



Government of **Western Australia**
Department of **Treasury and Finance**
Strategic Projects

Queen Elizabeth II Medical Centre Car Parking Project

Project Number: BMW14583/10

Design Requirements

Part A

Architectural Requirements

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1. Introduction

The redevelopment of the Queen Elizabeth II Medical Centre is part of a multi-billion dollar investment in health infrastructure for Western Australia. The proposed investment in the Queen Elizabeth II Medical Centre is stage 1 of the State Government's plan to establish the Reserve as one of Perth's major tertiary hospitals and a key health care delivery centre.

A significant component of the stage 1 development works is the construction of the New Car Park. The New Car Park is to be located on a pivotal site adjacent to what will become the new major entry forecourt to the Sir Charles Gairdner Hospital (Hospital) and adjacent to the major traffic route of Winthrop Avenue. As a high use facility for visitors and staff entering the Reserve, the New Car Park will be a major landmark and will form a significant part of the new entry to the Hospital.

The New Car Park design must consider the scale and form of the existing surroundings at the same time as providing a notable architectural outcome. This significant new building must make a positive contribution to the streetscape of Winthrop Avenue and act as a design benchmark for future building development within the Reserve.

The design must deliver a high level of performance befitting a large scale publicly accessed building in a prominent setting and serve to enhance the identity of the Reserve within the community.

As such the New Car Park design must address the following Design Principles:

- achieve a landmark presence, during both day and night;
- deliver a high standard urban design outcome which responds to the significance of the Reserve, its setting, and its context in the cities of Subiaco and Nedlands;
- employ an architectural expression consistent with ambitions to deliver a world-leading standard of healthcare, research and education on the Reserve;
- achieve a high build quality outcome which supports the vision for and function of the Reserve;
- meet the Minimum Capacity Requirements and Minimum Staging Requirements;
- provide a durable and sustainable architectural outcome appropriate to the long term aspirations of the Queen Elizabeth II Medical Centre Master Plan; and
- address the Design Objectives noted in Section 3.2.

Volume 2 - Design Requirements outlines the architectural and technical requirements of the State. It provides the framework in relation to functionality, constructability, environmental responsiveness and civic presence to enable Proponents to provide a world class architectural and technical response to this RFP.

To avoid repetition this document does not include the detailed requirements for engineering services that are included in *Volume 2 - Part B - Technical Requirements*.

Please note that Volume 2 only applies to the New Car Park. Unless specifically referred to, the At-Grade Car Parks are excluded from the architectural and technical aspects of this Volume 2.

2. Project Overview

2.1. General

The New Car Park will be a single or combination of stand alone buildings developed for the purpose of providing safe, convenient and protected motor vehicle parking for staff, patients and visitors to the Reserve.

The New Car Park must be an economical structural solution of contemporary design, and be comprised of resilient, durable, vandal and damage resistant materials and finishes. The design of the exterior façade treatments must address screening, ventilation and security and must be of a high quality appearance commensurate with the significant location of the new structures.

The New Car Park's relationship to existing buildings and proposed future developments must be carefully considered in the development of the building massing, form, address to streetscape and in the incorporation of wayfinding measures.

2.2. Description of the New Car Park

The Project is intended to address the parking needs of the Reserve, including the car parking needs of the New Children's Hospital, as well as providing significant master planning and design flexibility to facilitate future car park expansions. Once the New Children's Hospital is completed, the State has identified a total capacity for the New Car Park and the At-Grade Car Parks of 4,640 bays plus 150 Exempt Bays for a total minimum Reserve capacity of 4,790 parking bays.

The State strongly encourages Respondents to exceed the Minimum Capacity Requirements and deliver a physical solution that would ultimately provide up to 5,000 Parking Bays (after having deducted the Interim Bays) across the Reserve.

Table 1 below summarises the capacity requirements for the New Car Park and the At-Grade Car Parks and further information is contained in *Volume 1- Part B – Commercial Framework*.

Table 1: Car Parking Facilities capacity

Area	Sub-Total	Total
New Car Park		
Stage 1 Completion	1,200	
Stage 2 Completion	1,200	
Final Completion	1,150	
New Car Park (Minimum Capacity Requirement)		3,550
At-Grade Car Parks		
At-Grade Car Park (Stage 1 Completion)**	1,769	
At-Grade Car Park (nett: Stage 2 construction area)	-355	
At-Grade Car Park (nett: Stage 3 construction area)	35	
Western Power Substation (Car Park 3)	-161	
At-Grade Car Park - NCH bays	300	
At-Grade Car Parks		1,588
Total Car Parking Facilities (NCH Completion)		5,138
Interim Bays	-498	
Total Ultimate Capacity - Car Parking Facilities		4,640
Exempt Bays*		150
Total Ultimate Capacity - Reserve		4,790

* Exempt Bays do not form part of the Car Parking Facilities

** Adjusted for the 465 bays (max.) required for the Stage 1 Car Park Construction Area

Parking Bays across the Reserve will be categorised into one of three categories, being the New Car Park, At-Grade Car Parks and Exempt Bays. The New Car Park will be a new multi-deck car parking facility that may be developed over a site on the north-eastern quadrant of the Reserve (overlapping the existing car park 1 and the existing central plant building) in accordance with the Minimum Capacity Requirements and the Minimum Staging Requirements. The New Car Park, in conjunction with the At-Grade Car Parks, is expected to resolve the severe parking constraints across the Reserve with the provision of at least 3,550 bays in the New Car Park by 2015 with a maximum loss of At-Grade Car Parks of 785 bays.

The State is encouraging Respondents to carefully consider the way in which they program the construction of the New Car Park. In particular, the State encourages Respondents to open up and make available as many parks as soon as possible, particularly during the early stages of the Term, until the existing Reserve demand is accommodated (i.e. prior to the relocation of the New Children's Hospital). The Minimum Staging Requirements will be a key evaluation consideration and are required to:

- **(Minimise bay losses to the At-Grade Car Parks)** minimise the initial footprints of the Stage 1 Construction Area, the Stage 2 Construction Area and the Final Construction Area and to ensure that the final footprint of the New Car Park does not exceed 785 Parking Bays;
- **(Maximise interim and final capacity of the New Car Park)** maximise the final capacity of the Stage 1 New Car Park, the Stage 2 New Car Park 2 and the New Car Park; and
- **(Timeframes)** minimise the timeframes for achieving Stage 1 Completion, Stage 2 Completion and Final Completion.

The table below summarises the Minimum Staging Requirements of the State.

Table 2: Minimum Staging Requirements of the New Car Park

Area	Latest permissible Completion Date	At-Grade Car Park Bay loss	New Car Park Bay gain	Net Impact
Stage 1 construction area	24 May 2011	-465		-465
Stage 1 Completion Date	1 Nov 2012		1,200	735
Stage 2 construction	2 Nov 2012	-820		380
Stage 2 Completion Date	11 Dec 2013		2,400	1,580
Stage 3 construction	12 Dec 2013	-785		1,615
Stage 3 Completion Date	31 Dec 2015		3,550	2,765

2.3. Design Scope

Project Co must provide the following in the design of the New Car Park:

- the provision of the Minimum Capacity Requirements and the Minimum Staging Requirements;
- pre-allocated, dedicated staff bays are not required, however there will be a need for a separation of staff and visitor parking;
- all Parking Bays (other than accessible bays) should be designed as User Class 3 in accordance with Table 1.1 of AS2890.1:2004.¹
- ;
- minimum vertical clearances to structure must be sufficient to allow access by emergency vehicles and otherwise no less than 2.5m at ground floor level, 2.3m to typical floors and otherwise in accordance with applicable Australian Standards;
- the provision of a signalised intersection at Winthrop Avenue for a new major vehicle entry/exit point to the New Car Park;
- the facilitation of movement of private vehicles from the New Car Park entry/exit road to Hospital Avenue will not be permitted;
- access for emergency vehicle movement from Winthrop Avenue to Hospital Avenue through the New Car Park entry/exit road must be provided and maintained at all times. Project Co must:
 - provide a suitable interface of emergency vehicle movements with pedestrian movements along Hospital Avenue, ensuring the safety of pedestrians and right of way for emergency vehicles;
 - delineate emergency vehicle access as distinct from private vehicle traffic accessing the New Car Park;
 - implement methods to ensure that vertical clearances are maintained at all times;
 - prevent private vehicle access from New Car Park entry/exit road to Hospital Avenue; and
 - provide associated signage, lighting, pavement and kerbing treatments, landscaping etc.
- casual drop-off at New Car Park entry/exit road is not required (this will be provided for elsewhere);
- a emergency access road between the New Car Park buildings to Hospital Avenue is required;
- a minimum of 100 under cover motor cycle bays must be provided at the New Car Park;

¹ SP007

- a minimum of 2% of new car parking bays must be designated as disabled bays and designed in accordance with applicable Australian Standards (including AS1428 and AS2890);
- the New Car Park building must incorporate a covered pedestrian walk way / awning to Hospital Avenue façade in accordance with the Queen Elizabeth II Medical Centre Master Plan. The design must:
 - maximise access to natural light through the use of translucent materials where practical;
 - integrate lighting and signage;
 - address design for wind loadings and uplift; and
 - integrate with façade treatments.
- design the New Car Park to facilitate safe and efficient pedestrian movements between the New Car Park and the western side of Hospital Avenue. An overpass connection must be provided from the New Car Park to the western side of Hospital Avenue with lift and stair access from overpass level to Hospital Avenue level;
- provision for overpass connections from the New Car Park to future new buildings to the west of Hospital Avenue and to the New Children's Hospital. Project Co must demonstrate options for facilitating future overpass connections that may be constructed as part of future projects;
- vertical transportation to/from main entry points to the New Car Park must be provided at a minimum by a combination of lifts and stairs. Consideration should be given to options for increasing amenity of vertical circulation to visitor areas of the car park, for example through the use of escalators or travelators, for ease and convenience of use by the elderly and infirm;
- the design of Commercial Opportunities within the New Car Park must comply with the Commercial Opportunity requirements as set out in *Volume 1 - Part B - Commercial Framework Summary*;
- public toilets are to be provided, as a minimum, at ground floor in close proximity to major entry/exit points to the New Car Park;
- end of trip facilities for cyclists (including bike bays), joggers and walkers are **not** required;
- provision of an electronic car park management system and electronic signage providing advance advice of car bay availability, externally and on a floor by floor basis;
- provision of lighting in accordance with applicable Australian Standards, ensuring that high quality night lighting is provided to all accessible areas including external pedestrian walkways, covered ways and overpasses. Lighting must be of a high architectural standard;
- provision must be made within the New Car Park to house all plant and equipment required for the operation and maintenance of the building;
- operator staff facilities must be provided including car park attendant's office with separate toilets and facilities and a suitable area for interaction with Users; and
- the overall building height, inclusive of light poles, lift shaft structures, façade treatments, plant etc, must not exceed 7 storeys.

2.4. Functional Requirements

In relation to the New Car Park, Project Co must ensure that:

- the building contains all the systems, equipment and furnishings required for the provision of and maintenance of efficient car park services;
- there is a high level of system and equipment reliability and maintainability;
- the arrangement of the various areas within the building is efficient, logical and legible for the typical use and user;
- there is safe and efficient access for Staff and Visitors;

- the building is designed so that maintenance activities can be undertaken with minimum disruption to the normal working of the facilities;
- that the engineering services systems and equipment have a long life so that disruption caused by replacement is minimised;
- Visitors and Staff will be safe;
- that the proper response can be given to emergency conditions; and
- Visitors and Staff cannot access areas that would be hazardous for them.

2.5. Interfaces

Project Co must ensure all interface obligations are addressed in the design and construction of the New Car Park including:

- building volume and form to compliment existing and proposed structures and services;
- coordination of all finished surface levels to ensure compliant access is maintained;
- coordination of all materials and finishes compliant with and complimentary to the Queen Elizabeth II Medical Centre Urban Design Guidelines contained in *Volume 5 – Additional Information*;
- allowances for easements/access are made where required;
- unimpeded future development of Hospital Avenue precinct including alterations to Hospital Avenue cross section and provision for future light rail corridor;
- provision of safe and efficient pedestrian movements between the New Car Park and the western side of Hospital Avenue as part of the Additional Works requirements;
- provision for the interface of a new landscaped forecourt connecting the New Car Park to the New Children's Hospital;
- alterations to Winthrop Avenue and any required works to local road networks to facilitate Winthrop Avenue works as part of the Additional Works requirements; and
- early release of components of the New Car Park to address shortfall of car parking bays across the site (including upon handover of the New Children's Hospital site), that meets or exceeds the State's Minimum Staging Requirements.

2.6. Codes and Standards

The design and construction of the New Car Park must comply with all Laws, the Building Code of Australia, all relevant Australian Standards and good industry practice including:

- Disability (Access to Premises – Buildings) Standards 2010;
- AS 1428 "Design for Access and Mobility" (all relevant parts);
- AS 2890.1 "Off Street Parking Facilities";
- Parking user classes as defined in Table 1.1 of AS 2890.1 must be appropriate to the parking area users; and
- Parking spaces for people with disabilities must be designed in accordance with AS 2890.6 "Off Street Parking for People with Disabilities".

3. Design Requirements

3.1. General

The planning and design of the New Car Park must address and incorporate the requirements of the following documents relevant to the redevelopment of the Reserve:

- Queen Elizabeth II Medical Centre Access and Structure Plan – February 2007;

- Queen Elizabeth II Medical Centre Master Plan – June 2010;
- Queen Elizabeth II Medical Centre Master Plan Pedestrian Movement Plan – June 2010; and
- Queen Elizabeth II Medical Centre Urban Design Guidelines – March 2009.

3.2. Design Objectives

The following objectives must guide the design approach for the New Car Park:

- demonstrate an awareness of the future vision proposed for the Reserve;
- ensure design performance at both urban and architectural scales;
- respond sensitively and intelligently to the existing context, as appropriate;
- consider the visual experience for passing motorists in the design of the exterior surface;
- utilise surface articulation to reduce apparent bulk and the monolithic nature of the structure;
- deliver a high quality pedestrian experience in the vicinity of the new development;
- facilitate the activation of ground level spaces on key elevations. This is of particular importance in areas adjacent to public entries/exits from the New Car Park, building facades along Hospital Avenue and car park facades overlooking the proposed new Great Court to the south of the New Car Park site opposite the New Children's Hospital site;
- ensure entrances are well-scaled, welcoming and clearly distinguished;
- create clear hierarchies of movement and legible circulation networks;
- create wayfinding and signage strategies that complement existing Queen Elizabeth II Medical Centre signage and wayfinding principles and enhance legibility and amenity of use;
- deliver an efficient and economical structure capable of future expansion and upgrade;
- ensure robust build quality and minimise maintenance;
- ensure finishes and colour applications address disability access requirements; and
- address sustainability concerns by minimising energy use and water consumption.

3.3. Planning

Key planning issues to be addressed in the design of the New Car Park include:

- creation of a new focal entry point to the Reserve, including the proposed new landscaped Great Court that will be delivered as part of the New Children's Hospital project. The design of the New Car Park must complement the new entry focus to the Reserve;
- facilitation of convenient access to the main activity centre of the Queen Elizabeth II Medical Centre, i.e. entry to the Sir Charles Gairdner Hospital;
- the incorporation of an easily legible movement network for pedestrians, private vehicles (staff and visitors) and hospital traffic (emergency vehicles, patient transport vehicles) and integration with existing and planned Hospital movement networks;
- attributes so as not to impede the future development of Hospital Avenue in accordance with the Master Plan, i.e. into a pedestrian and public transport focused environment with minimal private vehicle traffic;
- attributes so as not to impede the development of future public transport options on the Reserve, including a possible future light rail transit service;
- a landscaped setback from Winthrop Avenue. Supplementary landscaping must be provided in accordance with the landscape design principles of the Master Plan;
- facilitate any agreed commercial development opportunities; and
- the New Car Park must not exceed 7 storeys.

3.4. Amenity

The New Car Park design must take into account and incorporate user amenity measures including:

- convenient, safe and easy to use facilities for staff and visitors;
- attractive and easily identified pedestrian and vehicular access;
- good integration with pedestrian access routes throughout the Reserve;
- high standard of security and safety including appropriate levels of lighting in accordance with Australian Standards;
- logical, clear and well located signage;
- application of the Crime Prevention Through Environment Design principles;
- adoption of good urban design practice and landscaping principles consistent with the Queen Elizabeth II Medical Centre Urban Design Guidelines; and
- provision of access to all areas of the New Car Park in accordance with relevant Australian Standards.

The design is to also take into account building environmental issues including site specific issues including prevailing inclement weather and noise and design strategies for minimising local environmental impacts, including:

- provision of weather protection at car park entries particularly where inclement weather will impact significantly on amenity and comfortable use;
- ensure noise impacts on adjoining Reserve facilities is minimised to the extent practicable and in accordance with relevant Australian Standards; and
- consideration must be given to penetration of natural light to spaces adjoining the New Car Park in particular the proposed new Great Court to the north of the New Children's Hospital. Project Co must demonstrate the New Car Park's impact on overshadowing of adjacent buildings and public spaces.

Project Co is to allow a sum of \$350,000 (ex GST) to cover all hard and soft costs of its public art concept. This allowance is to include the appointment of a public artist in accordance with the State's percent for Art Scheme guidelines during the early stages of design development.²

3.5. Access

Pedestrian and vehicular access ways to, from and within the New Car Park must be safely delineated in accordance with Local Authority requirements and relevant Australian Standards. Distances to pedestrian exits within the New Car Park must be in accordance with the Building Code of Australia and relevant Australian Standards.

Provision should be included for access to the New Car Park main entry areas for drop off and pick up by the Hospital shuttle bus ("Charlie's Chariot") transporting elderly and disabled patrons around the site and to and from car parks.

Pedestrians

The Queen Elizabeth II Medical Centre Master Plan requires the provision of "safe, legible and direct walking routes for pedestrians of all abilities between transport modes and medical service centres." All designated pedestrian pathways, exits and stairwells must comply with the relevant Australian Standards.

The following principles must be applied:

² SP040

- access paths are to be safe, well-lit and direct;
- all footpaths must be designed for universal access in accordance with relevant Australian Standards including AS1428.1 Design for Access and Mobility and AS2890.1 Off-street parking;
- all footpath designs, locations and integration with built form are to adopt the Crime Prevention Through Environmental Design principles;
- pedestrian footpaths are to be at least 2.0 metres wide to enable two wheel chairs to comfortably pass. Wider footpaths may be needed in high demand locations; and
- pedestrian paths and access way designs must integrate with the existing pedestrian network along Winthrop Avenue.

Stairs must be located to ensure safe, logical and convenient pedestrian movement between all levels of the New Car Park, lifts, pay machines and access to ground floor level. Stairs must be designed in accordance with the relevant Australian Standards.

Pedestrian priority access areas are to be provided within the New Car Park through the use of painted line markings and signage at minimum, particularly in areas adjacent to lifts and stairways but also between the lift, stairway and possible overpass areas at main entry/exit points and at the location of accessible car bays.

Vehicles

Primary entries and exits for vehicular access and egress must be dual-lane at minimum and sufficient to avoid excessive queuing to adjacent roads and access ways, dimensioned to Local Authority requirements and provide safe and easily legible access to and from the New Car Park.

The New Car Park must include all necessary kerbs and lane separation to safely direct vehicular traffic and to interface with public roads. Entry crossovers must have separated in and out lanes and are to enable full traffic movements into and out of the New Car Park without traffic queuing to enter the car park interfering with normal road traffic.

Vehicle entry and exit points must integrate with adjacent public footpaths and cycle ways and incorporate any necessary safety provisions in accordance with good industry practice.

Light rail

In relation to the light rail alignment through the Reserve, Respondents are to assume an alignment similar to that contained in the reference design diagrams (Items 26 to 28 of Volume 5).³

3.6. Disability Access

The requirements of the Disability Discrimination Commission are integral to the design and operation of the New Car Park and as such Project Co must comply with the access requirements of the *Disability Discrimination Act 1992* (Cth).

In addition to this, Project Co must ensure that all occupied areas of the building are designed to be accessible by disabled persons in accordance with the requirements of the Building Code of Australia and relevant Australian Standards (including AS1428) and where relevant will deliver equality, independence and functionality to people with cognitive, sensory, mobility and dexterity impairments.

Disabled toilets complying with AS1428 must be provided.

³ SP008

Where possible the disabled access bays must be located as close as practicable to lifts, public access ways and public entry points.

3.7. Crime Prevention Through Environment Design

The New Car Park and surrounds must be designed in accordance with the latest principles and strategies of 'Crime Prevention through Environmental Design' (**CPTED**) in order to maximise the potential for a safer environment. The principles of CPTED include:

- access – safe movement and connections, access control mechanisms;
- surveillance and sightlines – see and be seen;
- layout – clear and logical orientation, clear spatial definition;
- activity mix – eyes on the street;
- sense of ownership – showing a space is cared for;
- quality environments – well designed, managed and maintained environments; and
- physical protection – using active security measures.

The design of the New Car Park must avoid the creation of areas which may pose a safety risk. The New Car Park will be designed to operate 24 hours per day (including automated systems to close and secure access to night time secure parking areas for staff).

The design must discourage and minimise the opportunity for unauthorised pedestrian access at ground floor level. Provision is to be made in the design for pedestrian access to be access controlled or monitored. Public call points must be provided adjacent to the pedestrian entry/exit points (e.g. entries to the lifts). These points must be vandal resistant and well signed.

Project Co must provide secure and controlled access to Staff parking areas of the New Car Park to provide increased security measures for staff that start or finish work during darkness hours. Project Co will provide the following in dedicated staff areas:

- separate vehicle barrier access;
- security card access to entry/exit points including vertical circulation; and
- location of staff parking area in close proximity to vertical circulation points.

Project Co must provide architectural security screening to the ground level façade, the application of anti-vandal treatment to the lower façade levels, and integration of the building design with appropriate lighting levels both in and around the building together with strategically located CCTV, signage, public call points and effective wayfinding and signage.

3.8. Landscape

The landscaping of the New Car Park Land is to provide quality soft and hard landscaping elements that:

- maximise retention of as much of the existing natural site flora (particularly mature species) as reasonably possible;
- provide a soft landscaping theme in accordance with the Queen Elizabeth II Medical Centre Urban Design Guidelines;
- allow for the retention of mature trees on the western side of Winthrop Avenue;
- provide a landscape buffer between Winthrop Avenue and the New Car Park;
- provide landscaping that has significant potential to assist in the mitigation of visual aspects of the New Car Park form when viewed from Winthrop Avenue;
- ensures the creation of landscapes that are safe for pedestrians in and around the New Car Park, i.e. maintain sight lines and do not obscure lighting or CCTV; and
- clearly define complimentary paths for people, personal small wheel vehicles (gophers) and vehicles through changes of texture, level and colour.

3.9. Reserve Constraints and Access Requirements

The design must:

- facilitate safe and convenient access to the Reserve for material and equipment supply;
- minimise movement of and use of major plant (cranes, loaders);
- meet the Minimum Staging Requirements;
- include material storage areas during construction; and
- confine construction personnel, site accommodation, lay down areas and storage of construction materials to nominated locations agreed with the State.

4. Building Structure and Fabric

4.1. General

The design of the New Car Park must incorporate clear and intuitive way finding and achieve an amenable internal environment through good use of natural light, space and colour.

Wayfinding will allow integration with existing Queen Elizabeth II Medical Centre signage and wayfinding principles and enhance legibility and amenity in use. The design is to be light and airy, providing good cross ventilation to achieve air movement and natural ventilation to the extent possible throughout the car park structure.

Transparent materials are favoured to avoid solid visual barriers that might compromise the effectiveness of the security and CCTV cameras. The design is to facilitate clear views of designated main car park entry/exit points from the majority of car parking areas.

Efficient vehicle access and circulation systems is to created within the New Car Park that enhance user amenity and ease of use.

Key access points, pay stations, car park attendant facilities and public toilets must be located with good access and surveillance opportunities.

Specific consideration must be given to the following:

- the design of further stages of the development of the Reserve must be considered in the design, including flexibility for staging of construction if required. The design will, in as far as is possible, be able to be expanded by future additions without requiring major replanning, or major functional or structural alteration;
- in-ground service runs and major riser locations must be predetermined where possible to ensure site-wide flexibility;
- access panels and building treatments are to be designed (e.g. external access points, plant locations, slab design, etc) to ensure major pieces of plant and equipment can be easily installed, removed, relocated and maintained; and
- external access and/or connection points for future redevelopment, expansion or maintenance works.

4.2. Maintenance and Durability

The New Car Park design must ensure that all areas of the building are accessible and easy to maintain. In particular the design is to be developed such that it does not require the use of inaccessible services, or any other elements that would require invasive and costly retrofitting or maintenance.

All external building surfaces and components must be accessible for maintenance and cleaning and provide access for maintenance and cleaning in accordance with Worksafe requirements and applicable Australian Standards.

To avoid operational impacts the design is to minimise maintenance through the use of low maintenance products and finishes. Locally available fittings and fixtures should be used where possible.

The design must use durable vandal-resistant materials appropriate to the function and anticipated usage of the New Car Park and to the State's approval. Consideration must be given to the following:

- all materials are to be low maintenance and robust, with vandal resistant finishes;
- transparent cladding materials should be carefully considered in view of the impact on these materials due to vandalism;
- materials requiring paint finishes should be kept to a minimum with preference given to pre-finished or natural materials; and
- anti-graffiti treatment is required to all accessible surfaces.

4.3. Façade Treatments

Façade treatments must be developed to ensure proposed materials and finishes used in the façade composition provide a high quality appearance commensurate with the significant location of the new structures. Façade treatments may also complement existing and proposed structures within the Reserve.

The design must ensure that building facades to Winthrop Avenue appear as substantially occupied buildings, not decked car parks. The design of the New Car Park facades must facilitate natural cross flow ventilation while providing for safety and security.

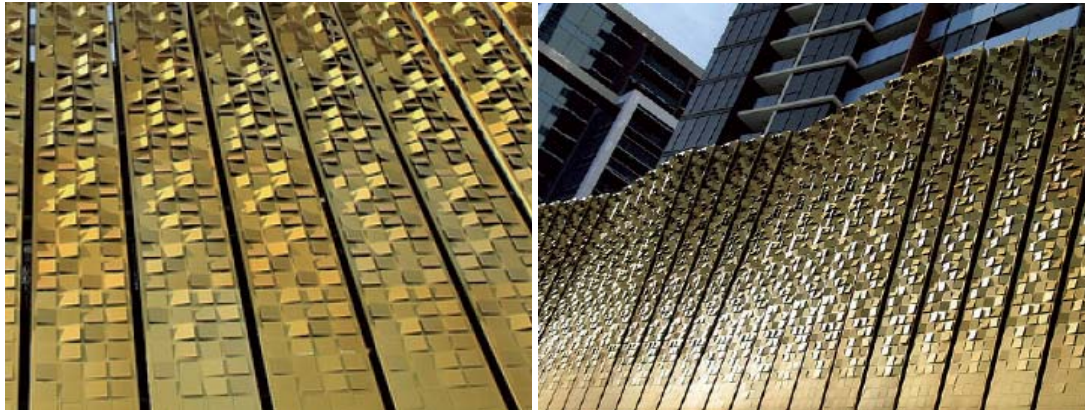
The following must be considered during design of the building facades:

- façade treatments must facilitate natural car park ventilation through the provision of sufficient free area or perforated surfaces as required to avoid the need for mechanical ventilation;
- façade screening must contribute to securing the perimeter of the New Car Park and create a secure boundary to the New Car Park;
- façade treatments (including those to the pedestrian overpass over Hospital Avenue) must preclude intentional climbing or external access at upper levels of the structure;
- facades are to conceal all slab edges and incorporate required safety barriers wherever possible;
- the articulation of ground floor elements distinct from car park decks above should be considered in order to assist in the development of appropriate building massing and form;
- the pedestrian overpass design must be of an architectural language complimentary to the New Car Park design, utilising consistent materials and finishes;
- consideration should be given to utilising vertical circulation routes as key wayfinding elements directing pedestrian movements towards major public entry/exit points and pay stations;
- lighting of the structures must be carefully considered, particularly lighting effects at night and potential impact of light spill from the car park on the amenity of adjacent buildings.

Project Co must demonstrate there will be no adverse impacts of light spill from the New Car Park to surrounding occupied spaces;

- architectural lighting must be incorporated into the façade design to enhance visibility and wayfinding and contribute to the architectural design;
- the integrated incorporation of public art into façade treatments or wayfinding elements should be considered;
- glazing and high quality materials such as prefinished metals or prefinished sheet materials should be considered to elevations addressing Winthrop Avenue and the new landscaped Great Court in particular;
- building signage and wayfinding devices are to be integrated with façade treatments;
- three dimensional modulation in the external screening is encouraged to articulate and “animate” the surface and assist to reduce scale and bulk; and
- consideration should be given to innovative visual screening devices and cladding designs that emphasise the significance of the building on the Queen Elizabeth II Medical Centre site and set an architectural benchmark future built form on the Reserve.

The images included following are examples of relevant design approaches:



- three dimensional modulation of surface



- design of exterior surface considers visual experience for passing pedestrians and motorists



- integrated lighting treatments to enhance night time presence



- achieving a landmark presence, during both day and night

4.4. Finishes

The selection of materials and finishes for the New Car Park must resist the effects of accidental and intentional damage.

Screening materials must be sufficient to provide visual interruption of views where required, particularly to screen external views of decked car park structures, but not to limit natural light or ventilation.

The design must ensure appropriate selection of materials and finishes to ensure the building and engineering elements can be maintained in an efficient manner with minimum impact to the operation of the Facilities. Selections must:

- resist the effects of accidental and intentional damage;
- utilise robust and durable materials and employ details within the building fabric that are durable and easy to maintain;

- address sustainability principles and incorporate measures to reduce emissions and improve water, waste and energy conservation;
- be easy to maintain and avoid adverse impacts on health and the environment; and
- ensure materials are maintained and/or replaced in a manner consistent with the original design intent throughout the life of the building.

The construction and finishing of materials must consider the following:

- availability;
- an assessment of the likely material lifecycle;
- durability;
- suitability of application;
- weathering and ageing properties;
- vulnerability and resistance to vandalism;
- fire resistance;
- locally manufactured or sourced where possible;
- performance to extreme weather conditions; and
- frequency and type of maintenance required.

4.5. Wheel stops

Wheel stops must be of sufficient size to retain all vehicles that have access to the New Car Park. Wheel stops must be located to prevent vehicle contact with façade finishes and to ensure the vehicle is able to be adequately positioned out of the traffic lanes.

Wheel stops must be provided in consistent locations in each parking bay with a consistent finish.

4.6. Balustrades

Balustrades must be provided at all changes in level, ramps and concrete slab parking levels as required by the relevant Australian Standards. Balustrades must be designed to complement, and provide continuity with, any adjacent balustrades provided within pedestrian walk ways or overpasses. Balustrades must provide the maximum not the minimum protection for pedestrians and must be of a sufficient design capacity to withstand collision impacts in accordance with good industry practice and relevant Australian Standards.

4.7. Bollards

Bollards must be provided where required to facilitate pedestrian movement and safety. They must be located to define motor vehicle movement and prevent unauthorised entry. Bollards must not be used to demarcate traffic movements in place of the delivery of effective designs.

4.8. Crash Barriers

A vehicular crash barrier sufficient to retain vehicles within each parking level must be provided at the perimeter of all open sides of the New Car Park.

The vehicle crash barrier must be integrated into the structure and not into the building façade and be positioned to protect the façade cladding materials from vehicle damage.

All other protective barriers must be provided as required to protect turning vehicles from damaging walls and fittings.

4.9. Columns

Columns at entries and exits to the New Car Park, walls and all elevations are to be situated behind the façade screen walls.

4.10. Tactile Indicators

Project Co must provide tactile indicators in accordance with all relevant Australian Standards (including AS 1428.4). Tactile indicators must be integral with the surface finish rather than installed as an applied finish. All tactile indicators must be resistant to damage and/or vandalism.

5. Signage

5.1. General

Signage must be of a uniform quality and style to match the interpretive and way finding signage of the Reserve. It must be easy to read, distinctive and provide pertinent information at specified locations. All graphic symbols must be of international standard and comply with the requirements of all relevant Australian Standards (including AS1428). Colour coding must integrate with wayfinding systems throughout the New Car Park and car park areas throughout the Reserve and integrate with the Queen Elizabeth II Medical Centre signage strategy.

Project Co must provide directional, warning, exit and safety signage as required to the public areas of the New Car Park. Signage must be designed to be vandal resistant, reflective and indirectly illuminated. Any reflective or illuminated surface must be arranged so that they do not affect the vision of drivers.

All way finding, directional, electronic and safety signage must be provided in accordance with the relevant codes and authority requirements to provide a clearly legible vehicular and pedestrian environment.

Fully automatic electronic signage and associated electronic counting mechanisms must be provided on approach to the New Car Park from Winthrop Avenue and near the entry of the New Car Park to notify of the number of available parking spaces and when the car park is full. It must be incorporated into the entry and exit system. Suitable warning must be provided to users so that they can consider other alternatives if the New Car Park is full.

Electronic signage is to be considered as a key wayfinding device throughout the car park providing directional advice and parking availability information for visitors. The locations and finishes of the signage must be such that it minimises the potential for vandalism.

5.2. Vehicular Signage

Vehicular signage, including road and traffic signage, must be provided as required in the section of this Request for Proposal setting out the requirements for traffic design.

5.3. External Directional Signage

External directional signage must:

- clearly indicate public access to the New Car Park;
- be well illuminated or back lighted so that they are readily visible at night;
- cater for both pedestrian and vehicular traffic;
- be located at a suitable distance before (particularly for vehicular traffic) and at each point where a directional decision is required;

- provide continuous trails from points where the signage is accessed to the final destinations; and
- notify the number of available parking spaces and when the car park is full.

Pedestrian signage must be located at each point where pedestrians enter the New Car Park or where people become pedestrians (e.g. at any internal bus stops, at set down points and at pedestrian exits from car parks).

5.4. Internal Directional Signage

A directory must be installed at every public entrance to the New Car Park that indicates the location of the car park entry in relation to other facilities on the Reserve.

The signage must:

- be installed to provide a continuous trail from the entrances to each of the destinations listed on the directories;
- be installed at each point at which a directional decision is required;
- be clearly visible as it is approached; and
- use consistent terminology throughout.

All levels must be easily identifiable through the use of a colour coded graphic signage system. The colour system must provide a clear identity to each parking level and be easily identifiable at the pedestrian entry and exit points to each parking level. The colour coding must integrate with wayfinding systems throughout the New Car Park and car park areas throughout the Reserve and integrate with the Reserve signage strategy.

5.5. Door Signage

Door signage must:

- identify all doors through which staff and visitors may need to move and which are normally closed;
- indicate restrictions on entry; and
- warn of any hazardous locations or activity.

5.6. Statutory Signage

All safety and fire evacuation signage must comply with the Building Code of Australia, relevant Australian Standards and other legislative codes.

Safety signage must be installed that:

- complies with any relevant regulations;
- covers all statutory requirements for signage; and
- includes signs that give warning of hazards but for which there is no statutory requirement e.g. signs at boiling water units warning of high temperature.

Fire evacuation signage must:

- be mounted in prominent locations at the normal and emergency exits of each fire compartment;
- include a plan of the area showing:
 - evacuation routes;
 - the locations of fire extinguishers;
 - the locations of wardens' intercommunication phones; and

- the locations of fire hose reels.



Government of **Western Australia**
Department of **Treasury and Finance**
Strategic Projects

Queen Elizabeth II Medical Centre Car Parking Project

Project Number: BMW14583/10

Design Requirements

Part B

Technical Requirements

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6. Introduction

The redevelopment of the Queen Elizabeth II Medical Centre is part of a multi-billion dollar investment in health infrastructure for Western Australia. The proposed investment in the Queen Elizabeth II Medical Centre is stage 1 of the State Government's plan to establish the Reserve as one of Perth's major tertiary hospitals and a key health care delivery centre.

A significant component of the stage 1 development works is the construction of the New Car Park. The New Car Park is to be located on a pivotal site adjacent to what will become the new major entry forecourt to the Sir Charles Gairdner Hospital (Hospital) and adjacent to the major traffic route of Winthrop Avenue. As a high use facility for visitors and staff entering the Reserve, the New Car Park building will be a major landmark and will form a significant part of the new entry to the Hospital.

The New Car Park design must consider the scale and form of the existing surroundings at the same time as providing a notable architectural outcome. This significant new building must make a positive contribution to the streetscape of Winthrop Avenue and act as a design benchmark for future building development within the campus.

The design must deliver a high level of performance befitting a large scale publicly accessed building in a prominent setting and serve to enhance the identity of the hospital campus within the community.

As such the New Car Park design must address the following Design Principles:

- achieve a landmark presence, during both day and night;
- deliver a high standard urban design outcome which responds to the significance of the Reserve, its setting, and its context in the cities of Subiaco and Nedlands;
- employ an architectural expression consistent with ambitions to deliver a world-leading standard of healthcare, research and education on the Reserve;
- achieve a high build quality outcome which supports the vision for and function of the Reserve;
- meet the Minimum Capacity Requirements and Minimum Staging Requirements;
- provide a durable and sustainable architectural outcome appropriate to the long term aspirations of the QEIMC Master Plan; and
- address the Design Objectives noted in Volume 2 - Part A - Architectural Requirements.

Volume 2 - Design Requirements outlines the architectural and technical requirements of the State. It provides the framework in relation to functionality, constructability, environmental responsiveness and civic presence to enable Proponents to provide a world class architectural and technical response to this RFP. To avoid repetition this document does not include the detailed requirements for engineering services that are included in *Volume 2 - Part A - Architectural Requirements*.

Please note that Volume 2 only applies to the New Car Park. Unless specifically referred to, the At-Grade Car Parks are excluded from the architectural and technical aspects of this Volume 2.

7. Existing Land Information

Site Survey

Site investigations have been carried out to identify site features and services on or adjacent to the site details are provided in *Volume 5 - Additional Information*. This information is provided to assist Respondents and does not diminish Project Co's responsibilities under the Project Agreement (including the obligation to inform itself in relation to below ground services within and immediately adjacent to the Land that may require diversion and/or alteration as a result of the design).

Project Co is also required to verify the position of surface or above ground features/services that may be affected by the design proposed to ensure all associated features and services (both above and below ground) that may require diversion, alteration or relocation works are addressed in Project Co's design.

Existing Services (Utility)

A dial before you dig analysis has been carried out to seek information on existing utility assets within or adjacent to the land.

See report titled "QEII Car Parking – Existing Underground Services" in *Volume 5 – Additional Information*.

Information received from different service providers (AMCOM, Water Corp, WA Gas, Western Power, AAPT, Telstra and UWA) is analysed in relation to the proposed location of the New Car Park. It should be noted that all the drawings provided were valid for a period of 30 days from the date of issue 22/07/2010 and Project Co must make a separate application to Dial Before You Dig (DBYD) prior to commencement of construction on site to investigate the latest status of underground services in the vicinity of the Construction Areas.

The analysis identified specifically an existing high pressure gas pipeline that runs alongside Winthrop Avenue and medium pressure gas pipeline alongside Aberdare Road. The high pressure gas pipelines connect to the existing Queen Elizabeth II central plant (Block H).

Telstra and AMCOM assets are also identified within the New Car Park site. The AMCOM infrastructure section and Telstra network integrity office should be informed of any conflict between planned works by Project Co and AMCOM/Telstra existing plants.

Project Co must make arrangements and pay all fees necessary to utility providers where the New Car Park works interface with the existing site utilities and require diversion to facilitate the design of the New Car Park.

Existing Services (State)

There are existing services drawings which indicate State assets within or adjacent to the Land. The relevant Drawing Numbers are – SSA001, SSP001, SSP002, SSP003, SSP003, SSP004, SSP005, SSP007, SSP008, SSP025, SSP026, SSR001, SSE040, SSE048, SSM001 and SSM003 (refer to *Volume 5 – Additional Information*.)

Review of these indicates that Project Co must isolate, make safe, cap off and divert a range of services including the following:

- stormwater;
- lighting columns and wiring;
- high voltage cable in south west corner of the Land; and
- ground water reticulation.

Water

The existing water infrastructure consists of a 300mm diameter water main located on the western side of Hospital Avenue. The mains connection for the New Car Park will be taken from this line.

Sewer

The existing sewer main is located on the western side of Hospital Avenue and is a 525mm diameter pipeline. This system will not be affected by the New Car Park construction and is the proposed connection point for the development.

Stormwater

Stormwater for the Reserve is currently taken up in pits and traps on the western side of the Reserve. These traps are fed to the main stormwater line (1010mm diam.) on the eastern side of Hospital Avenue via a series of 225mm and 300mm diameter pipes.

The pits and traps and their associated connection lines will have to be removed and sealed where required. The existing 1010mm diameter line could be affected by the foundations of the New Car Park. This will need to be clarified once the building setting out details are confirmed.

The existing system discharges into a water corporation compensating basin to the north west of the Reserve. No upgrading of the existing system is foreseen.

8. Services Connections

General

Project Co must make services connection for the New Car Park to the existing services provided at the locations described in the Design Requirements. Project Co must carry out all work associated with these services connections and must provide works method statements and seek a shutdown permit to work notices for each element of work, in accordance with QEII Medical Centre Management of Construction Guideline contained in *Volume 5 - Additional Information*.

Project Co must not commence the Works until Project Co is issued with a Permit to Work. All isolations and reconnections will be carried out or arranged by the State.

Project Co must carry out all work associated with services connections, including making good of surfaces to a standard equivalent to that before work commenced. Project Co must return all works outside of the Land to the State for maintenance. Project Co is responsible for all maintenance to services connections within the boundary of the Land.

Services interface schedule

The table below indicates the services interface schedule with delineation of State and Project Co responsibilities as follows:

Item	Description	State will provide	Project Co to provide
1	Electrical supply to New Car Park	1.1 MW rated 11kV non essential electrical supply terminating in a ring main unit with metered	High Voltage Switch Room ground level externally accessible on western elevation, 4000 long x 3000 wide x 2500mm high, complete with: <ul style="list-style-type: none"> door 820 x 2040mm clear, exit; 75mm diameter penetration through slab for

Item	Description	State will provide	Project Co to provide
		outgoing circuit breaker within a dedicated high voltage switch room	<p>earthing, one at each end of trench;</p> <ul style="list-style-type: none"> 3 x 150 id heavy duty ducts to site boundary at hospital avenue; 600 x 800mm wide vet at high level fitted with louvers, vermin mesh and 2 hour fire damper; 600 x 800mm wide vent at low level fitted with louvers, vermin mesh and 2 hour fire damper; minimum 300 lux at floor level, 0.5 uniformity with 2 way light switching at doors; walls and floor of trench to be painted with silicon glaze s50; 1200 wide x 1200 deep trench, set 600mm from edge of rear wall; trench cover with 21 thick grade f34 plywood, painted with 2 coats epoxy paint; 40mm wide x 20mm deep rebate for trench covers; cover to supports –ms angle fixed to wall of trench; support beam with stanchions centres 100 for trusts switchgear; Double door 2 x 820 x 2040 clear, exit; 2 hour fire rated; 75mm diameter duct installed at bottom of trench to wall for metering cabling; and complete N electrical installation from high voltage switch gear.
2	Fire alarm interface	Input/output module to receive fire alarm activation, common alarm and fault.	<p>Connection to input/output module.</p> <p>Complete New Car Park fire alarm installation from input/output module.</p>
3	Communication interface	<p>6 core multi mode fibre optic for data. 12 core single mode fibre optic for data provisions. 12 core single mode fibre optic for security interface.</p> <p>Terminating in a communications rack located within the electrical services intake position.</p>	<p>2 x 32 Amp captive sockets for communications rack separately metered.</p> <p>Utility telephone lines for:</p> <ul style="list-style-type: none"> each lift; and payphones. <p>Direct brigade alarm from fire indicator panel, fire rated as necessary.</p> <p>Complete New Car Park communications installation.</p>

Item	Description	State will provide	Project Co to provide
4	BMS interface	Extent to be identified.	Complete New Car Park BMS installation. This will include critical alarms e.g. fire activation in NCP, high CO levels in new car park and utility metering. BMS will remain wholly the responsibility of the State to connect to link points that are provided by Project Co. Project Co shall provide the Electrical Services Intake Room(s) and heavy duty ducts to the New Car Park site boundary along Hospital Avenue for connection interface. ⁴
5	Electrical Services Intake Room	Cabled facilities as 2, 3 and 4 above.	Electrical Services Intake Room, ground level externally accessible on western elevation, 3000 long x 2000 wide x 2500 mm high, room complete with: <ul style="list-style-type: none"> ▪ door 820 x 2040mm clear, exit; ▪ 3 x 100mm id heavy duty ducts to site boundary at hospital avenue; ▪ minimum 300 lux at floor level, 0.5 uniformity with light switching at door; ▪ 2 hour fire rated; and ▪ A/C to maintain 25 deg c + or – 1.5 deg c at 38 degc ambient, 3kw heat gain. Complete New Car Park electrical installation from Electrical Services Intake Room.
6	Water Service	38mm, or as required diameter id MDPE metered water services terminated in underground valve pits on the western site boundary.	Complete New Car Park domestic water installation including: <ul style="list-style-type: none"> ▪ all sub meters and associated valves, back flow prevention valves; ▪ break tanks and domestic water booster pumps, domestic hot water plant; ▪ sanitary appliances and associated tape ware wash down points; and ▪ domestic cold water service to any tenancies.
7	Sewer connection	Below ground sewer junction provided by the State inside out site boundary.	Sewer drains and sanitary plumbing to all points requiring sewer drains. Industrial waste drain appliances will be provided where and if required to tenancies.
8	Rainwater connection	Below ground storm water junction provided on the site boundary.	Storm water drains will be extend to all levels of the New Car Park, the storm water drain system will incorporate, rain water pipes, car park gullies and cut off drains. All gullies and channels are to be heavy duty type with lock down grates.
9	Fire services incoming supply	Below ground water ring main to be extended to 1 off 50mm fire connection	Complete New Car Park fire protection services installation from the valve pit. All work must be in accordance with QEII Structure Plan Requirements.

⁴ SP031

Item	Description	State will provide	Project Co to provide
		terminated in underground valve pit on the western site boundary.	

9. Environmental

General

The construction of the New Car Park will require a Development Approval (**DA**) from the Western Australian Planning Commission (**WAPC**) with the approval likely to attract a Planning Condition relating to the contamination status of the Land. Project Co is responsible for the clearance of contamination and the related planning conditions which will involve investigations by a qualified environmental consultant and sign off by a WA Department of Environment and Conservation (**DEC**) accredited Auditor. The processes to be employed in order to clear a contamination related conditions are stated below for information.

Methodologies

The methodologies to be employed to address potential contaminated site issues are defined in the DEC Contaminated Sites Guidelines Series and *Contaminated Sites Act 2003* (WA). The process generally involves completion of staged investigations, with completion of potential subsequent investigation stages based on the results and recommendations from the previous stage of works.

The stages of assessment as recommended by the DEC are as follows:

Preliminary Site Investigation – Involves collecting background knowledge such as historical and geological information to determine if past land uses have the potential to cause contamination.

Detailed Site Investigation (DSI) – Involves soil and groundwater testing to determine if contaminants are present on the site. The DSI also identifies substance types, concentrations and locations as well as the extent of contamination. DSIs can have several phases particularly when determining the extent of groundwater contamination.

Remediation – If the contamination identified by the DSI is causing or may cause an adverse effect on human health or the environment, it must be remediated. This may involve treating it onsite, treating it at an off-site specialised treatment centre or excavating contaminated soil and disposing of it to landfill. The method used for remediation may vary depending on the type and extent of contamination, where the contamination has been identified (soil, sediments and or ground/surface water) and the risk that the material poses.

Validation – Following remediation, it must be proven that all contamination has been removed or successfully treated. This includes sampling treated soil or where material has been excavated, sampling the walls and floor of the resultant pit. Validation of groundwater requires ongoing groundwater monitoring over a pre determined period of time.

Monitoring – Where on site remediation methods are used, ongoing monitoring of the remediation process is required to ensure contamination levels are reducing. This is generally in the form of regular soil or groundwater monitoring, often conducted at regular intervals to take into account seasonal changes in groundwater levels. A contingency plan is often required (i.e. a change in remedial method or further remediation) if the chemical levels identified during monitoring exceed a pre determined trigger level

Information sourced from the DEC produced Contaminated Sites Fact Sheet 2 – Staged Approach to Site Assessments.

DEC Accredited Auditor

The *Contaminated Sites Act 2003* (WA) requires that investigation reports are reviewed by a DEC Accredited Contaminated Site Auditor. Mandatory Auditor's reports are required in a number of circumstances, including the following:

- when a regulatory notice is issued under the Act;
- when a certificate of contamination audit is requested;
- when contamination has moved away from the property on which it originated, to affect other properties (i.e. the site is a 'source site'); and
- when a report is submitted in order to comply with a planning or Ministerial condition or similar statutory requirement.

In addition the CEO of DEC may request an Auditor's report for a site which presents complex technical issues or sites where inadequate reports have been required. The contaminated Sites Auditor is required to be commissioned independently from the qualified environmental consultant.

A list of Accredited Sites Auditors in WA can be found at <http://www.dec.wa.gov.au/content/view/3522/2065/>.

Further information on the process and regulations for Contaminated Site Assessments can be found on the Department of Environment and Conservation's Webpage www.dec.wa.gov.au/contaminatedsites.

Investigations Currently being Undertaken

The State has commissioned AECOM to prepare a Preliminary Site Investigation report. This is to assist with planning conditions likely to be issued by the WAPC, as well as to provide a preliminary overview of the sub surface soil conditions for the New Car Park. Preliminary Site Investigations (PSI) in accordance with the DEC Contaminated Sites Branch (CSB) and the *Contaminated Sites Act 2003* (WA) are currently being undertaken by AECOM.

The PSI involves an assessment of the Land to assess the contamination status of the sub surface soil conditions, in particular in the southern area of the Land that is adjacent to the existing Central Plant. In addition the preliminary investigation will aim to characterise potential contamination in the uncontrolled soil fill material (as reported by Coffey in their Geotechnical Investigation Report) that would be excavated during construction of the New Car Park. If deemed necessary, the PSI will form the basis for recommending further investigations at the site which may be required to address a WAPC planning condition in relation to the contamination status of the area, for example a Detailed Site Investigation (DSI), followed up by development of a Site Management Plan, Remediation Plan and Validation Plan.

The results of this preliminary investigation can be used to support the development of construction and soil management plans for this area. Excavated soils are to be removed from the site by construction contractors, as demonstration that the material is suitable for potential reuse as "clean fill" would be required.

The results of the PSI will be forwarded at completion Respondents for their consideration when completing their Proposal.

Likely Future Requirements Regarding Contaminated Site Assessments – Land

Should a WAPC planning condition be received on the Development Approval for the Land, an accredited Contaminated Sites Auditor will be required to be appointed by Project Co for the project to review investigation reports and prepare a Mandatory Auditors Report required for condition clearance.

If deemed necessary, the PSI forms the basis for recommending a Stage 2 Detailed Site Investigation (DSI), which typically involves soil and groundwater sampling. Completion of the DSI would be based on recommendations provided in the PSI report and/or requirements mandated by the Contaminated Site Auditor based on their review of the PSI report. If necessary, the DSI would be followed up by development by Project Co of a Site Management Plan, Remediation Plan and Validation Plan that are also reviewed and approved by the Auditor.

If excavated soils are to be removed from the site by Project Co, then a demonstration that it is suitable for potential reuse as “clean fill” would require collecting a representative number of samples for the volume removed. This could be based on the limited sampling conducted in the PSI and also on analysis of soils from stockpiles staged during construction.

10. Civil

Existing Services Infrastructure

Natural Gas

Currently a 200mm diameter natural gas pipeline is situated on the western side of Winthrop Avenue.

Westnet Energy are likely to impose restrictions to certain types of construction activities (vibration rolling or driven piles) in close proximity to the gas main and Project Co must notify Westnet Energy and obtain all necessary approvals in connection with such activities.

Electrical

An existing HV cable is located on the south western corner of the Land. Existing street lighting and cables are located in the existing car park. These will be dealt with further in “Section 9 Electrical” in this Volume.

Grounds Water Reticulation System

The existing grounds water reticulation system consists of 155mm diameter pipes and is located on all four sides of the Land. The line on the eastern boundary as well as a portion of the line on the south western boundary will have to be relocated or removed prior to excavation/construction commencing.

Groundwater reticulation will be reinstated by the landscapers as required.

Services requirements

Water

Water supply to the New Car Park will be from the 300mm diameter pipeline to the west of Hospital Avenue. Water supply must comply with the general provisions and guidelines of:

- AS2977; Unplasticized PVC (UPVC) pipes for pressure applications - compatible with cast iron outside diameters;
- AS4041; Pressure piping; and
- AS2032; Code of Practice for installation of UPVC pipe systems.

Sewer

Sewer mains connection must be to the 525mm diameter mainline. Connections must be to existing manholes only. Sewer works must comply with the general provisions and guidelines of:

- AS1260 Unplasticized PVC (UPVC) pipes and fittings for sewerage applications; and
- AS2032; Code of Practice for installation of UPVC pipe systems.

Stormwater

Stormwater must be contained on the Land and must comply with all applicable standards, including the general provisions and guidelines of:

- AS 3725, Loads on buried concrete pipes;
- AS4058, Precast concrete pipes;
- AS 1646-2007, Rubber Joint Rings for water supply, sewerage and drainage purposes;
- AS4139, Fibre reinforced concrete pipes and fittings; and
- AS 3996-2006, Access covers and grates.

Roadworks

Roadworks must comply with all applicable Australian Standards, including the general provisions and guidelines of:

- AS1160, Bitumen emulsions for construction and maintenance of pavements;
- AS2008, Residual bitumen for pavements;
- AS2150, Hot mixed asphalt;
- AS2157, Cutback bitumen;
- AS2734, Asphalt (hot-mixed) paving - Guide to good practice;
- AS2891, Methods of sampling and testing asphalt;
- NAASRA, Specification for performance requirements for mechanical sprayers of bituminous materials;
- AAPA (WA), Asphalt specification No. 1; and
- ASA175, Concrete kerbs and channels (Gutters).

Safety

General safety requirements must comply with all applicable Australian Standards, including the general provisions and guidelines of:

- AS1470, Health and Safety at Work - Principles and Practices;
- AS1742.3, Traffic control devices for works on roads;
- AS1743, Road Signs – Specifications;
- M.R.W.A, Guidelines on roadworks signage;
- WA Govt, Mines and Regulations Act 1961;
- WA Govt, The Explosives and Dangerous Goods Act 1961;
- WA Govt, Occupational Safety and Health Act 1984;
- WA Govt, Occupational Safety and Health Regulations 1996; and
- Worksafe WA Commission, "Excavation" Code of Practice.

11. Geotechnical

Geotechnical report

The State has obtained a Geotechnical Report prepared by Coffey Geotechnics Pty Ltd entitled “Geotechnical Investigation, New Children’s Hospital” reference dated 2 July 2010. (Refer to *Volume 5 – Additional Information*).

Project Co must source further analytical information/clarification as it considers necessary.

Groundwater Levels

The existing groundwater levels as published in the geotechnical report are at a depth of 7.0 to 8.7 meters below natural ground level (max 3.4m AHD). The Perth Groundwater Atlas (1997) indicates that the highest probable groundwater levels will be 4 to 5 meters below the average ground surface levels (5.0m AHD).

12. Structural

General structural performance

Guidelines, Standards and Specifications

Design and construction of the structural engineering services must comply with the requirements of the Health Department Guidelines and Australian Standards.

Planned Life

The planned life for the New Car Park is a 50 year minimum from the relevant Completion Date. The structural engineering services are required to provide a projected building life at least equal to that of the planned life.

Operational Performance

Structural engineering services are to suit the operational performance and architectural space planning requirements for the New Car Park.

Structural Systems

The structural systems for the New Car Park comprise the following:

- **Sub-Structure** – includes the foundations, any buried structural element and any basement areas. The substructure design and construction must be based upon geotechnical investigation for the land to transmit the building loads to ground of a suitable bearing capacity to limit settlements within the nominated limits; and
- **Structure** – includes the components which contribute to the function of sustaining and transferring to the foundations all forces and moments arising from vertical and horizontal loadings on the buildings; e.g. columns, walls, suspended floor slabs, roof structures, support beams, staircases, shear walls, core walls and primary structure supporting services and equipment.

Structural Materials

Structural materials must comply with all applicable Australian Standards and Health Department Guidelines and include reinforced concrete, prestressed concrete, post-tensioned concrete, structural steelwork, structural masonry, structural timber or a combination of these.

Design loading

Design loads must comply with the requirements of the Western Australia Health Facility Guidelines for Engineering Services 2006, Australian Standards and the Building Code of Australia. The design actions and loading values prescribed represent the minimum requirements.

Additional loading actions or higher values of specified load may be required to suit the final design requirements of the New Car Park. These loads must be confirmed at each Design Stage of the Design Development Process.

Design Dead Loads

Dead loads must be calculated in accordance with relevant Australian Standards.

Design Wind and Earthquake Loads

The structure must be designed to be capable of sustaining the design loads, which are to be assessed in accordance with the relevant Australian Standards, for a building with an importance level of 3 in accordance with the Building Code of Australia.

Design Live Loads

The structure must be designed to be capable of sustaining the design live loads listed in the Loading Code AS1170.1 unless higher loads are required.

Project Co's engineer must determine actual loads but these must not be less than those nominated in the loading code.

Earth Pressure and Groundwater Action Loads

Evaluate loads from earth and groundwater actions arising from nominated site soil parameters.

Loads from other actions

Project Co must consider additional loads where appropriate including:

- temperature changes;
- temperature gradients;
- shrinkage and creep; and
- vehicle impact.

Serviceability Requirements

The New Car Park structure movements must comply with the requirements of the Western Australia Health Facility Guidelines for Engineering Services 2006 and the Australian Standards. Interfacing structural systems must have compatible operational performance where required.

Structure – Gravity Load Deflection Limits

Deflection limits to control individual building element performance must be visually acceptable over the planned life and must be based on the requirements of recommendations contained in Table C1 of Australian Standard AS/NZS 1170.0 : General Principles. In all cases the deflection should be limited so that the functionality of the New Car Park is not compromised.

Limits for principal structural elements:

- total vertical deflection (typical) – span / 250 but not greater than 50mm;

- total vertical deflection (cantilever) – span / 125 but not greater than 20mm;
- element supporting brittle finishes – deflection occurring after addition of imposed load must be less than or equal to span / 500 or 10mm maximum; and
- element supporting non-brittle finishes – deflection occurring after addition of imposed load must be less than or equal to span / 250.

Notwithstanding the limits nominated above, structural element deflections must be limited to accommodate specified operational performance tolerances of specialist plant and equipment, cladding and finishes.

Structure - Horizontal Sway Limits

Wind Actions

- Project Co must ensure that horizontal sway movements are limited to the following for a 1:25 year annual probability of exceedance:
- sway deflection of any storey – storey height / 500; and
- total sway deflection – height / 500 but not greater than 50mm.

Earthquake actions

- Project Co must ensure the following in the case of an earthquake:
- inter storey drift – $0.015 \times$ storey height; and
- adjacent structures – distance sufficient to avoid damaging contact.

Sub-Structure Movement

Sub-structure movement must respond to the site characteristics of the soil. The foundations are required to suit the soil conditions of the site that provide adequate resistance to loads, and achieve settlements and movements within nominated limits of the defined planned life.

The determination of long term movements is to consider changes in soil properties over the defined planned life due to moisture and drainage variations and changes in structural properties due to creep and shrinkage.

Vibration Limits

Project Co must consider the dynamic response of the structure to ensure the building performance and functionality is not compromised. Project Co must also ensure that the dynamic response of the structure is within acceptable limits for human comfort.

Standards, Guide-Lines and Codes

The Works must comply with the requirements of the documents listed in this section.

Australian Standards

Loading Codes

Project Co must comply with all applicable standards, including the following:

- AZ/NZS 1170.0 – 2002, Structural Design Actions – Part 0 – General Principles;
- AZ/NZS 1170.1 - 2002, Structural Design Actions – Part 1 : Permanent, Imposed and other Actions;
- AZ/NZS 2270.2 - 2002, Structural Design Actions – Part 2 : Wind Actions; and
- AS 1170.4 - 2007, Structural Design Actions – Part 4 : Earthquake Actions in Australia.

Material Codes

The main material codes listed all contain appendices of referenced documents. The nomination of the main material codes includes the nomination of any of the relevant referenced codes that may be required including material components and workmanship.

Project Co must comply with all applicable Australian Standards, including the following:

- AS 3600 - 2009, Concrete Structures;
- AS 3610 - 1995, Formwork for Concrete;
- AS 3700 - 2001, Masonry Structures;
- AS 4100 - 1998, Steel Structures;
- AS 4671 - 1997, Steel Reinforcing Materials; and
- AS 1720 - 2001. Timber Structures.

Design Codes

Project Co must comply with all applicable Australian Standards, including the following:

- AS/NZS 2890.1 - 2004, Part 1 - Off-Street Car Parking; and
- AS/NZS 2890.6 – 2004, Part 6 – Off Street Parking for People with Disabilities.

International Standards

Where Australian Standards do not cover particular circumstances reference must be made to relevant American or British Standards. These include:

- BS 8110 – 1997, Structural Use of Concrete; and
- ACI-318 – 2005, American Concrete Institute, Building Code Requirements for Structural Concrete.

Guidelines and Building Codes

Project Co must comply with:

- Australasian Health Facility Guidelines;
- Western Australia Health Facility Guidelines for Engineering Services 2006; and
- Building Code of Australia.

13. Mechanical

General

The mechanical installation must comply with relevant Australian Standards in particular AS 3000, AS 2107, and AS 1668, the Building Code of Australia, the requirements of the Project Stakeholders (*Volume 1A – General Overview*), Authorities and Utilities e.g. City of Subiaco, Western Power, Telstra, Water Corporation, Alinta, WAER etc the Office of Energy and the requirements of the RFP as further detailed.

Project Co must arrange all electrical work to be supervised and carried out by an electrical contractor licensed by Western Power.

The New Car Park must maximise open facades to take advantage of natural and cross flow ventilation whilst providing for security. Ventilation easements must be included to enhance reliance on natural ventilation provisions under the Building Code of Australia and AS1668.2-1991.

If the width of the New Car Park is greater than 75 metres or does not comply with the prescriptive rules of AS1668.2, a computational fluid dynamics study will be required in order to demonstrate compliance with the intent of the standards, by proving that levels of carbon monoxide and other asphyxiating gases remain within safe levels at all times. A calculation of the exit queuing at the New Car Park length must be provided, and the appropriate calculations carried out to determine compliance with AS1668.2 in the queuing areas. It is anticipated that the New Car Park will be fully naturally ventilated, with the possible exception of the queuing area, or any 'dead air zones' surrounding lift cores or the like. These local problem areas should be ventilated using localised exhaust/supply air systems, or axial impulse fans, or a combination. The solution will need to be submitted to the relevant approving authorities for sign off.

Any supplementary mechanical ventilation systems must comply with the noise emission standards and requirements of the Environmental Protection (noise) Regulations 1997, and the internal design sound levels must meet AS2107. In addition the design must comply with the specific noise levels criteria for noise emission from mechanical plant at internal access ways as outlined in the "Acoustics" section of this brief. Mechanically exhausted areas must have one third of exhaust air taken from low level (<100mm afl) to remove combustion gases which are heavier than air such as nitrogen oxides.

Any ductwork risers/droppers must be protected by bollards to prevent damage.

A minimum of six CO / NO₂ sensors per car park level, sited at likely worst case positions, are provided within the New Car Park.⁵

Whilst the louvers/screens/barriers must meet the aesthetic and security/OHS requirements of *Volume 2 – Part A – Architectural Requirements*, they will need to provide adequate free area to enable natural ventilation to the vast majority of the New Car Park in compliance with AS1668.2.

The total peak fan power for any supplementary mechanical ventilation systems for the New Car Park must not exceed 2.0V.A per sqm averaged across the total gross floor area of the New Car Park.

All mechanical services systems must comply with the Building Code of Australia Section J. All Life/Safety mechanical emergency shed loads must be compliant with the Queen Elizabeth II Structure Plan.

Notwithstanding the design solution, Project Co must provide an alarm via the Building Management System connection if CO levels as read by any of the CO sensors installed to AS1668.2 read above 100ppm, and for NO₂ levels of >4ppm. Project Co must provide an evacuation alarm if CO >125ppm or NO₂ > 6ppm.

If the New Car Park is greater than 25m in effective height, Project Co must provide smoke control and stairwell pressurisation systems to AS1668.1.

Offices, toll booths or occupied areas within the New Car Park

Any occupied areas within the New Car Park must be air conditioned to 22.5°C ±1.5°C and must have a dedicated filtered fresh air supply to AS1668.2 to keep the area under positive pressure of >10Pa.

Fresh air intakes must be carefully considered and taken from a suitable location removed from traffic ways.

Any split system air conditioning units must be readily accessible and maintainable, of reputable manufacture, and the condensing units must be visually and acoustically treated to comply with the Architectural and Acoustics sections of this RFP.

⁵ SP045

Any air conditioned areas must be insulated and sealed in accordance with the Building Code of Australia Section J.

Toilet areas

All toilet areas must have exhaust systems complying with AS1668.2 however must not 'borrow' their make-up air from within the New Car Park. Instead, makeup air must come directly via the façade of the building, or via a dedicated supply air system.

Store areas

All store areas must be ventilated to AS1668.2, and chemical storage exhausts must be discharged vertically. Project Co must not store any dangerous or hazardous goods within the New Car Park.

Commercial tenancies within the New Car Park

Any commercial tenancies within the New Car Park must be serviced with modern electrical services systems complying with the requirements of PCA B Grade and the standards indicated above.

Retail tenancies within the New Car Park

Any retail tenancies within the New Car Park must be serviced with modern electrical services systems complying with the requirements of the standards indicated above.

14. Electrical

General electrical supply

The electrical installation must comply with relevant Australian Standards in particular AS 3000, AS 1680, AS 2293, AS 1668, AS 1670 and AS 1158, the Building Code of Australia, the requirements of the Project Stakeholders (*Volume 1A – General Overview*), Authorities and Utilities e.g. City of Subiaco, Western Power, Telstra, Water Corporation, Alinta, WAER etc the Office of Energy and the requirements of the RFP as further detailed.

The incoming electrical supply must be non essential and Project Co must make all necessary provisions for safety services on this basis.

All electrical work must be supervised and carried out by an Electrical Contractor licensed by Western Power.

Project Co must liaise with Western Power and Telstra and make provision for the payment of any capital works and fees due to the proposals.

All electrical services must comply with the Building Code of Australia Section J.

All Life/Safety electrical emergency shed loads must be compliant with the Queen Elizabeth II Structure Plan. Project Co must be responsible for liaising with Western Power and Telstra and to pay for any capital works and fees required.

The existing high voltage system on site operates at 6.15kV. This voltage is delivered by Western Power. During the redevelopment of the New Car Park site the high voltage system will be increased to operate at 11kV. This is currently projected to occur in late 2014 / early 2015.

Project Co shall make all due allowance for the high voltage parameters that will occur throughout the life of the car park. As a minimum, this will include the provision of transformers with dual wound high voltage windings (6.15kV and 11 kV) and that high voltage cabling and switchgear will be suitable for operation at both voltage pressure.⁶

Underground services conduits

General

All underground services must comply with the relevant Australian Standards and must follow guidelines in relation to the depth of each service, type of conduits to be used, excavation, backfilling and the type of pits in all common areas.

Separation Distances

Project Co must maintain the appropriate separation distances to all other Reserve services as required by the appropriate Australian Standards.

Site Services Co-ordination

Project Co must provide a co-ordinated services conduit installation to the Land boundary to facilitate fire, security, BMS and communications cabling from the New Car Park to the main State control centres.

Lead-in conduits

Project Co must provide lead in conduits (for Telstra and State) for the New Car Park structured cabling system for telephone (voice) and data communications.

Project Co must provide conduits with draw-in ropes. Also see Utilities Section for details of utilities and related interfacing.

Electromagnetic Interference (EMI)

Project Co must provide suitable protection to all new services works in order to prevent electromagnetic interference to existing State services.

Lighting

New Car Park lighting

The lighting design must comply with the general provisions and recommendations of the AS1680.2.1:2008 Interior and Workplace Lighting Part 2.1, Specific Applications Circulation Spaces and Other General Areas.

Project Co must ensure that average horizontal maintained luminance levels, Eh (minimum) at New Car Park floor level exceed those recommended as follows:

Car Park Location	Design Criteria
Entrance / Exit daytime first 15m	800 lux
Entrance / Exit daytime 15 to 19m inclusive from entrance	160 lux
Entrance / Exit night time	160 lux
Aisles, ramps, circulating roads, pedestrian crossings	40 lux

⁶ SP016

Car Park Location	Design Criteria
General parking bays	40 lux
Disabled parking bays	40 lux
Stairs	160 lux
Corridors	160 lux
Lift Lobbies	200 lux
Office / Control Centre	320 lux at 700mm above ffl
Security Room	320 lux at 700mm above ffl

Project Co must ensure uniformity of illuminance, Emin/Eav, of 0.5 or better in the New Car Park and uniformity of illuminance, Emin/Eav, of 0.7 over task areas in offices and security room.

Project Co must ensure lamp colour appearance and colour rendering and maximum glare index is as recommended within AS1680.2.1:2008 Interior and Workplace Lighting Part 2.1, Specific Applications Circulation Spaces and Other General Areas.

The lighting system must be designed by an experienced lighting specialist and must include consideration of the latest lamp, controls and luminaire technologies. Project Co must provide evidence of research and life cycle calculations showing the consideration of capital, maintenance and running costs as well as manufacturer's guarantees and warranties. Specific site conditions must be carefully considered including room finishes, temperature ranges, Room Surface Maintenance Factors and other relevant influences to provide an installation that maximises lamp life and spacing's, while minimising energy use and maintenance costs. The lighting system must:

- provide the defined horizontal and vertical illumination levels;
- use suitable approved luminaires and lamp systems as further described; and
- provide vertical illuminance to 50% of the required horizontal illuminance on car park walls to a height of 2300 mm above floor level.

Roadway Lighting

Project Co must provide lighting in entrance roadways in accordance with Classification P2 as per AS 1158.3.1.

Upper Deck of New Car Park

Project Co must provide suitable lighting on the external upper deck of the New Car Park in accordance with AS 1158.3.1. Particular attention must be paid to the prevention of light pollution (both upward and downward pollution) to adjacent buildings and must be in accordance with AS 4282.

High Level Link Bridges

Project Co must ensure that the lighting design for the high level link bridges must comply with the general provisions and recommendations of the AS1680.2.1:2008 Interior and Workplace Lighting Part 2.1, Specific Applications Circulation Spaces and Other General Areas.

Lighting Control Switching and Energy Management

Project Co must ensure that the control of lighting is by a microprocessor based flexible, programmable switching system.

Footpath and Covered Walkway

Project Co must provide lighting in accordance with Classification P1 as per AS1158.3.1

Project Co must provide a PC-based control system complete with a computer and Windows latest technology and operating system featuring ease of use through an intuitive Graphical User Interface (GUI) by simple mouse accessibility to switching functions. The lighting control system must be capable of:

- being reconfigured without the need to rewire;
- provide control of individual zones as required by the Building Code of Australia;
- be daylight responsive;
- have presence detection capabilities; and
- allow for manual operation if a control fault occurs.

In order to cater for scheduled occupancy the controller/gateways Project Co must include an integrated real-time clock for automatic time scheduling of any lighting control actions that the State requests, including:

- an integrated real-time clock to allow automatic time schedules to be run on the gateway independent of the ethernet network;
- to ensure ongoing accuracy the real-time clock must support automatic synchronization with a network time server;
- the real-time clock must provide automatic daylight savings adjustment and leap year correction;
- sunrise/sunset support based on site location. Schedules are to be provided with a configurable offset to allow lighting to be controlled relative to dusk and dawn. e.g. Sunrise + 20 minutes, Sunset – 30 minutes;
- custom time schedules are to be configured for an absolute time e.g. Car Park Open, Monday to Sunday at 5:30am, closing at midnight;
- linked time schedules relative to another time schedule e.g. car park Open + 15 minutes;
- repeat time schedules e.g. run façade lighting sequence every 30 minutes from 7pm until 11pm;
- time schedules must be able to be configured to include or exclude holiday periods. Holiday periods are to be configurable for one or more days and are to be able to be selected as perpetual (e.g. January 1, every year); and
- configuration of the time schedules must be completed over the ethernet network.

The lighting system must interface with the security system at high level to ensure pre programmed lighting scenes are activated on receipt of specific security inputs.

Project Co must ensure minimum light levels are maintained for selected CCTV camera operation.

Project Co must provide photo cell and time switch controls for external lighting.

Automated Pay On Foot Machines (APMs) and Entry/Exit Control

Project Co must supply and install any Automated Pay on Foot Systems.

Variable Message Signage and Way Finding

Variable Message Signage and way finding must be supplied and installed by Project Co in compliance with the Queen Elizabeth II Structure Plan requirements and Health Facility Guidelines.

Power

Project Co must provide an RCD protected general purpose socket outlet for every 200sqm of car parking in addition to outlets required for specific equipment.

Project Co must provide power and communications requirements for services and signage in the high level link bridges. All outlets must be suitably rated for the environment they are located.

Risk Management

Project Co must minimise the risk of injury to people within the New Car Park by selection, positioning and enclosing of electrical equipment.

Project Co must use equipment and fittings that are robust, vandal resistant and securely fixed to solid surfaces. Where cables cannot be run in ceiling spaces, walls and slabs or underground floor slabs enclose cabling within conduits or metal ducts and trays with screw fixed lids.

Project Co must ensure luminaires and other electrical equipment do not protrude under beams or other services pipes and ducts to maintain the minimum clearances from above finished floor level.

Project Co must ensure riser cupboards are sealed to prevent the ingress of dust and dirt.

15. Fire

Scope

The Building Code of Australia classifies the building as Class 7a Car parking building. If the New Car Park is greater than 25m in effective height or the New Car Park does not meet the Building Code of Australia requirements of "Open deck carpark", the following Fire Services requirements are mandatory:

- water supply system;
- automatic fire sprinkler system;
- fire hydrant/hose reel system;
- automatic fire detection and alarm system;
- emergency Warning and Intercommunication System (EWIS); and
- portable fire extinguishers.

Design criteria

The fire services installations will be designed in accordance with the following Codes and Standards and Local Authorities requirements:

- fire services installation to comply with Building Code of Australia 2009;
- fire services installation to comply with Water Authority of WA and Fire and Emergency Services Authority of WA requirements;
- water supply grade to comply with the Building Code of Australia i.e. Grade 1 Water Supply requirement;
- fire services to comply with current Australian Standards where applicable and particularly the following:
 - AS 2118.1-1999, Automatic Fire Sprinkler Systems- Part 1: General Requirements;
 - AS 2118.6-1995, Part 6: Combined Sprinkler and Hydrant Systems;
 - AS 4118.1-1996, Fire Sprinkler System Components;
 - AS 2419.1-2005, Fire Hydrant Installation – Part 1: System Design, Installation and Commissioning;
 - AS 2441-2005, Installation of Fire Hose Reels;
 - AS 2941-2002, Fixed Fire Protection Installations – Part 1: Pumpset Systems;

- AS 1668.1-1998, Part 1: Fire and Smoke Control in Multi-compartment buildings;
- AS 1670.1-2004, Part 1: Fire detection, warning, control and intercom system – Fire;
- AS 1670.4-2004, Part 4: Sound systems and Intercom Systems for Emergency Purposes;
- AS/NZS 3000-2000, Electrical Installation- Wiring Rules;
- AS 2444-2001, Portable Fire Extinguishers and fire blankets;
- AS 1851-2005, Maintenance of Fire Protection System and Equipment; and
- AS/NZS 3500.1-2003, Plumbing and Drainage Part 1: Water Service.

System description

Water supply system

The incoming water supply may be obtained from the existing 300mm dia. internal water ring main along Hospital Avenue. A water connection with isolation valve located within an underground valve pit must be provided near land boundary for the fire water supply.

On site water storage and fire services pumps, in accordance with the requirements of AS 2419 and 2491 must be provided.

The water supply must comprise of “deemed to satisfy” compliant fire water storage tanks for both fire hydrant and sprinkler systems (final capacity to be determined during detailed design subject to flow test results) coupled to 2 off fire services pumps. The full holding storage tank capacity may be reduced on the basis of sufficient water flow rates and pressures from internal water supply ring main infrastructure to the building for the make-up supply tank infill.

The fire pump system must comprise of 1 off electrically driven and 1 off diesel engine driven fire pumps each of which must be capable of providing adequate pressure and flow required for a combined hydrant and sprinkler system.

The new central plant will not be supplying chilled or hot water feeds to the proposed new Car Park.⁷

Automatic Fire Sprinkler System

An automatic fire sprinkler system must be provided in accordance with AS 2118.1 to protect the entire New Car Park. According to the AS 2118.1 for Sprinkler System Installation, design class of occupancy of the New Car Park is classified as Ordinary Hazard (OH) Group II.

The sprinkler system must be designed to satisfy the Ordinary Hazard 2 (Carpark) and Light Hazard (Office) Group Classifications for sprinklers, which must be required to produce a density of 5mm/min over 144m² for the New Car Park, 6 sprinklers operating at 48 Litres per minute for Office areas.

The sprinkler heads must be industry standard response time index with temperature ratings as follows:

Car park areas:

- brass glass bulb conventional; and
- 680C, 15mm orifice diameter.

Office areas:

- chrome glass bulb, fast response; and
- 680C, 10mm orifice diameter.

⁷ SP015

It is anticipated that the sprinkler system must direct connect to the fire services tank and pump set. Upon operation of a sprinkler the primary electric or secondary diesel pump must activate, to boost the systems to their required operating pressures. Should a sprinkler head operate, a signal must be transmitted to the fire indicator panel and EWS panel and directly to the Fire Brigade.

Fire Hydrant and Hose reel System

A fire hydrant and hose reel system must be provided throughout the New Car Park in line with relevant FESA operational requirements.

The system must be fed from a combined sprinkler and hydrant fire services tank comprising boosted rising mains sprinkler / hydrant ring main reticulating to internal hydrants at each floor level of individual stair cores.

Fire booster valve assembly must be provided to meet the FESA operational requirements.

Automatic Fire Detection and Alarm System

An automatic fire detection and system must be installed throughout the New Car Park to provide indication monitoring, testing and control of all relevant equipment and systems for fire fighting purposes.

All main isolation valves used throughout the system must be monitored back through the Fire Indicator Panel (FIP) and an alarm raised.

The FIP must also monitor all associated fire protection equipment such as sprinkler flow switches, pumps, hydrant systems etc. This system upon detection of smoke must also relay a signal to the Fire Brigade.

Provision of the Direct Brigade Alarm from the fire indicator panel is the responsibility of Project Co.

Manual call points must be provided by Project Co to allow occupants to raise an alarm in the event of a fire. Horn type sounders must be located throughout the New Car Park to alert occupants in the event of a fire.

Emergency Warning and Intercommunication System (EWIS)

An EWIS system must be installed throughout the New Car Park to the relevant standards of AS 1670.4. This system upon operation of a sprinkler, smoke detector or break glass alarm must activate the EWIS system via the main emergency control panel. A sequenced audible signal must be transmitted throughout the New Car Park via the speakers and sounders.

This system must be installed throughout the New Car Park to provide an early audible warning in the fire alarm mode. The speakers must be of the horn type in the New Car Park and exposed areas and 100mm recessed ceiling speakers throughout the office areas.

All speakers must be capable of 80dB (A) when measured at 1m with alert and evacuate tone generator complying to AS 2220.1

Portable Fire Extinguishers

Fire extinguishers must be provided throughout the New Car Park where required to facilitate the fixed protection systems and provide a means of first attack fire fighting appliance which is suited to the type of risk, i.e. electrical fire.

Fire extinguishers must be installed to AS 2444 and must be selected according to class of fire and occupancy hazard. Suitable type/capacity fire extinguishers will be provided to all plant rooms and other fire hazard areas to comply with Building Code of Australia and AS 2444 requirements.

16. Hydraulic

General

Project Co is responsible for the co-ordination, diversion, relocation and reinstatement of all the various existing services to be retained currently located adjacent to or within the Land, e.g. external fire hydrants (but not restricted to), together with the co-ordination of all new services described below and elsewhere within this document.

Potable and Domestic Water Systems

Project Co must arrange for separate new valved and capped Potable water main branch connections to supply the New Car Park from the existing 300mm diameter water main running North to South adjacent the west side of Hospital Avenue. In addition Project Co must arrange for pressure and flow tests to be conducted on the aforementioned existing 300mm diameter water main prior to commencing any design works.

Project Co must be responsible for surveying and locating all existing external below grade branch domestic mains water supplies, (including their stop/isolation valves etc.) Upon completion of the survey works the branch pipes and their sizes must be incorporated on a drawing for record purposes and be submitted together with a condition report, which must include all existing branch stop/isolation valves together with all remedial works that may be required to existing stop/isolation valves that may be found leaking or not functioning. Subject to location, size, condition and approval, any/all existing supply branches may be accepted for incorporation into the new works. Branches approved for reuse must be terminated (down stream of the branch valve) at the land boundary and capped to prevent ingress of soil or other foreign matter until the new system pipework is connected at the interface. Pipework to the Land, must be installed using new approved pipe and fittings.

Project Co must remove all existing supply pipework branches deemed to be unsuitable for reuse and must submit method statements for approval for all existing supply pipework branches to be abandoned and removed. The methodology and works must be strictly in accordance with the appropriate requirements of the Perth Water Corporation, Australian Standards.

The 'new' domestic water services systems must incorporate storage tanks and packaged booster pumps of inverter/variable speed type, selected and sized as necessary to ensure that all appropriate water pressures and flows are achieved throughout the systems up to and including through all points of discharge.

Project Co must provide calculations to demonstrate the selection of booster pump package together with the design pipe sizes from the booster pumps, are correct and that all appropriate water pressures and flows are achieved throughout the systems up to and including through all points of discharge.

The fire supply & protection systems must be as described within the "Fire" section of this document.

The above ground high level services designs and installations must ensure that the minimum headroom within the ground floor and the upper floors is not compromised

The new above and below ground water services systems for the New Car Park must be designed and installed in accordance with the requirements of the Perth Water Corporation, Australian Standards, together with any/all other additional variations as may be required or otherwise applicable within the State of Western Australia.

All pipework installations below & above must not be permanently covered (soil back-fill for below grade works, box-out/duct covers including application of insulation for above grade works) until the successful completion & approval of all flow/pressure system installation tests have been conducted in accordance with the relevant sections within the Australian Standards as set out below:

- the design & Installation works must be in compliance with Australian Standard AS/NZ 3500.1:2003 & AS/NZ 3500.5:2000;
- the domestic water services pipework below & above grade must be tested in compliance with Australian Standard AS/NZ 3500.1:2003 sections 9 & 16;
- the fire hydrant installations below & above grade must be tested in compliance with Australian Standard AS 241:2005 section 10; and
- the design & installation works must incorporate "Best Construction, Operating & Installation Practices".

Sanitary Plumbing and Drainage Systems

Project Co must arrange for the connections of new sewer drain branches to the New Car Park to the existing 525mm diameter main sewerage drain pipe running north to south adjacent the west side of Hospital Avenue. In addition Project Co must incorporate into the design, construction/installation of new manholes, inspection shafts and, inspection openings on/or adjacent to the aforementioned existing sewer pipe as may be required in accordance and compliance with the appropriate requirements of the Perth Water Corporation, Australian Standards.

Project Co must provide calculations to ascertain the compatibility for the additional discharge flows into the existing sewer.

Project Co is responsible for surveying and locating all existing external below grade branch drains that may be within the Land. Upon completion of the survey works the branch drainage pipes and their sizes must be incorporated on a drawing for record purposes and must be submitted together with a condition report and method statement for any required remedial repair works for any existing branch drains that Project Co may wish to propose for reuse.

All existing branch drains approved for reuse must be terminated at the Land boundary and capped to prevent ingress of soil or other foreign matter until the new system pipework is connected at the interface. Pipework, must be installed using new approved pipe and fittings.

Project Co must remove all existing drainage pipework branches, manholes & inspection openings etc. that are no longer required or deemed to be unsuitable for reuse and are to be abandoned and removed. A method statement must be provided fully describing the proposed methodology intended for the abandonment of drains below the roadway. All works must be strictly in accordance and compliance with the appropriate requirements of the Perth Water Corporation, Australian Standards together with any/all other additional variations as may be required or otherwise applicable within the State of Western Australia.

Project Co must provide calculations to demonstrate the pipe sizes and gradients proposed for the 'new' sanitary plumbing & drainage (sewerage) systems are of appropriate diameters which provide the correct self cleansing velocities. The design must incorporate heavy duty sealed locking/non-rocking manhole covers (if required) and/or heavy duty sealed inspection opening covers where located within the car parking areas, adjacent external footpaths or roads.

The above ground high level services designs and installations must ensure that the minimum headroom within the ground floor (2500mm) and the upper floors (2300mm) is not compromised.

The new above and below ground sanitary drainage systems for the New Car Park must be designed and installed in accordance with the requirements of the Perth Water Corporation, Australian Standards, together with any/all other additional variations as may be required or otherwise applicable within the State of Western Australia.

All pipework installations below and above ground must not be permanently covered (soil back-fill for below grade works, box-out/duct covers for the above grade works) until the successful completion & approval of all hydraulic pressure tests have been conducted in accordance with the relevant sections within the Australian Standards (item below refers).

- The design & Installation works must be in compliance with Australian Standard AS/NZ 3500.2:2003 & AS/NZ 3500.5:2000.
- All pipework below & above grade must be tested in compliance with AS/NZ 3500.2:2003 Section 13.
- The design & installation works must incorporate "Best Construction, Operating & Installation Practices".

Stormwater drainage systems

Project Co must arrange for the connections of new stormwater drain branches for the New Car Park to the existing 1010mm diameter stormwater main drain pipe running south to north adjacent the east side of Hospital Avenue. In addition Project Co must incorporate the design, construction/installation of new manholes, inspection shafts and inspection openings on/or adjacent to the aforementioned existing main stormwater drainage pipe as may be required in accordance and compliance with the appropriate requirements of the Perth Water Corporation, Australian Standards.

Project Co must provide calculations to ascertain the compatibility for the additional discharge flows into the existing sewer.

Project Co is responsible for surveying and locating all existing external below grade stormwater drainage channels associated pits, traps and their branch drains within the Land. Upon completion of the survey works the branch drainage pipes and their sizes must be incorporated on a drawing for record purposes and must be submitted together with a condition report and method statement for any required remedial repair works for any existing branch drains that Project Co may wish to propose for reuse. All existing branch drains approved for reuse must be terminated at the Land boundary and capped to prevent ingress of soil or other foreign matter until the new system pipework is connected at the interface. Pipework must be installed using new approved pipe and fittings.

Project Co is responsible for the removal of all existing drainage channels, pipework branches, manholes and inspection openings, etc. that are no longer required or deemed to be unsuitable for reuse and are to be abandoned and removed. A method statement must be provided fully describing the proposed methodology intended for the abandonment of drains below the roadway. All works must be strictly in accordance and compliance with the appropriate requirements of the Perth Water Corporation, Australian Standards together with any/all other additional variations as may be required or otherwise applicable within the State of Western Australia.

Project Co must provide calculations to demonstrate the pipe sizes and gradients proposed for the 'new' stormwater plumbing and drainage (sewerage) systems are of appropriate diameters which provide the correct self cleansing velocities. The design must incorporate heavy duty sealed locking/non-rocking manhole covers (if required) and/or heavy duty sealed inspection opening covers where located within the car parking areas, adjacent external footpaths or roads.

The above ground high level services designs and installations must ensure that the minimum headroom within the ground floor (2500mm) and the upper floors (2300mm) is not compromised.

The new above and below ground stormwater drainage systems for the New Car Park must be designed and installed in accordance with the requirements of the Perth Water Corporation, Australian Standards, together with any/all other additional variations as may be required or otherwise applicable within the State of Western Australia.

All pipework installations below and above ground must not be permanently covered (soil back-fill for below grade works, box-out/duct covers for the above grade works) until the successful completion and approval of all hydraulic pressure tests have been conducted in accordance with the relevant sections within the Australian Standards (item below refers).

- The design and Installation works must be in compliance with Australian Standard AS/NZ 3500.3:2003 and AS/NZ 3500.5:2000.
- All pipework below and above grade must be tested in compliance with AS/NZ 3500.2:2003 Section 10.
- The design and installation works must incorporate "Best Construction, Operating and Installation Practices".

Natural gas system

The State will make no provision for natural gas connection or use within the New Car Park. If required this is the responsibility of Project Co.

17. Vertical Transportation

Performance

Project Co must provide all vertical transportation within the New Car Park. The vertical transportation system must be designed to the following requirements:

- peak average waiting interval less than or equal to 40 to 50 seconds;
- peak handling capacity 10% to 15%;
- population diversity factor: 50%;
- number of persons at 1.4 persons per car bay for office car parking and 2 persons per car bay for visitor;
- if lifts are in separate locations for efficiency of service allow a plus 20% population inefficiency factor;
- the lift design must include for multiple lift locations if the walking distance to a lift is greater than 60 metres;
- number of lifts: (subject to traffic analysis);
- rated load: (subject to traffic analysis);
- rated speed: (subject to traffic analysis);
- machine type;
- drive system: efficiency <95%;
- control system: Microprocessor based control;
- levels served: All levels;
- car and lift well entrances: Two panel centre opening;
- landing door jambs finish: Stainless steel - satin finished;
- landing door jamb type: Full depth;
- landing door finish: Stainless steel – satin finished;
- car door finish: Stainless steel – satin finished;
- clear door opening: Minimum 1000 mm wide x 2100 mm high;
- car door passenger protection: 3D Multiple infrared light beam;

- clear car inside: Minimum 1400 mm wide 2000 mm deep (In accordance with DDA requirements);
- clear height inside car: Minimum 2400 mm (nominal) to ceiling;
- disabled facilities: Fully compliant with Australian Standards;
- fire service: In accordance with the Building Code of Australia;
- emergency communication: Provide “hands free” emergency type;
- car interior finishes: Stainless steel – satin finished; and
- voice mechanism: Compliant to AS1428.12.

The lifts must comply with AS1735 Part1, AS1735 Part 12 Facilities for Persons with Disabilities, and the Building Code of Australia E 3.6 Facilities for People with Disabilities. The minimum dimension of the lifts must allow for a stretcher or a wheelchair use.

Project Co must ensure a safe return method bearing in mind the electrical service to the New Car Park is non-essential.

18. Acoustics

Issues

Project Co must address the following sources affecting noise emissions:

- traffic into and out of the New Car Park;
- car-door slamming;
- car horns;
- wheel squeal on concrete as building ages;
- expansion joint covers;
- late night emergency visits;
- mechanical services ventilation fans; and
- fire services pump testing.

Design objectives

Project Co must provide a New Car Park for which noise does not unreasonably impose on users and the building surrounds, as set out in the minimum requirements. Noise emissions from the New Car Park are to meet the requirements of the Western Australian Environmental Protection (Noise) Regulations 1997. Noise levels within the New Car Park should adhere to the Australian Standard AS2107.2000.

Additional Requirements:

To the west are hospital services facilities (Blocks Band C) in one to two-level buildings, mainly occupied during the day, and their use as recovery wards during the hours of 22:00 and 07:00 must be considered in establishing noise emissions. To the south is the proposed New Children’s Hospital. The assigned noise levels outside those buildings may be treated as for a “residential” site consistent with treatment for assessment of other on-site building.

The Queen Elizabeth II Medical Centre may have additional overriding noise emission limitations to address neighbourhood annoyance, given its position within an otherwise quiet suburban location.

19. ESD

General requirements

The initiatives proposed in this section have been identified and recommended as being in accordance with the State's commitment to the State Sustainability Strategy 2003.

Additionally, this section includes sustainable initiatives which support the proposed Australian Green Infrastructure Council's (AGIC) rating scheme. The AGIC scheme proposed is similar to the Green Building Council of Australia's (GBCA's) Green Star rating scheme and it considered likely to gain significant traction in the market. Whilst the final version of the AGIC tool is yet to be released, it is expected that the scheme will be released during the D&C Phase of the project.

It should be noted that the initiatives recommended within this section do not represent all of the categories within the AGIC tool. Preference has been given to initiatives which are undertaken during the D&C Phase and the Operating Phase.

Each initiative area has been presented with three levels for consideration for inclusion in the Proposal:

- Minimum Requirement – the minimum requirements of this RFP (for the purposes of this section) suggested to either meet existing or reasonably expected regulatory and or compliance programs at state or national level;
- AGIC Consideration – initiatives in addition to minimum requirement which contribute to an improved outcome in the proposed AGIC rating scheme; and
- Best Practice Consideration – initiatives in addition to minimum and AGIC which are designed to be equivalent to best practice in sustainability in Australia or present opportunities to be innovative or extend best practice.

Governance and Operation

Construction Environmental Management Plan

Minimum Requirement: A Construction Environmental Management Plan should be developed by Project Co prior to construction to ensure that environmental impacts arising from the construction activities are managed and appropriate mitigation is undertaken where required.

AGIC Consideration: Construction Environmental Management Plan is required to conform to Section 4 of the NSW Environmental Management System Guidelines 2007.

Project Co is required to have ISO14001 certification.

Benchmarks and Reporting

Benchmarking and reporting of performance against key sustainability indicators which are aligned with State government sustainability principles will enable the project to demonstrate its commitment to sustainability. During the D&C Phase, the benchmarking and reporting of performance against a wider set of performance indicators will be used to monitor and report on the performance of the project in terms of meeting sustainability objectives.

Minimum Requirement: Establishment of performance indicators with annual reporting during construction (energy, water and waste) and operation (energy).

AGIC Consideration: Annual reporting against performance indicators to form part of public sustainability review for the NCH.

Best Practice Consideration: Performance indicators are incentivised such as through a profit sharing relationship i.e. where 50% of utility cost savings based are paid to the owner as a sustainability bonus.

Procurement

Minimum Requirement: Procurement policy is developed which considers environmental, economic and social elements of sustainability and these elements are considered during the evaluation process.

AGIC Consideration: Significant suppliers are required to have ISO14001 certification.

Best Practice Consideration: Significant suppliers required to address the sustainability of the supply chain associated with procured items.

Innovation

Minimum Requirement: No Minimum Requirement.

AGIC Consideration: Opportunities for innovative materials and construction approaches to be identified and tracked during D&C Phase.

Best Practice Consideration: Incentivise innovation activities, whereby cost savings result in profit sharing arrangement or innovation bonus.

Carbon management

Minimum Requirement: Project Co must meet regulatory reporting requirements related to greenhouse gas emissions and to supply greenhouse and energy data for inclusion in state government agency greenhouse and energy reporting requirements during the D&C Phase and the Operating Phase.

AGIC Consideration: Carbon management plan which includes annual carbon footprint, consistent with ISO14064:2, undertaken as part of the D&C Phase and the Operating Phase. Design phase footprint to identify base case carbon emissions during construction. This figure must be used as a benchmark.

Best Practice Consideration: Carbon neutral operations achieved through offsetting of emissions.

Energy Conservation and Generation

Minimum Requirement: Compliance with energy reduction programs applicable to State government agencies.

Natural Ventilation

The New Car Park should be mainly naturally ventilated which is discussed in the "Mechanical" section of this RFP.

Lighting

Minimum Requirement: Incorporation of energy efficient lighting technologies (with lighting densities as described by Green Star Commercial (for 95% of New Car Park lighting density not to exceed 1.5W/m² per 100 lux.

Best Practice Consideration: Preparation of lighting scheme which maximises day lighting and identifies opportunities for reduced energy consumption through zoning, motion, photoelectric, and timed lighting controls switching.

Motors/ Pumps

Minimum Requirement: High efficiency variable speed drive motors for all fan and pump applications.

Best Practice Consideration: CFD analysis of fan and pumping systems to be carried out to optimise energy consumption.

Water and Wastewater Management

Downstream water and pollution response

Minimum requirement: Use of gross pollutant traps and drain filters which capture hydrocarbon contaminated run off from routine cleaning and storm within the New Car Park.

AGIC Consideration: All storm and cleaning water, up to 1 in 20 year event captured within the New Car Park treated before release off site.

Best Practice: All grey and rain water, including water used to clean the New Car Park collected, treated and stored for reuse within the Reserve.

Operational Water Use

Minimum requirement: Installation of water efficient (5 star WELS) fixtures, toilets and waterless urinals for staff amenity within the New Car Park.

Construction waste

Minimum Requirement: No hazardous materials used in construction or operation.

AGIC Consideration: Construction and demolition wastes segregated, reused within precinct where possible, or recycled or recovered.

Best Practice: 80% of construction and demolition wastes from site are beneficially used.

Material Selection and Use

Materials Procurement

Minimum Requirement: No Minimum Requirement.

AGIC Consideration: Construction practices adopted which reduce wastage.

Best Practice: Lifecycle assessment of concrete, steel and key materials undertaken at the start of construction. Materials sourced from sustainable sources with industry/international certification.

Utilisation of Recycled and Reused Materials

Minimum Requirement: Opportunities for the utilisation of recycled and reused materials to be identified during construction.

AGIC Consideration: 15% recycled aggregate used in concrete.

Best Practice: Industrial waste material used in place of virgin material, for example fly ash in concrete.

Low VOC Paints, Adhesives and Solvents

Minimum Requirement: Low VOC paints, adhesives and solvents to be used for all applications, where comparable product exists. Low VOC defined as per GBCA Green Star technical manual V3, IEQ 13.Paragraph that precedes a set of dot points.

20. Security

Standards, Guidelines and Codes

Project Co must comply with all AS, ISO and IEC standards that impact on security, including the following:

- AS2201 Intruder Alarm Systems;
- AS4806 Closed Circuit Television;
- ISO27002 Code of Practice for Information Security Management;
- AS3000 Australian Wiring Rules;
- AS3080 Telecommunication Installations;
- IEC60529 Ingress Protection; and
- all equipment must meet or exceed WA Police standards and requirements.

General System Description

Project Co must provide a Cardax FT Head End to monitor access control and alarms and Bosch Videos to monitor CCTV within the New Car Park security room.

Please note the following additional information.

- the CCTV system is Bosch.
- the Access Control System is using Cardax FT3000 Controller (the existing controller has the capacity for an extra 4 readers).
- each FT3000 controller has the capacity of up to 8 readers for heavy usage.
- the operating software of the Access Control System is CCFG Cardax Headend.⁸

New Car Park CCTV footage, alarms and access control events must be able to be viewed by the State from the existing hospital control rooms, and Project Co must provide the necessary facilities and software for the cable linkage for this activity. Cable connections to the State's control rooms from the designated termination point is the responsibility of the State.

Access control, alarms and CCTV must be independently delivered in the New Car Park security control room with no reliance on any of the existing security control equipment. As such, any failure of existing security control equipment must not affect the continued operation of the New Car Park security systems.

Project Co must not use any existing security hardware. This includes:

- the existing dedicated network video recorder and storage for retaining car park CCTV footage;
- the existing dedicated security control panels for at grade car park alarm and access control devices; and
- the existing dedicated Cardax FT Server and workstation for managing car park alarms and access control events.

Security Objectives

The objectives of electronic security in the New Car Park are:

- to minimise the likelihood of security incidents within the New Car Park;
- to provide a timely response to security incidents by enunciating alarms to security staff and displaying CCTV video images at the security control room for monitoring;

⁸ SP059

- retention of CCTV video images for post-incident forensic and evidence purposes;
- to protect staff, customers and property such as various pay machines and associated equipment;
- to provide a sense of safety for users of the New Car Park;
- to assist customers accessing the New Car Park with use of CCTV and intercoms at the entries/exits and payment machines; and
- the monitoring of parking fee evasion via monitoring of all entries/exits.

CCTV System Coverage

Vehicle and Motorcycle Entries and Exits

CCTV System Coverage must provide field of view to cover complete lane width and any nearby assets (boom gates, signs, etc).

Image quality and resolution must allow license plate recognition of entering/exit vehicles and facial recognition of vehicle occupants and pedestrians walking in through laneways. There must be a minimum of one camera per laneway and this camera must be adjusted and suitable for use in all lighting conditions. There must be adequate secondary pan tilt and zoom camera support to cover vehicle and motorcycle entry/exit areas.

Pedestrian Entries and Exits

Pedestrian entry / exit points must provide full coverage of all points with fixed views not to exceed 3m across entry point. This must provide full facial recognition of all people entering the New Car Park to be useable for analytical purposes. This camera must be adjusted and suitable for use in all lighting conditions. There must be adequate secondary PTZ camera support to this area.

Automated Pay on Foot Machines (APM's)

All APM's must be covered by a fixed camera with secondary support via PTZ's. These views will be maximised to protect the machines from tampering or vandalism, to assist staff during customer calls for assistance and to protect staff during coin collection. There must be a minimum of one fixed camera per 2 APMs.

Staff Assist / Pay Stations

Any area designated as a staff assist point (boom gates, APMs, intercoms, customer service points, etc) or pay station must have a fixed camera with secondary PTZ support. The camera must cover the full staff / customer interaction. This must include a general view of the interaction as well as a full facial recognition of the customer.

Control Room

A general view fixed camera is required to cover the control room. This camera must have a suitable lens to ensure uninhibited views of the room.

Coin Count Rooms (If Applicable)

A general view fixed camera is required to cover the coin count room where included in the facility. This camera must have a suitable lens to ensure uninhibited views of the room.

Roadways and Choke Points

A PTZ camera is required at all vehicle entry points to be located on the outside of the building to provide coverage of the road way and any potential traffic build up or hazards related to the New Car Park.

Entry Lobbies and Congregation Points

A fixed camera is required to provide adequate coverage of people when waiting at lobbies or at a congregation point. This camera must provide a general view of the area. Secondary support from a PTZ is required.

Lift Lobbies

A fixed camera must be provided at all lift call points. This camera must provide a general view of the lift waiting area and provide facial recognition of all people exiting the lift. Secondary support from a PTZ is required.

General Parking Areas

Project Co must provide CCTV coverage to 100% of the New Car Park area. Cameras must be located in the centre of the laneways to allow unrestricted view of each laneway on each level. All PTZs must be programmable to do 360° sweeping views or guard tour when not in manual use. The PTZs must be positioned to take into account the following priorities:

- provide secondary support to all entry and exit points;
- provide secondary support to all fixed camera locations;
- provide video coverage of all stairwell exits;
- provide video coverage of all alarmed area exits (storeroom, motor room, etc);
- provide maximum coverage of all car / bike parking bays;
- provide video coverage to all other State assets (VMS, equipment, etc); and
- all cameras are to be mounted to avoid any obstruction or viewing restriction of lighting and other obstacles (signs, pillars, height, etc).

Camera Performance

The supplied CCTV cameras must be fully compatible with the existing Bosch Videos Pro Network Video Management Software and must meet or exceed the following essential performance criteria:

Camera

- 4CIF resolution;
- image sensor;
- fixed: 1/3" interline CCD;
- PTZ: 1/4" Exview HAD CCD;
- day / night functionality with automatic infrared cut off filter;
- minimum illumination (assume 50 IRE);
- fixed: 1 lux in colour, 0.2 lux in monochrome;
- PTZ (assume at 15x zoom): 0.7 lux in colour, 0.2 lux in monochrome.

Image Processing

- 12 images per second;
- H.264, MPEG-4 or M-JPEG image compression;

Digital Video Functions

- 60dB or better Dynamic Range;
- manual and automatic gain, iris, white balance, electronic shutter and focus control;
- image stabilisation;
- window blanking with user defined shapes;
- threshold adjustable motion detection.

Network Interface

- open architecture connectivity allowing integration into any IP-based system;
- 10/100 Base-T, auto-sensing, half/full duplex with built-in Network Interface Card (NIC);
- must support TCP/IP, UDP/IP, DNS and DHCP protocols as a minimum;
- Digital Video Encryption: SSL;
- Digital Video Connector: RJ45 (8P8C).

Lens

- the lens installed on each camera must achieve the required fields of view described in Section 15.3 while providing facial recognition and ability to read license plates;
- camera manufacturer-recommended lenses must be installed;
- the selected lens must cause minimal optical aberrations (blur, curvature of the field of view, distortion and the like) in the produced image.

PTZ

- 18x motorised optical zoom;
- adjustable optical zoom speed;
- 3° - 45° field of view;
- F1.4 – F3.0;
- 360° pan range with 0.1° preset angular resolution;
- 18° tilt angle;
- automatic control of pan and tilt speeds in proportion to depth of zoom;
- 256 preset PTZ positions. Program preset positions to view duress and intruder alarm points upon alarm activation.

Housing

- IP66 rated high impact vandal proof pressurised housing sized to suit the camera, lens and ancillary equipment assembly;
- housing to include sun shield, fan and heater supplied as necessary in order to keep the operating temperature inside the housing within the operating limits specified by the manufacturer for the successful operation of all equipment inside the housing. The sun shield must not inhibit the view of the camera;
- vents in the housing must be fitted with filters in order to prevent the ingress of dust and moisture, to maintain IP66 rating. Camera housings are also to provide adequate ventilation to prevent high temperature build-up;
- anti-condensation measure should also be included as part of the housing in order to remove humidity inside the housing;
- only use housings approved by the camera manufacturer;
- connect dome to housing by safety chain;
- slotted dome tint or mask to disguise the camera orientation;
- conduit glands must be fitted to the rear of each housing to seal cable entry points;
- surface and pendant mounting;
- housing must include a tamper switch which will be set up to enunciate an alarm at the security head end.

Mounting

- provide suitable mounting brackets to allow cameras to be mounted in areas with height restrictions so as to not obstruct or sustain damage as a result of objects moving through the New Car Park;
- brackets must be custom selected to permit soffit, wall or pole mounting, depending on the specific camera location;
- mount in accordance with OH&S practice, including any necessary barriers and harness points;

- for areas where cameras are ordinarily accessible (low mounted cameras) housings must be tamper resistant and locked to prevent intentional damage or disruption of image;
- cameras must be mounted at a height that achieves the required FoV and image quality. A camera's positioning should not make it openly vulnerable to human, structural or natural/ambient harm.

Network Video Management System

The existing Bosch Videos Pro Network Video Management System (NVMS) must be expanded by the State to accommodate the monitoring of the additional cameras in the New Car Park and provide any additional software licenses to allow the monitoring of new cameras.

After expansion, the Bosch Videos Pro NVMS must:

- maintain less than an 80% load on server and workstation PCs; and
- use less than 90% of the available bandwidth on all Ethernet network transmission mediums and equipment.

CCTV Recording

Project Co must provide a dedicated expandable NVR with RAID5 redundancy for storing video from the New Car Park CCTV cameras. Each NVR Server must have a minimum with one hot spare hard disk drive (HDD). The NVR must have a 1Gbps connection to the IP CCTV system using a 100/1000BaseT Ethernet network interface. The NVRs must not employ a dedicated monitor, keyboard or mouse and must be accessed and controlled using Client CCTV Operator Workstations residing on the IP network. The NVR must be rack mountable.

NVR storage for the New Car Park CCTV cameras must retain video images using the following parameters:

- retention period of 31 days with first-in first-out overwrite;
- 12 images per second upon motion detection. The motion detection threshold must be adjusted to optimise recording efficiency for each camera;
- 5 second pre and post motion detection buffer recording;
- record at resolution transmitted by each camera; and
- MPEG4, H.264 or JPEG-2000 compression.

All CCTV Operator Workstations must be capable of archiving and producing CD/DVD/USB backups and exports of required footage. All exported footage must contain a proprietary NVMS watermark and be tamper evident.

Project Co must provide power failure automatic shutdown software sized for each NVR. The shutdown software installed on the server(s) must perform an automatic, orderly system shutdown without operator intervention in the event the main source of power and emergency back-up power are lost and shutdown is required. This must ensure all multitasking operations and databases are closed with full data integrity.

UPS

Project Co must provide a double conversion in-line rack mountable Uninterruptible Power Supply (UPS) rated to provide 30 mins of battery discharge time to all CCTV associated control equipment. Project Co must provide UPS alarm annunciation at the operator workstations when UPS is in operation.

The UPS alarms (alarm when on battery and low battery alarm) must be connected to the NVRs and the low battery alarm must be configured to initiate automatic shutdown of this equipment at the 1 minute period. Immediately after receiving an "alarm when on battery", the NVR must distribute to all CCTV operator workstations.

Access Control System

Electronic Access Control

As a minimum, the doors requiring electronic access control to limit the use of keys are:

- control room door;
- coin count rooms (where included);
- store rooms; and
- motor rooms.

The door entrances to above rooms must be fitted with electric door strikes with the following performance specifications:

- fail safe operation, power on to secure. Strike must engage door latch;
- operating voltage: 12 – 24 VDC;
- holding strength: >1 tonne;
- dry relay output (relay open when latch not engaged);
- stainless steel; and
- 4 hour fire rating.

Acceptable products include Lockwood, Assa Abloy, FSH or equivalent.

Project Co must:

- provide proximity access card readers on the door handle side of each of the above room entries at 1300mm above finished floor level;
- at coin counting rooms, provide card readers on the inside of the room, enabling badge-in and badge-out; and
- provide card readers that are compatible with the existing Cardax FT Head End and able to read proximity cards currently used.

Project Co must provide card reader enclosure protection as follows:

- external: IP66D to AS1939; and
- internal: IP54 to AS1939.

Card reader performance is as follows:

- technology: Compatible with specified cards;
- operating voltage: 12VDC or 24VDC;
- interface: Wiegand;
- format: compatible with current cards;
- maximum read range: >5cm for wall and mullion mount readers;
- visual indication: LED to illuminate or changes colour on presentation of card;
- audio indication: Beeper to sound on presentation of card; and
- response time from presentation of a card: <1 second.

Access controlled doors must remain unlocked for 10 seconds. After this time the electric strike must re-engage. Project Co must program the Cardax FT Head End to monitor card readers at the entrances of the above rooms. All access events must be logged.

Door Hardware

Project Co must provide:

- heavy duty door closers on control room and coin count room doors;
- hinge bolts on all doors of above rooms; and
- strike plates on store room and motor room doors.

Alarm System

The alarms are to be monitored by the current Cardax FT Head End. Provide a dedicated Cardax FT server for the new car park security systems located in the new car park security control room.

All control rooms, store rooms and other restricted areas that have external entry points will require adequate alarm protection. All roller doors will have reed switch protection. All stairwell doors will have reed switches. Enclosed car parks that are closed at night require adequate long range passive infrared (PIR) intrusion detection on all levels. All APM alarms need to be integrated. All intercom call points need integration. All control rooms will require remote arming stations as well as a head end for arming.

The alarm system needs to be configured so that local control rooms handle all alarms whilst the control room is manned. After hours alarms are to be directed to nominated after hours monitoring locations.

All alarms within the system will require video confirmation. All PTZs that can be positioned and zoomed to provide coverage or leading and lagging coverage to an alarm will be programmed to respond via presets and event tags. A video notification window must appear on the monitoring head end. These alarms include:

- all inputs for all alarmed areas (control rooms, store rooms, etc);
- all reed switches (stairwell doors, etc);
- APM alarms;
- APM and intercom call points;
- all failed or incorrect reader badges; and
- all video fail alarms.

Reed Switch Performance

Project Co must provide recessed Magnetic Door Reed Switches. Magnetic reed switches are to be mounted with switching element in door frame and matched magnet element mounted in door frame top member at furthest edge from hinge. Switch cabling to be routed on secure side of portal only. Project Co must use rare earth magnets for steel frames.

Magnetic reed switches to be provided with suitable gap tolerances for the given application. Gap tolerances listed are indicative only.

Type: Biased or Magnesphere:

- output: dry relay contacts, closed when door is fully closed;
- door gap tolerance: $\leq 10\text{mm}$;
- construction: Hermetically sealed, nylon case; and
- built in end of line resistors.

Heavy Duty Magnetic Reed Switches

Project Co must use heavy duty magnetic reed switches for roller shutter doors and mounted with switching element on floor and matched magnet element mounted on roller shutter door end flange.

Stainless Switch cabling must be routed from switch to adjacent tamper proof and tamper protected junction box. Magnetic read switches to be provided with suitable gap tolerances for the given application. Gap tolerances listed are indicative only.

Project Co must provide mounting brackets as required to satisfy manufacture's installation recommendations.

- type: biased or magnesphere;

- output: dry relay contacts, closed when door is fully closed;
- door gap tolerance: $\leq 15\text{mm}$; and
- construction: hermetically sealed, cast aluminium case for pedestrian door;

Project Co must provide Built In End of Line Resistors.

Passive Infrared Volumetric Detectors

- detection range: to provide required coverage;
- operating voltage: 12Vdc;
- output: dry relay contacts, open when movement detected;
- tamper detection: built in end-of-line resistors; and
- mask detection: mask attempts results in intruder alarm generation.

Control Rooms

Each control room will require a PC running the control system software. Two monitors will be wall mounted on adjustable brackets, connected to the client machine with monitor one being the user interface and alarm monitor and monitor two being for displaying user defined camera views. Two monitors will be provided, mounted to the wall on adjustable brackets in a useable location to provide user defined multi-screens (4 way to 16 way) view of all / majority of cameras.

The access control system will have fully useable maps displaying all inputs, areas, doors, intercoms, APMs, cameras, etc to provide the operator with a simple point and click mouse operation for the majority of tasks.

The entire installed system will be fully documented with cable schedules including cable labelling, manufacture documents, drawings, software backups, maintenance programmes, etc in both hard and soft copies with one copy to be at the control room and one copy to be kept at the main office.

Training for CCTV/Security Access/Alarm Systems

Two programmes of full operator training for 4 operators will be required. The purpose of this course must create operator competency and confidence in the control room environment and to get full benefits of the systems installed.

Maintenance and Breakdown

The entire installed system must be fully maintained and documented to the State's requirements. All this documentation is required to be kept current in both the control room and at the State's main office. The purpose of this is to provide a full audit trail of all equipment.

21. Traffic / Pedestrians

Technical Specifications

Project Co must:

- design the New Car Park to cater for a minimum of 3550 cars including a 2% quantity of disabled bays noting that this Australian Standards (due to the New Car Park being for a hospital), in conjunction with hospital requests;
- design the New Car Park layout as per Australian Standards for Off-street car parking (AS/NZS 2890.1:2004);
- ensure the New Car Park is designed to minimise impact on Winthrop Avenue and to allow for the retention of mature trees on the western side of Winthrop Avenue;

- ensure the east-west link road is designed to minimise delays to vehicles entering and exiting the New Car Park;
- ensure the number of barrier gates entering and exiting the carpark(s) are designed to allow for peak hour demand and minimise queuing and delays. The position of the barrier gates within the New Car Park should allow for stacking of vehicles inside the New Car Park, so as queuing back does not affect the east-west link road;
- ensure the entry / exit lanes within the New Car Park after / before the barrier gates are spine roads with no direct access to car parking bays allowing for better circulation and traffic flow;
- ensure signals and intersection at Winthrop Avenue are designed to minimise the delays on through traffic on Winthrop Avenue and traffic entering and exiting the east-west link road;
- ensure the New Car Park is designed to limit impact on Hospital Avenue;
- provide an emergency access point connecting Hospital Avenue to the east-west link road. This should be for emergency vehicles only and controlled by the use of mechanical bollards or other means;
- provide a swing type height restriction barrier (or similar) on the east west link road rather than at New Car Park entrances;
- ensure that the footpath on the eastern side of Hospital Avenue is designed to a minimum of 2.5m. A 4.0m minimum footpath must be provided on the eastern side of Hospital Avenue between the pedestrian entrance to the staff New Car Park and the New Children's Hospital; and
- ensure that in sections of high pedestrian demand (which will also be shared with the shuttle buggy service), footpaths are at least 6.2 m wide. This includes an east-west pedestrian boulevard in line with the landscaped forecourt north of the New Children's Hospital.

Project Co is to note, and where required, allow for the following requirements.

- pedestrian operated (puffin) signals must be provided outside the New Car Park in line with 'B' Block. This is to enable the full width of Hospital Avenue to be crossed in one continuous trip;
- pedestrian operated (puffin) signals must be provided at the east west pedestrian boulevard (landscaped forecourt) which would also service the transit stop. These signals must permit staged crossing;
- the footpath along the eastern side of Hospital Avenue and the two Puffin Crossings and High Level Walkway (Figure 5.) are Additional Works;
- the Reserve boundary along Winthrop Avenue is the demarcation line between the Land reserved "Public Purpose - Hospital" and "Other Regional Road" under the MRS. This is shown in Figure 5, however Project Co must correctly identify this boundary from survey prior to undertaking works;
- undertake detailed design of the necessary road works on Winthrop Avenue required to accommodate traffic entering and exiting the New Car Park and also existing Winthrop Avenue traffic; and
- the future management of the internal accessway will be required of Project Co, and Winthrop Avenue will remain with the local government.

Workings for the Technical Specifications

This requirement specifies the road and pedestrian access requirements necessary to accommodate the proposed New Car Park in the north east corner of the Reserve.

This requirement references the following reports:

- "QEII Medical Centre - Paramics Modelling Report", SKM, December 2009; and
- "QEII Medical Centre Masterplan, Pedestrian Movement Plan", SKM, June 2010.

This requirement is broken down into the following 3 sections:

- operation, configuration and performance of new intersection on Winthrop Avenue servicing the New Car Park;

- operation and configuration of the east-west link road and car park entrance requirements; and
- pedestrian movements from the New Car Park.

Winthrop Avenue

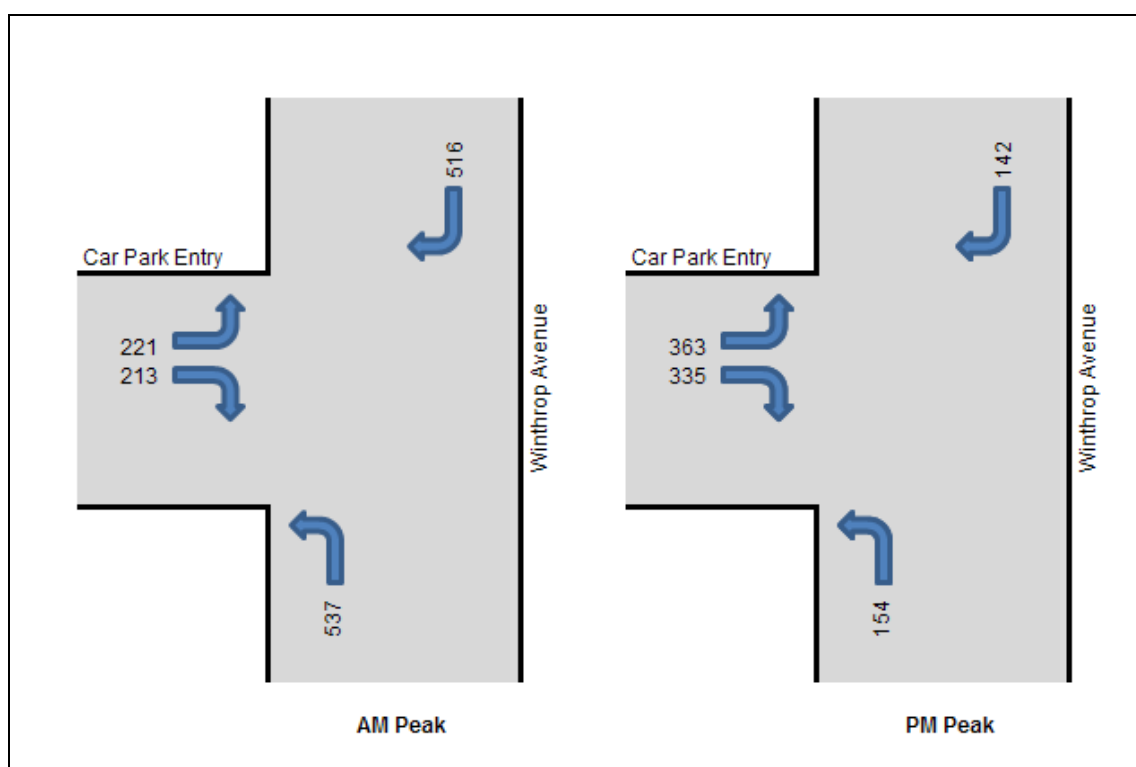
An SKM Paramics report developed 6 car parking scenarios based on 3 car parking arrangements and 2 access arrangements. The report made a recommendation on a preferred option based on the greatest reduction of traffic on the internal road system and best distributed parking around the site.

The preferred option shows a new east-west link road built directly off Winthrop Avenue approximately halfway between Monash Avenue and Aberdare Road. This road is proposed to be cul-de-sac so that it only services the New Car Park and hence reduces traffic on Hospital Avenue which is used by emergency vehicles and pedestrians.

The development quantum of the car-park has changed since this report was produced. The new Car Park is expected to accommodate approx 3,500 cars of the 5000 car parking spaces which are expected to be needed (The SKM report was based on 4140 car parking spaces for the new multi-storey car parks).

This then gives the indicative flows into and out of the proposed car park shown in Figure 1.

Figure 1: Estimated Peak Hour traffic volumes entering and exiting the New Car Park from Winthrop Avenue



Traffic flows on Winthrop Avenue were obtained from the Main Roads Western Australia Sydney Co-ordinated Adaptive Traffic System (SCATS) for the Winthrop Avenue / Monash Avenue and Winthrop Avenue / Aberdare Road intersections for Thursday 24 June 2010.

Table 1: Current Traffic Flows on Winthrop Avenue (MRWA SCATS 24 June 2010)

Winthrop Avenue	AM Peak (0700-0800)	PM Peak (1600-1700)
Northbound Flows	1038	1155

Winthrop Avenue	AM Peak (0700-0800)	PM Peak (1600-1700)
Southbound Flows	981	1069

Data from the Main Roads Regional Operations Model (ROM) showed an 11% increase in traffic from late 2009 to 2025 (SKM Report). Assuming a similar increase from 2010 to 2025, this gives the volumes on Winthrop Avenue shown below.

Table 2: Predicted 2025 Traffic Volumes on Winthrop Avenue (2010 Flows + 11%)

Winthrop Avenue	AM Peak (0700-0800)	PM Peak (1600-1700)
Northbound Flows	1152	1282
Southbound Flows	1089	1187

The data above was used to determine if these volumes are suitable for an intersection at this location and what type of intersection would be required. The intersection was analysed using SIDRA (Signalised and Unsignalised Design Research Aid).

The performance measures of the proposed intersection obtained from SIDRA for comparison are described below:

Degree of Saturation: A comparison of the demand traffic flow for a movement divided by the capacity for the movement. Values over 1.0 indicate that a movement is over saturated and hence indicate failure of that movement. A value of 0.9 is generally accepted as practical maximum degree of saturation for a movement.

Average Delay(s): The average delay for each vehicle performing a movement measured in seconds.

Level of Service: Level of Service (LoS) is a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and / or passengers. The LOS for intersections, based on overall intersection delays, used in this analysis are shown in the table below. This information is based on the Highway Capacity Manual (HCM, 2000) used in the SIDRA analysis software.

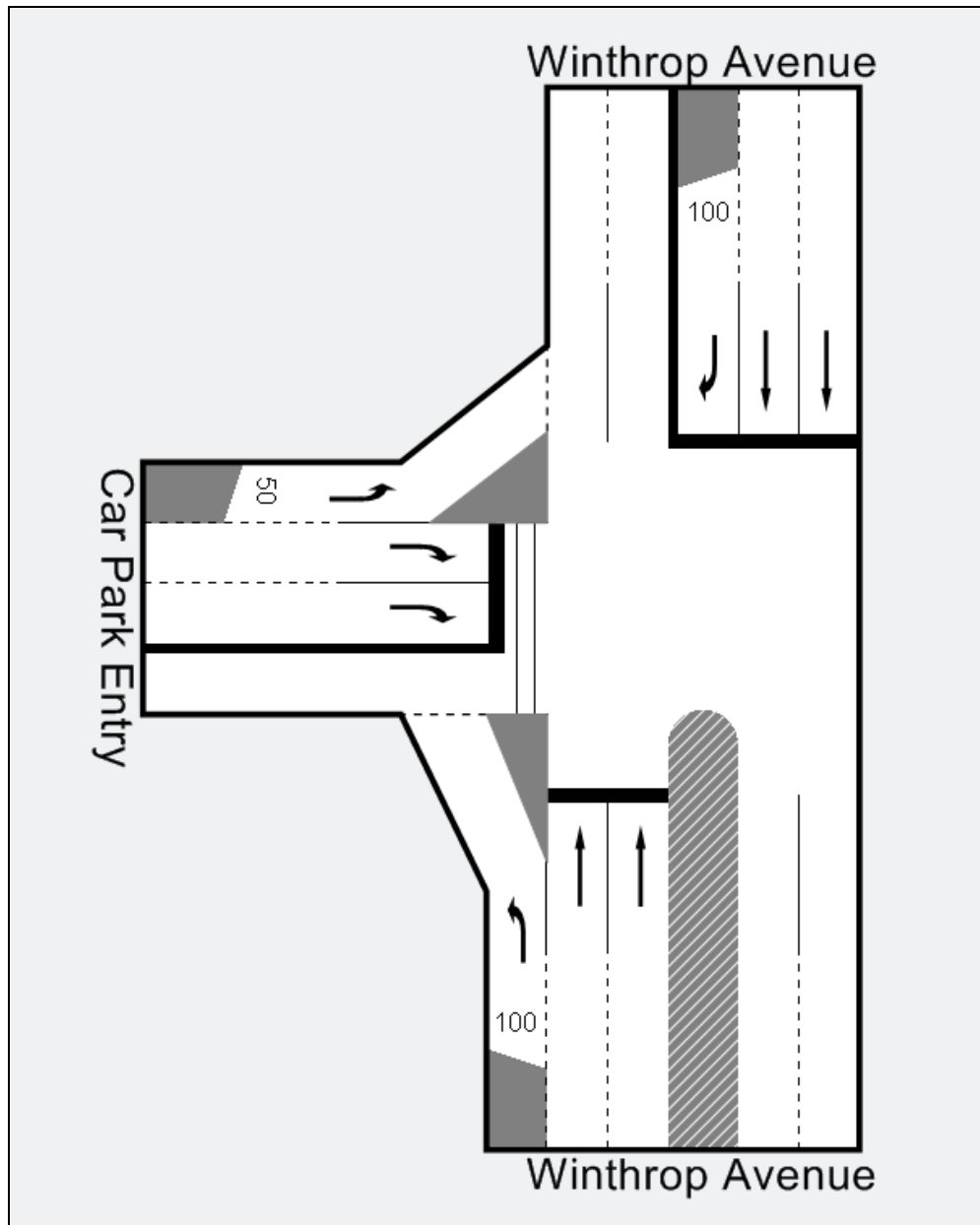
95% Back of Queue (m): Value below which 95% of all observed back of queue lengths fall for a movement.

Table 3: Level of Service Definitions

LOS	Description
A	Very low delay, with extremely favourable traffic progression. Majority of vehicles not needing to stop at all.
B	Minimal delays with good progression and/or short cycle lengths. More vehicles are required to stop than for LoS A.
C	Operations with higher delays, fair progression and/or longer cycle lengths. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Operations influenced by more noticeable congestion. Longer delays may result from some combination of unfavourable progression and long cycle lengths. Many vehicles required to stop.
E	Considered being the limit of acceptable delay. High delay values generally indicate poor progression and long cycle lengths.
F	Operations with excessive delays, which is considered to be unacceptable to most drivers. This condition often occurs when the volume of traffic arriving at the intersection exceeds the capacity of the intersection. Results in poor progression and long cycle lengths.

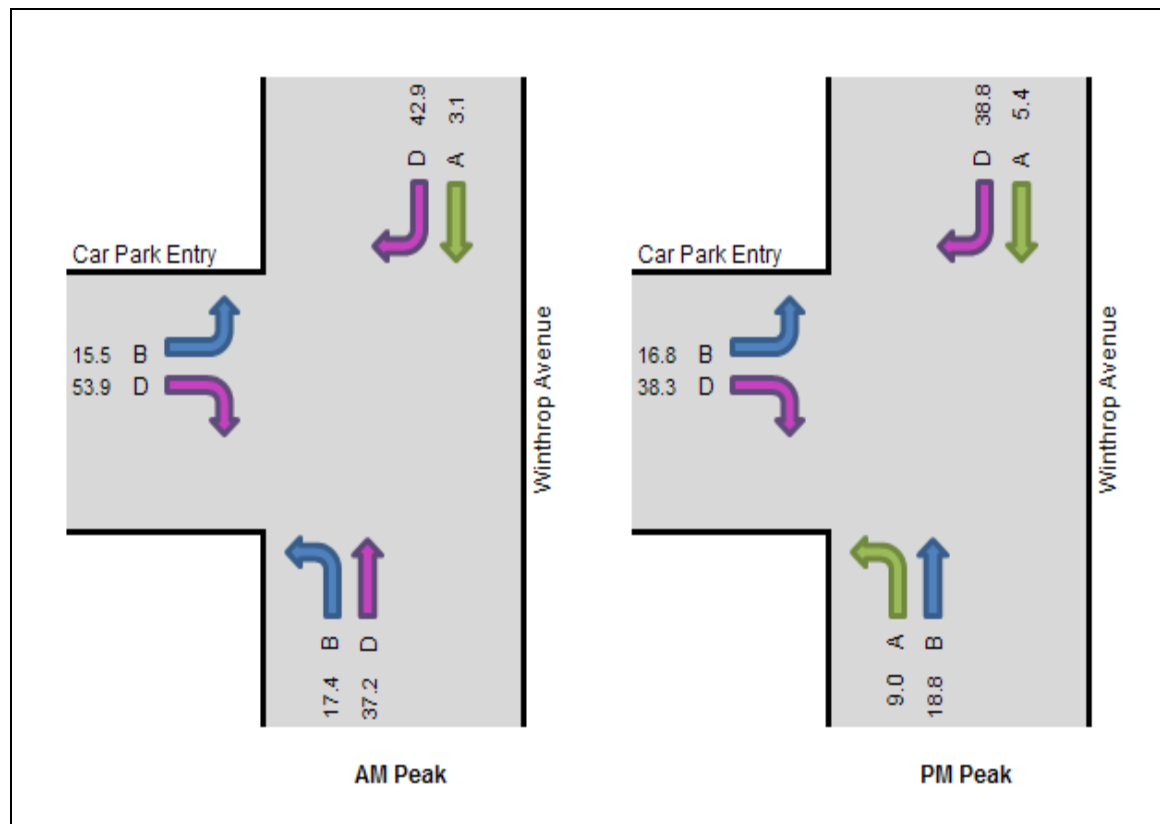
Various intersection configurations were tested to determine which would best suit the predicted 2025 am and pm peak traffic flows. The solution is presented in Figure 2, and illustrates that the intersection would require a left turning bay from Winthrop Avenue South, a right turn bay from Winthrop Avenue North and 2 right turn lanes and one left turn lane from the east-west link road.

Figure 2: Intersection layout – Winthrop Avenue / New Car Park entrance



Using this layout, SIDRA was run and the results are shown in Figure 3. This shows the LoS and average delay (in seconds) for each approach and turning movement.

Figure 3: SIDRA Analysis – Winthrop Avenue / Car Park Entry 2025



The results show an acceptable LoS and operation of the intersection based on the peak hour traffic flows entering the New Car Park and the predicted 2025 flows on Winthrop Avenue.

Operation and Configuration of the East-West Link Road and Car Park Entrance Requirements.

The Australian Standard; Off Street Parking Facilities (AS/NZS2890.1:2004) shows that automatic ticket issue machines with boom gates can handle 300 vehicles per hour per lane. On this basis a minimum of approximately four entry lanes and three exit lanes would be required to accommodate the predicted peak volumes. However due to the east-west link road being short and potential for queuing back onto Winthrop Avenue and additional entry lanes should be provided to reduce the impact of car breakdowns or faults in the boom gates / ticket machines.

To reduce the impact on the east-west link road and the Winthrop Avenue intersection, queuing for entrance to the New Car Park is to be provided within the New Car Park. To accommodate this the ticket machines / barriers should be located a minimum of five car lengths inside the New Car Park.

The overall width between the two car parks should be sufficient to accommodate the roundabout, tow circulating lanes and a three metre clearance between the roundabout and the building facades.

Other requirements include:

- an emergency access point should be provided connecting Hospital Avenue to the east-west link road. This link is for emergency vehicles only and controlled by the use of mechanical bollards or other means.
- a swing type height restriction barrier (or similar) should be located on the east west link road rather than at car park entrances to avoid over height vehicles reversing from the car parks.

Pedestrian Movements from the New Car Park

A full pedestrian movement study was undertaken by SKM in 2010. Using data from the existing car parks it estimated the current pedestrian flows from surveyed 1.13 persons per car for staff and 1.44 persons per car for patients and visitors. The footpath width recommendations were made in order to achieve a LoS of 'B' or better.

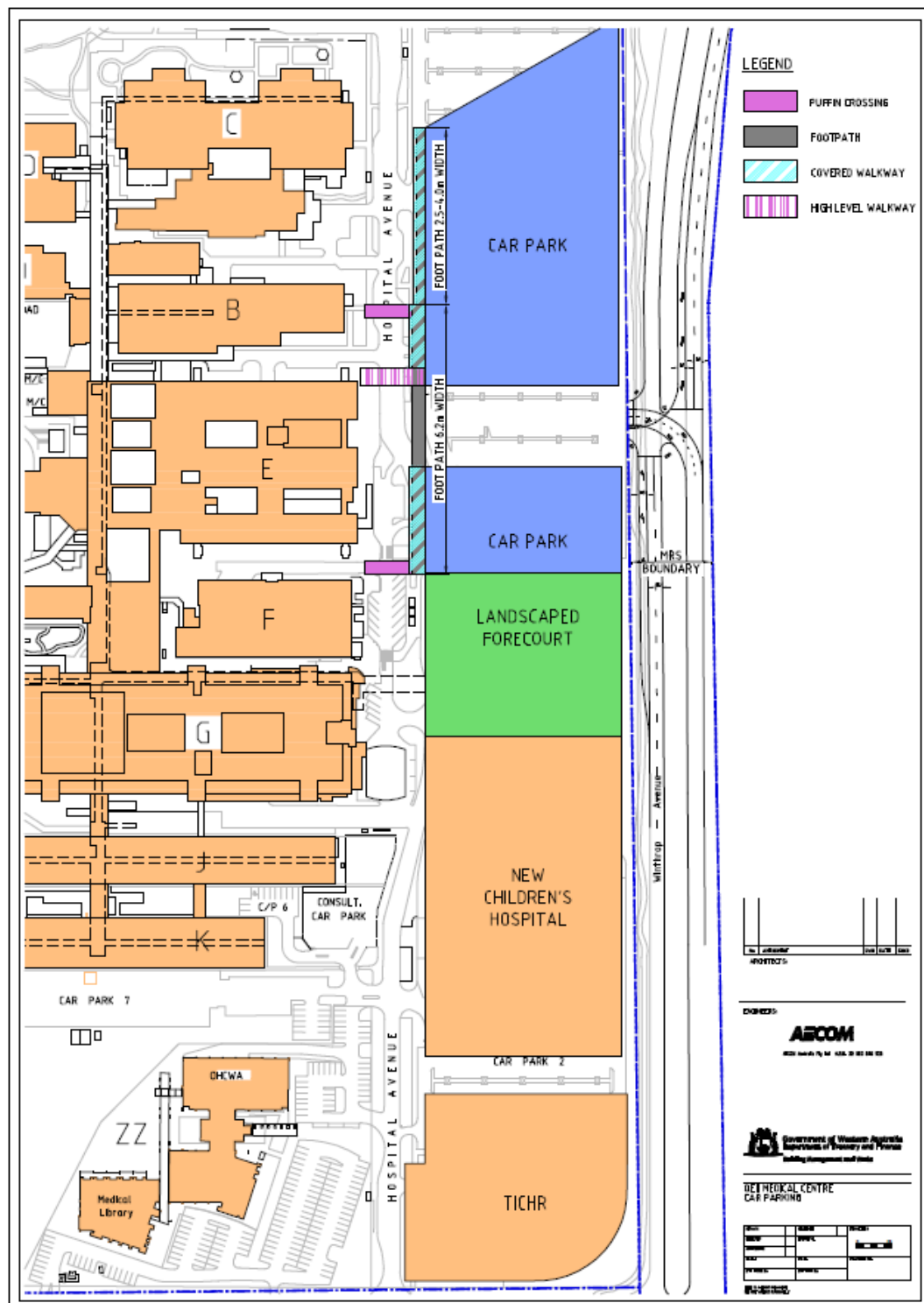
Please note that the SKM study assumed the small car park would hold 1,090 car parks and the larger car park 3,090 bays. This report will need to be considered in the context of Project Co's design and expected patronage of the New Car Park.

Based on the flows produced in the SKM report the following infrastructure recommendations were made:

- footpaths of 2.5m widths on the eastern and western sides of Hospital Avenue. A 4.0m minimum footpath should be provided on the eastern side of Hospital Avenue at least between the pedestrian entrance to the staff car park and the Children's Hospital. Elsewhere along the eastern side a 2.5m footpath would be satisfactory;
- in sections of high pedestrian demand which will also be shared with the shuttle buggy service, footpaths should be increased to 6.2 m. This includes an east-west pedestrian boulevard in line with the landscaped forecourt north of the New Children's Hospital;
- the footpath between the New Car Park and the new Children's Hospital should be sheltered;
- pedestrian operated (puffin) signals outside the staff car park in line with 'B' Block. This is to enable the full width of Hospital Avenue to be crossed in one go;
- pedestrian operated (puffin) signals at the east west pedestrian boulevard (landscaped forecourt) which would also service the transit stop. These signals should permit staged crossing. This crossing should be covered;
- Zebra crossing connecting the Children's Hospital and Women's Hospital. This may not be necessary until the Women's Hospital is built but in the interim would provide direct and safe movement between the Children's Hospital and Ronald McDonald House.

Project Co's responsibilities in relation to these recommendations are depicted in the figure below.

Figure 4: Pedestrian Infrastructure Requirements



22. At-Grade Car Parks

Project Co is required to provide all equipment and machinery required to undertake the collection of Parking Charges, including card readers, boom gates, ticket machines and associated works required to install and commission these elements, as well as any Parking Charge specific signage in the At-Grade Car Parks.

Project Co must survey the retained At-Grade Car Parks and establish what works are necessary. This will encompass:

- provision of all Parking Equipment (including signage);
- power and control to Parking Equipment; and
- maintenance or replacement of existing Parking Equipment.

Cancer Centre Stage 2

Project Co must interface with the Parking Equipment at the Cancer Centre Stage 2. See also *Volume 5 – Additional Information* (Cancer Centre Stage 2) which selected elements of the design documentation for information.

Project Co must include all equipment and machinery required to undertake the collection of Parking Charges, ticket machines and associated works required to install and commission these elements, as well as any Parking Charge specific signage.

New Children's Hospital

Project Co is also required to install the Parking Equipment in the car parking facility at the New Children's Hospital prior to completion of the New Children's Hospital.



Government of **Western Australia**
Department of **Treasury and Finance**
Strategic Projects

Queen Elizabeth II Medical Centre Car Parking Project

Project Number: BMW14583/10

Design Requirements

Part C

Departure Schedule

[Not disclosed]