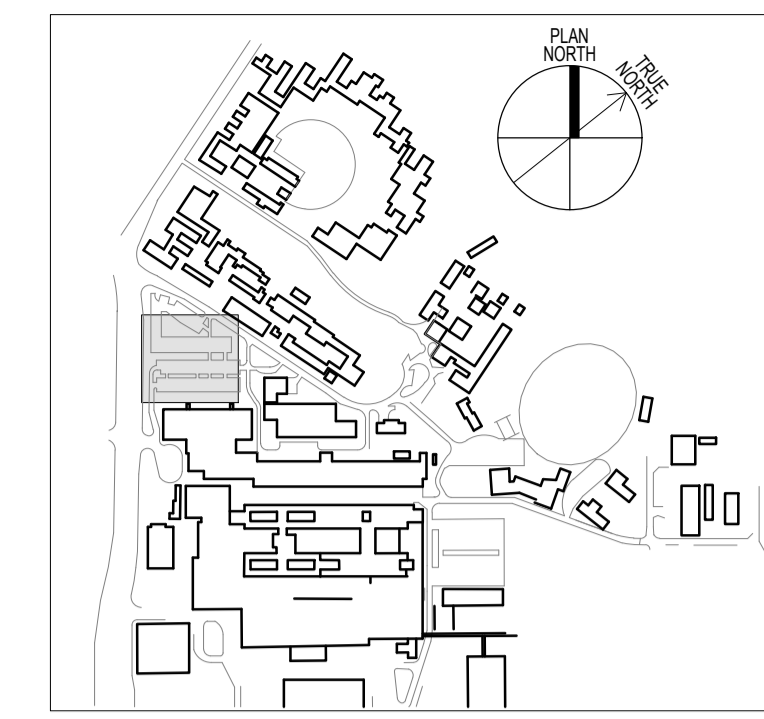


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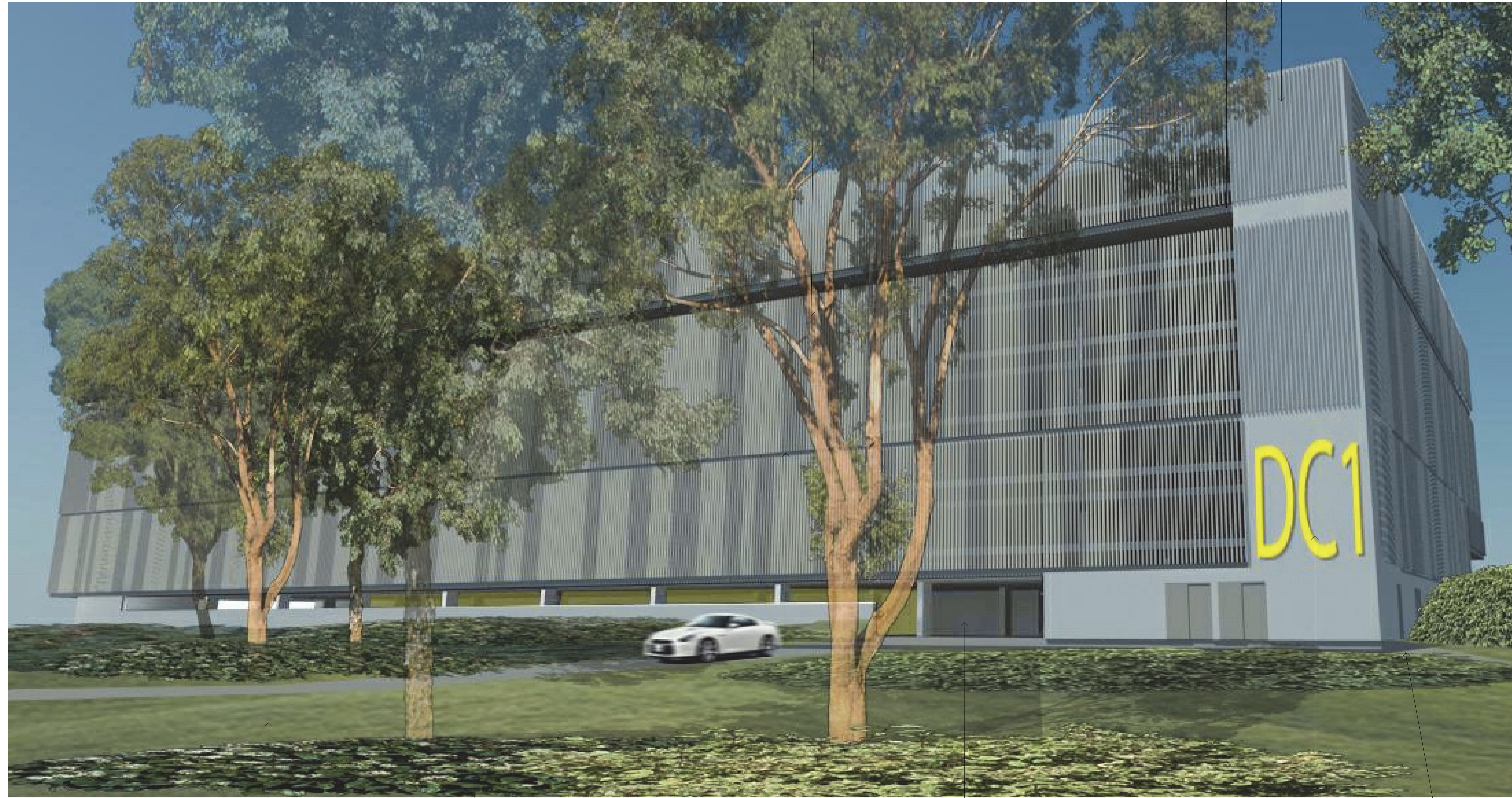
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VERTICAL LOUVRES CLOSELY SPACED - THREE SHADES OF GREY PROVIDE A RHYTHM TO THE FACADE. FINAL ARTICULATION TO BE APPROVED BY ARCHITECT

AIR GAP AT LEVEL 5 TO CREATE BREAK IN THE FACADE AND AID VENTILATION

LOUVRES TO UPPER FLOOR EXTEND 2100MM TO ENVELOP CORES AND CREATE A SAFETY BARRIER



TURF AND LOW LEVELS SHRUBS TTD LANDSCAPE ARCHITECTS SPECIFICATION

CLASS 2 CONCRETE WALL CREATES A BASE TO THE NEW CAR PARK

EXPOSE SLAB EDGE AT LEVEL 3 TO CREATE BREAK IN THE FACADE

CAR PARK EXIT AT LEVEL 0

WAYFINDING SIGNAGE TO CLIENTS APPROVAL

FIRE BRIGADE ACCESS ROUTE

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